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September 24, 2021

Ms. Denise Kirkpatrick
Solid and Hazardous Waste Specialist
Montana Department of Environmental Quality
Permitting and Compliance Division
Air and Waste Management Bureau
P.O. Box 200901
Helena, MT 59620-0901

RE: Rail Investigation Area Interim Measure Field Investigation Report – Updated September 2021

Submitted via Montana File Transfer Service with Hard Copy to follow

Dear Ms. Kirkpatrick,

Please find attached Calumet Montana Refining LLC's (CMR) Rail Investigation Area Interim Measure Field Investigation Report (RIAIM Report) which has been updated to reflect our updated understanding of the Conceptual Site Model (CSM). The RIAIM Report presenting the findings from this work was originally submitted to MDEQ in September 2019. Since that time, additional subsurface investigations were conducted on behalf of CMR within or adjacent to the CMR facility. The findings from these investigations resulted in Ramboll US Consulting, Inc. (Ramboll) preparing an update to the CSM which was submitted to MDEQ in June 2021 as an Appendix to the 2020/2021 Annual Groundwater Sampling Summary Report. This updated version of the RIAIM report incorporates the updated CSM that provides an improved understanding of the geology and hydrogeology associated with the site and aid in evaluation of current interim measure activities and scoping of the upcoming of the RCRA Facility Investigation (RFI) at the site. Portions of the attached report that have been modified since the original submittal are denoted by *italicized text*.

The report presents the findings of investigation activities in the East and West Rail Loading Rack Investigation Areas (RIAs) at the CMR property in Great Falls, Montana. The report was developed in response to MDEQ's correspondence dated November 8, 2017 that directed CMR to conduct additional investigative work to determine the extent

and magnitude of contamination in the RIAs. Site investigation activities were performed in accordance with the Rail Investigation Area Interim Measures Work Plan dated November 15, 2018, which was subsequently approved by MDEQ in an approval letter dated January 28, 2019, and Work Plan Addendum dated June 13, 2019, which was verbally approved by MDEQ on June 14, 2019.

Based on the findings of the RIAIM, no additional interim actions are recommended regarding impacted groundwater at this time. The following activities are anticipated to be included as part of the upcoming RFI:

- Characterization of the groundwater quality in the Upper Bedrock Semi-Confined Saturated Zone down-gradient of the East Rail;
- Characterization of the groundwater quality in the Perched Unconfined Saturated Zone down-gradient of the West Rail;
- Abandonment and replacement of one crossed connected monitoring well (MW-91) with one monitoring well cluster to be installed in the Perched and Upper Bedrock Saturated Zones (MW-91S/MW-91D); and
- Installation of one Upper Bedrock Saturated Zone monitoring well (MW-79D2).

If you have any questions or concerns related to the Report, please don't hesitate to call me directly at (406) 454-9887.

Regards,

Joe Dauner

Joe Dauner
Environmental Manager

cc: Jesse Newland, USEPA
Mark Cheesman, CMR

RAIL INVESTIGATION AREA INTERIM MEASURES FIELD INVESTIGATION REPORT

CALUMET MONTANA REFINING, LLC
GREAT FALLS, MONTANA

Originally Issued September 2019
Updated September 2021

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ACRONYM LIST

1,2-DCA	1,2-Dichloroethane
cm/sec	Centimeters per Second
ft^2/day	Square Feet per Day
m^2/sec	Square Meters per Second
mg/kg	Milligrams per kilograms
ACM	Anaconda Copper Mining
AMSL	Above Mean Sea Level
AOC	Area of Concern
API	American Petroleum Institute
AST	Aboveground Storage Tank
bgs	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene and Xylenes
CCR	Current Conditions Report
CH_4	Methane
CMR	Calumet Montana Refining, LLC
COPC	Chemicals of Potential Concern
CSM	Conceptual Site Model
DAF	Dissolved Air Floating
DO	Dissolved Oxygen
DPT	Direct Push Technology
East Rail	East Rail Loading Area
EDR	Environmental Data Resources
EPH	Extractable Petroleum Hydrocarbons
eV	Electron Volt
gpm	Gallons Per Minute
H_2S	Hydrogen Sulfide
HHSs	Human Health Standards
IDW	Investigation Derived Waste
IM	Interim Measures
L	Liter
LCA	Lead Consolidated Area
LIF	Laser-Induced Fluorescence
LNAPL	Light NAPL
M&E	Metcalf & Eddy
MAH	Monocyclic Aromatic Hydrocarbon
MDEQ	Missouri Department of Environmental Quality
MDEQ-7 Standards	Circular MDEQ-7 Montana Numeric Water Quality Standards
mL	Milliliter
MRC	Montana Refining Company
MTBE	Methyl Tertiary Butyl Ether
NAPL	Non-Aqueous Phase Liquids
NFA	No Further Action
NPL	National Priorities List
O_2	Oxygen

Order	Corrective Action Order on Consent
ORP	Oxidation-Reduction Potential
PAH	Polycyclic Aromatic Hydrocarbons
PID	Photoionization Detector
ppm	Parts Per Million
PRG	Preliminary Remediation Goal
PVC	Polyvinyl Chloride
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
Ramboll	Ramboll US Consulting, Inc.
RBC	Risk-Based Concentration
RBCA	Risk-Based Corrective Action
RBSL	Risk-Based Screening Levels
RCRA	Resource Conservation and Recovery Act
RFA	RCRA Facility Assessment
RFI	RCRA Facility Investigation
RIA	Rail Investigation Area
RIAIM	Rail Investigation Area Interim Measures
RSL	Regional Screening Levels
SAP	Sampling and Analysis Plan
SDG	Sample Delivery Group
Site	CMR Facility
SOP	Standard Operating Procedures
SVOC	Semi-Volatile Organic Compounds
SWMU	Solid Waste Management Unit
TEL	Tetraethyl Lead
TOC	Total Organic Carbon
TPH	Total Petroleum Hydrocarbons
USEPA	US Environmental Protection Agency
UVOST®	Ultraviolet Optical Screening Tool
VOC	Volatile Organic Compounds
VPH	Volatile Petroleum Hydrocarbons
West Rail	West Rail Loading Area
WWTP	Wastewater Treatment Plant
yd^3	Cubic Yards

SIGNATORY PAGE

I certify under penalty of law that this document and all attachments were prepared under my direct supervision according to a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature: Wayne A Leiker Digitally signed by Wayne A Leiker Date: 2021.09.20 10:38:27 -06'00'

Name: Wayne Leiker

Title: Vice-President, Calumet Montana Refining, LLC

Date:

EXECUTIVE SUMMARY

The Montana Department of Environmental Quality (MDEQ) directed Calumet Montana Refining, LLC (CMR) (the Site) to conduct additional investigative work to determine the extent and magnitude of contamination at/near the CMR property in Great Falls, Montana, identified at the East and West Rail Loading Rack Investigation Areas [rail investigation areas (RIAs)] in CMR's Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI). MDEQ specifically directed that CMR prepare an Interim Measures (IM) Work Plan for the East and West Rail Loading Racks in correspondence dated November 8, 2017.

CMR submitted a draft RIAIM Work Plan on December 15, 2017, to which MDEQ provided comments on May 15, 2018. Based on those comments, additional discussions, and correspondence, a revised RIAIM Work Plan was prepared and submitted in November 2018. MDEQ approved the revised RIAIM Work Plan in January 2019. Field implementation activities began the week of May 13, 2019, and due to unexpected subsurface conditions encountered in the East Rail Loading Rack Area, an addendum to the RIAIM Work Plan was submitted to MDEQ on June 13, 2019. MDEQ approval to implement the changes detailed in the RIAIM Work Plan Addendum was provided during a teleconference on June 4, 2019.

Pre-rail investigation drilling methods employed at the Site included a combination of direct push, hollow stem auger and air rotary. Previous investigators interpreted borehole refusal as the top of bedrock. Accordingly, the pre-rail investigation Conceptual Site Model (CSM) consisted of unconsolidated sands and/or clayey sands with intermittent silts from ground surface to approximately 5-15 feet below ground surface (bgs) underlain by a competent, red-colored shale bedrock at depths ranging from approximately 3-20 feet bgs with the upper surface of the bedrock somewhat weathered with fractures.

Sonic drilling methods were employed for the first time at the Site in April 2019 to drill and install monitoring wells along the perimeter of the refinery. Three monitoring well boreholes (MW-91, MW-97, and MW-98) drilled just south of the East Rail Loading Rack Area along the Missouri River achieved depths below the top of a dusky red well lithified silt unit.

Additional subsurface investigations have occurred to the east of the refinery at Area of Concern (AOC)-16 along North River Road, south of CMR's truck loading rack. To further understand the lithology that underlies the entire operation of the refinery, Ramboll US Consulting, Inc. (Ramboll), on behalf of CMR, prepared an Updated CSM following an investigation of geologic outcrops along the northern bank of the Missouri River conducted during September 2020. The findings from the geologic outcrop investigation were integrated with previous field investigations, including a review of site-specific geologic literature, boring logs and well construction information, and historic groundwater elevations, down-gradient of the AOC-16 Area along North River Road, West Rail Loading Area (West Rail), East Rail Loading Area (East Rail) and along the Missouri River. The complete updated CSM is presented in the Updated CSM (CMR 2021a) and is included as Appendix A.

The current understanding of the Site's hydrostratigraphy has been incorporated into pertinent sections of this report and are as follows:

- *The **Perched Unconfined Saturated Zone** is a low yield hydrostratigraphic unit present within fill, glaciolacustrine deposits and/or poorly lithified mudstone/siltstone that contain various amounts of fine sand. The top of competent bedrock is encountered and appears laterally continuous across the Site as a dusky-red siltstone. The weathered portion of the dusky-red siltstone is moist and constitutes the base of the Perched Unconfined Saturated Zone. Due to the heterogenous and often re-worked nature of colluvial deposits at the Site, perched groundwater was observed to be discontinuous. Groundwater elevations in the perched hydrostratigraphic unit shows a rapid response to infiltration of surface water from rain and/or snowmelt.*
- *The **Upper Aquitard** which hydraulically separates the overlying Perched Unconfined Saturated Zone and the underlying Upper Bedrock Semi-Confined Saturated Zone is comprised of the dry dusky-red siltstone. This unit is composed of a well lithified siltstone/mudstone interbedded with moderately to well cemented sandstone. The Upper Aquitard is continuous across the Site except for a few locations where it has been either removed by excavation or erosional processes. [1] The low permeable strata of the aquitard impedes the hydraulic communication between the overlying Perched Unconfined Saturated Zone and the underlying Upper Bedrock Semi-Confined Saturated Zone.*
- *The **Upper Bedrock Semi-Confined Saturated Zone** is a low yield hydrostratigraphic unit underlying the Upper Aquitard and is composed of alternating layers of hard massive siltstone and/or shales[2] with fine to very fine sandstone lenses and/or beds.*

The heterogeneous nature of the lithology, stratigraphic occurrence, lateral discontinuity of deposits in these zones, result in limited groundwater movement through the more permeable lenses/layers or bedding planes.

Historical sources of information were reviewed to better understand any contamination identified during this investigation that may be related to past activities in and near the RIA. These historical sources included: spill information dating back to 1981, historical aerial photographs, historical Sanborn Fire Insurance maps and historical topographic maps. Several significant spills were identified that could be a contributing factor to contamination in the RIAs and some potentially relevant activities that could have resulted in subsurface impacts were identified via the historical aerial photographs. In addition, historic releases from the 16 current or former solid waste management units (SWMUs) and AOCs in and

[1] The first stratigraphic unit associated with the fifth member (Kk5) of the Kootenai (i.e., dusky-red siltstone) was not observed at three monitoring wells (MW-11, MW-62, and EB-15/MW-99) likely due to excavation related to the construction of 15th Street Bridge and/or erosional processes. The absence of this unit could provide a more readily available migration pathway for perched unconfined groundwater to the Upper Bedrock Semi-Confined Saturated Zone.

[2] The top of the Upper Bedrock Semi-Confined Saturated Zone is typically observed as a gray siltstone and/or shale.

surrounding the East Rail Area and five current or former SWMUs and AOCs in the vicinity of the West Rail Area are likely contributing to the impacts observed in the RIAs

The extent of light non-aqueous phase liquids (LNAPL) in the RIAs was discovered to be far less than originally believed based on past investigations, particularly the results of the Laser-Induced Fluorescence (LIF)/Ultraviolet Optical Screening Tool (UVOST®) investigation in 2017. In the East Rail Area, LNAPL was present in one of the borings/monitoring wells (EB-03/MW-101) installed as part of this rail investigation and in MW-79S which was replaced as part of this effort. In the West Rail Area, a thin layer of LNAPL accumulated on groundwater in WB-01S and WB-02S which are located nearest to the LNAPL recovery wells MW-73, MW-75, and MW-76.

All significant soil impacts in the RIAs are limited to the perched lithologic zone (i.e., present in the upper 10 feet of heavily reworked material above the Upper Aquitard). In general, hydrocarbon contamination was not observed within the screened interval associated with the Upper Bedrock Semi-Confined hydrostratigraphic unit. Petroleum hydrocarbon groundwater impacts were identified in both the Perched Unconfined Saturated Zone and the Upper Bedrock Semi-Confined Saturated Zone, but to a far lesser degree in the latter. Petroleum hydrocarbon impacts in the East Rail Area are more prevalent in the eastern portion of the area than the western portion.

Groundwater within the Perched Unconfined Saturated Zone does not have an apparent connection to the adjacent Missouri River, nor does there appear to be substantive vertical migration of the groundwater through the dry dusky red Upper Aquitard unit (i.e., decrease in soil moisture content and increase in bedrock competency) to the underlying Upper Bedrock Semi-Confined hydrostratigraphic unit. Groundwater flow in the perched and upper bedrock hydrostratigraphic units is south towards the Missouri River, located directly down-gradient of the Site and may daylight along the riverbank. Based on stratigraphic correlation and elevation data, groundwater in the Upper Bedrock Semi-Confined Saturated Zone may also daylight along the riverbank above the river level and/or may discharge into the riverbank below the level of the river. Hydraulic conductivities measured in the down-gradient wells near the river are quite low and would minimize the volume of impacted groundwater reaching the shoreline.

Based on the results of this and previous investigative work in the RIAs, no additional IM response actions are recommended for groundwater in the East and West Rail Areas at this time and recommended actions are limited regarding LNAPL and soil. Recommended actions in the RIAs are summarized by area below:

EAST RAIL AREA

LNAPL/Source Area

Continue the recovery activities using sorbent socks that are currently installed in MW-97, MW-70, MW-14R and MW-48 in and downgradient of the East Rail. Consider LNAPL recovery activities using sorbent socks at MW-79S and MW-101 if LNAPL thicknesses increase.

Further evaluate the sewer line (SWMU 20) in the vicinity of MW-101S to determine if releases from this sewer line are the source of the LNAPL observed in this well. Impacted shallow soil and groundwater directly adjacent to refueling track pans do not appear to be associated with this well. If confirmed as the source, repair of the sewer line (SWMU 20) in the vicinity of MW-101S is recommended.

Soil

CMR has developed a soil management plan to guide any potential excavation and utility work in the East Rail Area for the purposes of limiting exposure to contaminants by construction workers and to appropriately manage the waste soil generated.

Determine appropriate facility-specific background concentrations in shallow soil as part of the upcoming RFI, with the collection of background samples from unimpacted areas that are representative of natural conditions. The background data collected will be used to evaluate if the elevated inorganic concentrations in the shallow soil horizon are at least in part naturally occurring background levels.

Elevated inorganics concentrations in the shallow soil horizon may in part be due to naturally elevated levels in site soil and/or historic rail operations. The historic rail operations included the transportation of coal and/or ore material through the present-day East and West Rail Areas to the former Anaconda Copper Mining (ACM) Company Smelter and Refinery approximately 1 mile east of CMR, which is currently on the National Priorities List (NPL).

Groundwater

No additional actions are recommended regarding impacted groundwater at this time. The following activities are anticipated to be included as part of the upcoming RFI:

- *Characterization of the groundwater quality in the Upper Bedrock Semi-Confined Saturated Zone down-gradient of the East Rail;*
- *Abandonment and replacement of one crossed connected monitoring well (MW-91) with one monitoring well cluster to be installed in the Perched and Upper Bedrock Saturated Zones (MW-91S/MW-91D); and*
- *Installation of one Upper Bedrock Semi-Confined Saturated Zone monitoring well (MW-79D2).*

WEST RAIL AREA

LNAPL/Source Area

Operation of the existing product recovery system should continue. The system was recently upgraded (October 2020) with the addition of skimmer pumps to replace the total fluid recovery pumps. Further evaluation of potential upgrades related to the system, both the wells and the interceptor trench, to include valving so that product recovery volumes from each well and the trench can be measured separately. Based on the recovery

information, the need for any additional upgrades to the system in this area may need to be assessed.

Soil

CMR has developed a soil management plan to guide any potential excavation and utility work in the West Rail Area for the purposes limiting exposure to contaminants by construction workers and to appropriately manage the waste soil generated.

Determine appropriate facility-specific background concentrations in shallow soil as part of the upcoming RFI, with the collection of background samples from unimpacted areas that are representative of natural conditions. As with the East Rail Area, the background data collected will be used to evaluate if the elevated inorganics concentrations in the shallow soil horizon are at least in part naturally occurring background levels.

Groundwater

No additional actions are recommended regarding impacted groundwater. However, as part of the upcoming RFI CMR it is anticipated that characterization of the groundwater quality in the Perched Unconfined Saturated Zone down-gradient of the West Rail will be included.

1. INTRODUCTION

In correspondence dated November 8, 2017, MDEQ directed CMR to conduct additional investigative work to determine the extent and magnitude of contamination at/near the CMR property in Great Falls, Montana, identified as the East and West Rail Loading RIAs in CMR's RFI. MDEQ specifically directed that CMR prepare an IM Work Plan for the East Rail and West Rail to accomplish the following objectives:

- Investigate soil for impacts to human health (including onsite industrial workers) and the environment;
- Conduct additional groundwater monitoring, including analysis for volatile organic compounds (VOCs), semi-VOCs (SVOCs) and inorganics;
- Further assess the mobility and recoverability of non-aqueous phase liquids (NAPL); and
- Evaluate technologies to address source control, groundwater contamination (both NAPL and dissolved phase) and soil contamination, especially soil above US Environmental Protection Agency (USEPA) Regional Screening Levels (RSL) for industrial workers.

CMR submitted a draft Rail Investigation Area Interim Measure (RIAIM) Work Plan December 15, 2017. In correspondence dated May 15, 2018, MDEQ provided comments to the draft RIAIM Work Plan. Based on those comments, additional discussions, and correspondence, a revised RIAIM Work Plan dated November 2018 was prepared that refined the objectives as follows:

- Assess the mobility and recoverability of LNAPL in the East Rail and West Rail; and
- Evaluate technologies to address source control, groundwater contamination (both LNAPL and dissolved phase) and soil contamination, especially soil above USEPA RSLs for industrial workers.

MDEQ issued an approval letter in response to the November 2018 RIAIM Work Plan. Following kickoff of field activities during the week of May 13, 2019, and initial field observations, an addendum to the RIAIM Work Plan was submitted to MDEQ on June 13, 2019, to address modifications related to the change in drilling equipment and subsurface conditions encountered in the East Rail. CMR informed MDEQ via telephone on June 4, 2019, that due to unexpected subsurface conditions encountered in the East Rail, a field decision was made to change the drilling methodology from direct push technology (DPT) to the use of a Sonic rig. Sonic drilling methods were previously used in April 2019 to drill and install 14 monitoring wells along the perimeter of the refinery as part of the implementation of the January 2019 Revised Site-Wide Groundwater Monitoring Work Plan. Three of the perimeter monitoring wells installed (MW-91, MW-97, and MW-98) are located along the Missouri River just south of the East Rail. At each of these monitoring well locations, a saturated sand unit with petroleum impacted groundwater was present at elevations ranging from approximately 3,310-3,320 feet above mean sea level (amsl) (12 to 25 feet bgs).

Implementation of the investigative activities defined in the RIAIM Work Plan began during the week of May 13, 2019, using a DPT rig in the East Rail. Six DPT soil borings were completed in the East Rail and all encountered refusal at depths ranging from 12-19 feet bgs and achieved a total basal elevation ranging from 3,322-3,325 feet amsl. Because the DPT drilling equipment could not reach the depth interval of the petroleum impacted groundwater zone along the Missouri River immediately to the south of the East Rail Area, a field decision was made to suspend the RIAIM investigation, demobilize the DPT rig and arrangements were made to complete the RIAIM investigation with Sonic drilling equipment.

This RIAIM Field Investigation Report presenting the findings from this work was originally submitted to MDEQ in September 2019. Since that time, additional subsurface investigations were conducted on behalf of CMR within or adjacent to the CMR facility (CMR, 2020a and CMR, 2020d). The findings from these investigations resulted in Ramboll preparing an update to the CSM (CMR, 2021) which had originally been developed from findings of the 2019 RIAIM. This updated version of the 2019 RIAIM report incorporates the updated CSM that provides an improved understanding of the geology and hydrogeology associated with the Site. The Updated CSM Report is included as Appendix A.

Those portions of the updated RIAIM report that have been modified/updated since the original submittal are identified by italicized text.

2. BACKGROUND INFORMATION

The CMR refinery is located at 1900 10th Street in Great Falls, Montana (Figure 1). The Site is bounded on the north by Smelter Avenue NE, on the south by the Missouri River, on the west by 6th Street NE and on the east by 11th Street NE. The refinery produces gasoline, middle distillates, and asphalt for nearby markets in Washington, Montana, Idaho and Alberta, Canada. The refinery has operated in the same location since approximately 1922 when it was owned and operated by the American Refining Company. The refinery ownership has changed hands during its tenure, but most recently was owned by Holly Oil Corporation (operated as Montana Refining Company) from 1984-2006, then by Connacher Oil and Gas Limited of Canada from 2006-2012 and currently by Calumet Specialty Products Partners, LP, who purchased the assets in 2012.

The approximately 87-acre site is improved with numerous structures and processing equipment throughout the property. The RIA encompasses both the West Rail and East Rail that are located south of the refinery process unit and tank farm areas (Figure 2).

2.1 RAIL AREA HISTORY

A RCRA Facility Assessment (RFA) was performed by Metcalf & Eddy (M&E) on behalf of USEPA in 1988 that identified several SWMUs and two AOCs throughout the refinery facility. The 1998 Final Description of Current Conditions Report (CCR) identified seven additional AOCs and the MDEQ Corrective Action Order on Consent (Order) identified an addition three SWMUs and four AOCs for a total of 32 RCRA units.

The locations of SWMUs and AOCs throughout the facility are depicted on Figure 3. The SWMUs and AOCs located within the vicinity or immediately up-gradient topographically of the East and West Rail Areas are as follows:

EAST RAIL AREA (AOC 24 – RAIL LOADING AREA)

- SWMU 1: Diversion Pond (unlined, operational from 1970-1985);
- SWMU 2: Overflow Sump (unlined, operational from 1970-1986);
- SWMU 3: Wastewater Surge Tank (located within SWMU 1);
- SWMU 4: API Separator (used since 1967);
- SWMU 5: Dissolved Air Floating (DAF) Unit (used since 1967);
- SWMU 6: DAF Cone Bottom Tank (located within SWMU 5);
- AOC 10: Tetraethyl Lead (TEL) Building (used until 1995);
- SWMU 11: Past Leaded Sludge Oxidation Area (used in the 1970s, located within SWMU 12);
- AOC 12: Staining Around Tanks 17, 52, 53, 54 (staining associated with nine recorded historical petroleum releases);
- AOC 13: Stained Area East of Former USEPA Well DH-1 (part of AOC 12);

- AOC 17: Asphalt and Heavy Oil Loading Rack (used since 1961);
- SWMU 20: Refinery Sewer System (in use, recorded historical releases);
- AOC 21: Emulsion Mill Area (part of AOC 24);
- AOC 22: Tank 50 Stained Area (inactive, historical asphalt spill);
- AOC 23: Tank 115 and 117 Stained Area and Sump (historical releases of fuel oil and sludge); and
- AOC 32: Tank 48 Spill Area.

WEST RAIL AREA (AOC 33 - Rail Line Expansion Area)

- SWMU 8: Aeration Pond (unlined, operational from 1970-1986);
- SWMU 9: Oxidation Pond (unlined, used from 1970-1986);
- AOC 26: Contaminated Area South of Landfarm (inactive, discolored soil observed 7-10 feet bgs);
- SWMU 27: Lead Pit (later identified during 2001 RFI activities); and
- SWMU 30: Tank 112 Dump Site.

Of the SWMUs and AOCs in the East and West Rail Areas, SWMU 8, SWMU 9 and SWMU 30 were granted no further action (NFA) status in the 2012 Order.

2.1.1 Historical Spills

In an effort to better understand any contamination identified during this investigation, Ramboll reviewed spill information provided by CMR dating back to 1981. Several significant spills were identified that could be a contributing factor to contamination in the rail areas. Only those spills of greater than 1,000 gallons of a material other than asphalt are discussed below:

EAST RAIL AREA

AOC 12 (Staining around tanks 17, 52, 53 and 54)

- 1995: One spill of 6,846 gallons of gasoline;
- 1997: Two spills of gasoline (1,500 gallons and 420 gallons);
- 1998: One spill of 12,600 gallons of gasoline;
- 2000: One spill of 5,250 gallons of gasoline;
- 2001: One spill of 5,712 gallons of gasoline;
- 2013: Spill recorded but no record of amount or material spilled; and
- 2014: One spill of 14,000 gallons of caustic.

SWMU 20 (Refinery Sewer System)

- 2000: One spill of 8,400 gallons of gas oil and water.

AOC 24 (Rail Loading Area)

- 2017: One spill of 1,620 gallons of an unidentified product.

WEST RAIL AREA

SWMU 9 (Oxidation Pond)

- 2001: One spill of 1,500 gallons of asphalt. Overflow went to Tank 50 dike, was contained. One spill of 1,100 gallons of diesel at tanks 127 and 128, drained to the Oxidation Pond.
- 2013: One spill of 1,400 gallons of gas oil. Gas oil is a type of fuel oil that is cheaper than normal road diesel due to it being a rebated fuel used for heating, vehicles, machinery in the construction and agricultural sector.

2.1.2 Other Historical Sources

Ramboll reviewed other historical sources of information that may provide insight into past activities in the rail areas that could have contributed to any impacts observed. Historical aerial photographs were obtained through CMR and a report ordered from Environmental Data Resources (EDR) provided additional historical aerial photographs, historical Sanborn Fire Insurance maps and historical topographic maps. Potentially relevant findings from our review are summarized by rail area in the following paragraphs.

2.1.2.1 Historical Aerial Photographs

The earliest aerial photographic coverage obtained is from approximately 1922. Coverage is more substantial for the East Rail Area than the West Rail Area. Appendix B provides the aerial photographs reviewed for this effort.

EAST RAIL AREA

An undated photo estimated to have been taken between 1922-1933 shows a creek or drainageway discharging to the Missouri River. It originates south of the railroad track but likely is piped subsurface beneath the tracks and portions of the refinery. The location appears to be between the current onsite wastewater treatment plant (WWTP) and the American Petroleum Institute (API) separator/DAF units.

By 1946 it appears that the drainage ditch was dammed as there is a pond at the location of the drainage ditch noted in the 1922-1933 photograph mentioned above.

In the 1953 photograph, the dammed pond referenced above appears to be overflowing to the river.

An undated CMR provided photograph (IMG869), which based on the EDR aerials appears to be from around 1960, shows two impoundments at the current location of the onsite WWTP and two small ponds east of the impoundments and west of the API separator/DAF units. The eastern most of these two impoundments corresponds to SWMU 1 (Diversion Pond). The small pond observed in area of EB-15/MW-99 is still present.

In 1964, the same two impoundments at the current location of the onsite WWTP and two small ponds east of the impoundments and west of the API separator/DAF units. The pond observed in the vicinity of EB-15/MW-99 is no longer present and there appears to be ground disturbance in this area.

By 1975, there are two small ponds located east of the two impoundments at the current location of the onsite WWTP that have been filled. A more pronounced drainage cut-out to the river was observed just south of the current Energy Substation (EDR photograph) located between the East and West Rail Areas.

In the 1984 aerial, there is some small tankage east of the two impoundments. There appears to be standing water south of these tanks perhaps related to a bermed area. This standing water is in the vicinity of SWMU 2 (Overflow Pond/Sump).

By 1990, though still present, it appears that the two impoundments are being decommissioned or refurbished as they appear smaller, and the boundaries are less defined.

A photograph dated February 1995 shows a depression in the vicinity of EB-15/MW-99. What appears to be an elevated rail line or piping run coming from the old rail bridge runs along the southside of the API area and ends at the onsite WWTP. The photograph also shows ponding within the tank berms north of the East Rail Area. A later aerial from 1995 shows that construction of the new bridge across the Missouri River has begun. Construction activities would include additional disturbance in the vicinity of EB-15/MW-99 and elimination of the elevated rail or pipe chase. The west impoundment is still present, but the east impoundment is now circular in nature and appears to be in the current configuration of the open-top SWMU 3 (Wastewater Surge Tank).

By 2006, the west impoundment is not present and in its place is the eastern most of the two current aboveground storage tanks (ASTs) at the onsite WWTP.

In 2013 it looks like a top has been added to SWMU 3 (Wastewater Surge Tank).

WEST RAIL AREA

The first historical aerial photograph that includes coverage of the West Rail Area is from 1975. It shows that SWMU 8 (Aeration Pond) and SWMU 9 (Oxidation Pond) are present north of the area and the city WWTP is present to the south.

Features in the West Rail Area appear to be relatively unchanged until 2006 when SWMU 9 (Oxidation Pond) appears to be dry. By 2009, both SWMU 8 (Aeration Pond) and SWMU 9 (Oxidation Pond) appear dry.

In 2013, both SWMU 8 (Aeration Pond) and SWMU 9 (Oxidation Pond) are being redeveloped for tankage and construction has begun for the aeration basins on the east side of the city WWTP.

2.1.2.2 Sanborn Fire Insurance Maps

Sanborn map coverage is very limited in the East Rail Area and non-existent for the West Rail Area. Coverage is focused on Main Plant and AOC 16 spanning the years from 1950-1965.

2.1.2.3 Historical Topographic Maps

Historical topographic maps provide no additional information related to the East Rail Area but do indicate that the city WWTP south of the West Rail Area was constructed sometime before 1965.

2.2 PREVIOUS INVESTIGATIONS AND REMEDIAL ACTIONS

The Montana Refining Company (MRC) performed site-wide RFI activities in 2004 that included the investigation of several SWMUs and AOCs within the rail areas. The soil results were compared to Residential and Industrial USEPA Region IX Preliminary Remediation Goals (PRGs) and Region III Risk-Based Concentrations (RBCs), used at that time to assist risk assessors and others in initial screening-level evaluations. Groundwater results were compared to PRG and RBC tap water standards and MDEQ Water Quality Circular WQB-7. Relevant findings from this investigation are summarized below:

- SWMUs 1-6 (East Rail Area): Benzene and benzo(a)pyrene above residential RBCs in soil at two locations and no measured concentrations exceeded groundwater standards;
- SWMUs 8 and 9 (West Rail Area): No analytes were measured at concentrations above the relevant standards. As a result, NFA status was received in 2012 without additional investigation;
- AOCs 10, 12, 13 and SWMU 11 (East Rail Area): Metals, polycyclic aromatic hydrocarbons (PAHs) and SVOCs, above soil and groundwater standards.
- AOC 17 (East Rail Area): Two SVOCs and one arsenic concentration exceeded industrial soil PRGs;
- SWMU 2 (East Rail Area): Lead exceeded residential and industrial soil PRGs, arsenic exceeded the residential soil PRG and benzene and 1,3,5-trimethylbenzene exceeded residential and industrial soil PRGs;
- AOC 21 (East Rail Area): No measured concentrations in soil exceeded residential PRGs;

- AOC 22 (East Rail Area): Impacted materials were excavated and disposed offsite in 2000;
- AOC 23 (East Rail Area): Lead, benzo(a)anthracene, benzo(b)fluoranthene and benzo(a)pyrene exceeded residential soil PRGs; benzo(a)pyrene also exceeded the industrial soil PRG;
- AOC 26 (West Rail Area): No measured concentrations in soil exceeded residential soil PRGs; and
- AOC 27 (West Rail Area): Metals, SVOCs and PAHs exceedances in groundwater from a down-gradient well.

MDEQ issued an Order in 2012 based on the results of historical RFI activities and several isolated soil sampling activities performed by MRC during the 2000s.

In June 2012, soil sampling activities identified concentrations of lead, benzene, ethylbenzene, and naphthalene exceeding USEPA industrial RSLs at AOC 32 (East Rail Area).

In July 2012, following excavation of hazardous soil from AOC 31 to address worker exposure concerns from lead; as required by the 2012 Order, AOCs 31-33 were regrouped into a Lead Consolidated Area (LCA) that also included AOCs 10, 12, 13, 22, 23, 25, 27 and SWMU 11. Many of these AOCs and SWMU 11 are potentially associated with observed impacts in the East Rail Area. The LCA was identified as having impacted site groundwater with metals, SVOCs and/or VOCs.

Interim soil removal RFI activities were performed in 2013 and 2014 by CMR to address the contamination associated with the LCA. Over 19,000 cubic yards (yd^3) of impacted soil in the LCA was excavated and disposed offsite. After the soil removal activities, CMR implemented a quarterly groundwater sampling program with samples to be analyzed for RCRA metals and Total Petroleum Hydrocarbons (TPH).

2.3 RECENTLY DOCUMENTED RELEASES

The most recent observed releases were discovered on June 6, 2017, near the West Rail Area and on June 20, 2017, south of the East Rail Area. Emergency response actions were implemented to address the releases due to an observed sheen on the Missouri River. These actions are detailed in the CMR Assessment Report for Rail Investigation and Remediation, August 2017 (Assessment Report, August 2017) and were summarized in the November 2018 RIAIM Work Plan.

Actions within the RIAs included performing a high-resolution site characterization event in an effort to delineate the extent and magnitude of LNAPL located at the West and East Rail Release Areas. The initial LIF/UVOST® investigation was performed starting on June 13, 2017, along the West RIA's north side. This investigation included analysis for fluorescent response at four locations from ground surface to a depth of approximately 9-12 feet bgs. As the UVOST® investigations were performed along the West Rail Release Area, the East

Rail Release Area release was discovered and investigation activities expanded to the East Rail Area.

LIF/UVOST® and DPT investigations continued between June 13 and June 22, 2017. Figures 4 and 5 present portions of the LIF/UVOST® response results for the East and West Rail Areas, respectively. In August 2017, an additional LIF/UVOST® investigation was performed to better delineate the area between the East and West RIAs and to extend the East RIA further east. The data from all three LIF/UVOST® events were composited for continuous spatial and depth analysis as of the August 30, 2017, Assessment Report for Rail Investigation and Remediation (CMR 2017a).

2.3.1 LNAPL Recovery Activities

Based on the results of the LIF/UVOST® investigations, CMR installed 10 additional groundwater monitoring/LNAPL recovery wells in December 2017 and February 2018 to support the ongoing investigation as well as to comply with MDEQ's directive for source control.

Four recovery wells were installed along the East Rail Area in February 2018 (MW-79, MW-80, MW-81, and MW-82) as depicted on Figure 6. Based on the well boring and construction logs each of the recovery wells were drilled to an approximate depth of 15 feet bgs and screened from total depth to 2-3 feet bgs. Little to no LNAPL accumulation was observed in these wells initially though in time a thin layer of LNAPL was reported in MW-79 located on the southside of the rail.

Six recovery wells were installed within the West Rail Area in December 2017 (MW-73, MW-74, MW-75, MW-76, MW-77, and MW-78) as depicted on Figure 7. Based on the well boring and construction logs, each of the recovery wells was drilled to an approximate depth of 10 feet bgs and screened from total depth to 2-3 feet bgs. MW-77 and MW-78 were installed north of the West Rail Loading Rack near the refinery sewer lift station. LNAPL was not found in these two wells before or after development but has been observed occasionally during site-wide groundwater monitoring activities at an approximate thickness of 0.01 feet measured in both wells.

Four of the wells (MW-73, MW-74, MW-75, and MW-76) were installed between the railroad tracks south of the southernmost loading rack. Three of these wells (MW-73, MW-75, and MW-76) exhibited measurable LNAPL thicknesses. During development of the wells several gallons of dark brown to black LNAPL was removed from MW-73 and MW-75 and what was described as red-dyed diesel was removed from MW-76. Following LNAPL transmissivity testing performed on these three wells to evaluate the recoverability of LNAPL in the West Rail Area, total fluids recovery pumps were installed in May/June 2018. *Installation of new skimmer pumps at three recovery wells (MW-73, MW-75, and MW-76) to replace the total fluid recovery pumps occurred in October 2020 has improved LNAPL recovery.*

As part of the initial response action taken in June 2017, a temporary trench system was installed down-gradient from the West Rail Loading Rack Seep Area just north of the city's

WWTP access road. The initial temporary trench installed in June was approximately 1 foot wide and approximately 130 feet long at a depth of approximately 2-4 feet bgs with a vertical sump in the center. Due to additional hydrocarbon seepage to the east a second trench was added to the east in September 2017. The combined length of both trenches is approximately 205 feet. Flow rates from the trenches in September 2017 were estimated at approximately 0.85 gallons per minute (gpm). A pneumatic pump in the trench conveys groundwater and LNAPL to CMR's WWTP (Assessment Report for Rail Investigation and Remediation, Addendum No. 2, dated October 13, 2017).

2.3.2 Historic LNAPL Fingerprinting

CMR collected one sample of LNAPL from MW-70 for carbon screening fingerprinting analysis to evaluate the distillation curves, sulfur content, petroleum hydrocarbon additive chemistry and petroleum hydrocarbon ranges present in the LNAPL. This sample was collected in July 2017 and submitted to Texas Oil Tech Laboratory for fingerprinting analysis. Texas Oil Tech Laboratory analyzed for hydrocarbon fingerprint and an expanded list of monocyclic aromatic hydrocarbons (MAHs) including benzene, toluene, ethylbenzene, and xylenes (BTEX), PAHs and saturated hydrocarbons.

Field observations noted that the LNAPL sample was dark in color. In general, the fingerprinting reported that "Sample MW-70 was a mixture of No. 2 fuel oil or diesel fuel and gasoline (or similar product)". The MW-70 sample also "contained TEL indicating that at least a portion of the gasoline was an historic variant". The presence of TEL in the MW-70 LNAPL sample and the more dominant weathered or heavier fuel oil components in the sample suggests both some evidence from a recent release and influence from historic variant or older LNAPL contamination. The LNAPL fingerprinting analytical report for monitoring well MW-70 is included in Appendix C of this report.

2.4 REGIONAL GEOLOGY AND HYDROGEOLOGY

The North American Cordilleran Orogeny led to the development of the Cordilleran Foreland Basin System and associated sedimentary deposits. These sedimentary deposits have been the focus of CMR geologic investigations. The archetypal collision of the North American Cordilleran fold and thrust belt lies to the west of present-day Great Falls and represents the collision of oceanic and continental lithosphere as the North American Continental Plate overrode the oceanic Kula-Farallon Plate during the Late Jurassic into the Early Cretaceous Period (beginning approximately 150 million years ago) (Reid 2015).

A non-marine, foreland basin system developed to the east of the topographic load of the North American Cordilleran Orogenic Belt, the associated foredeep of the foreland basin system infilled with fluvial and estuarine-dominated sediment deposits during the Early Cretaceous that thinned eastward, away from the collision boundary, meanwhile a forebulge emerged to the east of where the city of Great Falls is located today (Reid 2015).

The fluvial and estuarine deposits of the foreland basin system are dominated by silts and sands of the Kootenai Formation which represents the lithology that underlies the city of Great Falls and the CMR facility. The Kootenai Formation has informally been differentiated

into fifth member (Kk5 – shallowest and youngest), an upper and lower fourth member (Kk4 – older and underlying the Kk5), all of which is underlain by a member known as the Sunburst Sandstone (Reid 2015). These Cretaceous age lithologic units underlying the city of Great Falls are overlain by Pleistocene Deposits associated with the Pleistocene-aged, late-Wisconsin episode of the Laurentide Ice Sheet (Hill and Feathers, 2002).

2.4.1 Pleistocene Deposits

During the Pleistocene, the Keewatin Lobe of the Laurentide Ice Sheet blocked the Missouri River's northern course. (Alden 1932; Wilke 1983). This blockage forced the Missouri River to flow east around the glacier front. The Missouri River's new course eroded an entrenched paleochannel approximately 300 feet deep, along the city of Great Falls' western side, east along the city's southern side and north along the city's eastern side. The glacier dammed the Missouri River and its tributaries east of the city forming Glacial Lake Great Falls.

Tributaries deposited silt and sand near their mouths and clay, silt, and fine sand in the lake's quieter waters. These sediments have been dated at 16,900-14,800 years, indicating a late-Wisconsin episode (Hill and Feathers 2002). As the glacier receded northward, the glacial lake began draining east. Eventually, glacial drift blocked the Missouri River and the river course shifted north, cutting through the glacial and lake deposits south of the Site.

The Site is located on these glacial lake deposits, which overlie the consolidated Kootenai Formation. Lemke (1977) calls these sediments Deposits of Glacial Lake Great Falls. Lemke (1977) describes two subunits as an upper stratigraphic unit consisting predominantly of non-plastic fine sand and silt and a lower stratigraphic unit consisting mostly of laminated to non-laminated plastic clay and minor amounts of silt. The Pleistocene deposits are generally saturated but yield minimal quantities of water to wells because of their low hydraulic conductivity (Wilke 1983).

2.4.2 Kootenai Formation

Underlying the Pleistocene glacial lake deposits is the Cretaceous-age Kootenai formation that has been differentiated into the fifth (upper) and fourth (lower) members. The fifth member is distinguished by red-weathered mudstone that contains lenses and beds of brownish-gray and greenish-gray, cross-bedded, micaceous sandstone, and light gray nodular limestone concretions. The lower part contains a dark-gray shale and lignite bed with a significant pre-angiosperm flora. Thickness of the fifth member is estimated to be approximately 230 feet (Reid 2015). Maughan and Lemke (1991) describe the sandstone bodies in the upper member as averaging approximately 7 feet thick, soft and friable except for local calcareous cementation and consisting predominantly of quartz and chert with some clay grains. Wilke (1983) and Lemke (1977) indicated that perched groundwater is generally present in the upper member although the sandstone beds tend to be discontinuous and less productive aquifers. The bottom of the Kootenai formation's upper member is estimated to occur at 60-100 feet bgs near the Site.

The upper strata of the fourth member of the Kootenai Formation, which directly underlies the fifth member, has been identified as brownish-gray limestone and interbedded shale. The limestone contains ostracods and brackish water dinoflagellates (Burden 1984). The lower portion of the fourth member of the Kootenai Formation has been identified as sandstones interbedded with very dark reddish-brown mudstones that contain brackish water dinoflagellates (Burden 1984). The sandstones of the lower portion range from dusky-red to pale reddish-brown, fine to medium-grained, platy, thin to medium-bedded. Large channels cut through the lower portion of the fourth member unit and channel fill has been observed to be mudstone, interbedded sandstone and mudstone, or sandstone deposits (Hopkins 1985). Wilke (1983) describes several sandstone aquifers within the Kootenai Formation lower member in the city area. The approximate thickness of the fourth member of the Kootenai Formation has been estimated to be as much as 200 feet.

2.4.3 Site Geology and Hydrogeology

Previous investigation activities at the CMR facility have documented the presence of unconsolidated Pleistocene fluvial and lake deposits and various fill material at the ground surface immediately beneath the Site. These surficial units have been encountered at variable depths across the Site that range as much as 10-20 ft bgs. The fifth member of the Kootenai formation is encountered sitewide immediately beneath the surficial Pleistocene deposits and/or fill material. Based on the current understanding of the Site's geology, an updated CSM, included in Appendix A, identified two distinct hydrostratigraphic units that have been encountered at depth across the Site and overlie the shallowest potable aquifer present in the Great Falls area (Sunburst Sandstone Semi-Confined Aquifer) and regional limestone aquifer (Confined Madison Aquifer). The current understanding of the Site's hydrostratigraphy has been incorporated into the geologic and hydrogeologic understanding of the RIA's presented later in this report and is as follows:

- *The **Perched Unconfined Saturated Zone** is a low yield hydrostratigraphic unit present within fill, glaciolacustrine deposits and/or poorly lithified mudstone/siltstone that contain various amounts of fine sand. The top of competent bedrock is encountered and appears laterally continuous across the Site as a dusky-red siltstone. The weathered portion of the dusky-red siltstone is moist and constitutes the base of the Perched Unconfined Saturated Zone. Due to the heterogenous and often re-worked nature of colluvial deposits at the Site, perched groundwater was observed to be discontinuous. Groundwater elevations in the perched hydrostratigraphic unit shows a rapid response to infiltration of surface water from rain and/or snowmelt.*
- *The **Upper Aquitard** which hydraulically separates the overlying Perched Unconfined Saturated Zone and the underlying Upper Bedrock Semi-Confined Saturated Zone is comprised of the dry dusky-red siltstone. This unit is composed of a well lithified siltstone/mudstone interbedded with moderately to well cemented sandstone. The Upper Aquitard is continuous across the Site except for a few*

locations where it has been either removed by excavation or erosional processes. [3] *The low permeable strata of the aquitard impedes the hydraulic communication between the overlying Perched Unconfined Saturated Zone and the underlying Upper Bedrock Semi-Confined Saturated Zone.*

- *The **Upper Bedrock Semi-Confined Saturated Zone** is a low yield hydrostratigraphic unit underlying the Upper Aquitard and is composed of alternating layers of hard massive siltstone and/or shales*[4] *with fine to very fine sandstone lenses and/or beds.*

The geologic and hydrogeologic conditions in the RIAs obtained from May to June 2019 investigative work, as well as other investigative and remedial work conducted in this area, are presented in Section 4 of this report. The Sitewide CSM is provided as Appendix A.

[3] The first stratigraphic unit associated with the fifth member (Kk5) of the Kootenai (i.e., dusky-red siltstone) was not observed at three monitoring wells (MW-11, MW-62, and EB-15/MW-99) likely due to excavation related to the construction of 15th Street Bridge and/or erosional processes. The absence of this unit could provide a more readily available migration pathway for perched unconfined groundwater to the Upper Bedrock Semi-Confined Saturated Zone.

[4] The top of the Upper Bedrock Semi-Confined Saturated Zone is typically observed as a gray siltstone and/or shale.

3. FIELD ACTIVITIES

Field activities during the CMR RIAIM Field Investigation took place Thursday, May 16, 2019, through Wednesday, July 3, 2019. The field investigation was completed in response to MDEQ correspondence dated November 8, 2017, requesting additional investigative work to determine the extent of soil and groundwater contamination identified at the East and West Rail Loading Rack Investigation Areas. Field activities at the Site included soil boring advancement, monitoring well installation, soil sampling, groundwater sampling and hydrogeologic testing. All field activities were completed in accordance with the November 2018 RIAIM Work Plan and June 2019 RIAIM Work Plan Addendum. Weather conditions at the Site featured temperatures ranging from 55-85°F under partly cloudy to sunny skies.

3.1 SOIL BORING ADVANCEMENT

A total of 44 soil borings were installed during the field investigation: 21 in the East Rail Area [EB-01 (replacement wells MW-79S and MW-79D), EB-02, EB-03S (MW-101), EB-03D, EB-04S (MW-100), EB-04D, EB-05S, EB-05D, EB-06S, EB-06D (replacement wells MW-81S and MW-81D), EB-07S, EB-07D, EB-09S, EB-09D, EB-10, EB-11S, EB-11D, EB-14S, EB-14D and EB-15 (MW-99)], as depicted on Figure 6 and 23 in the West Rail Area (WB-01S, WB-01D, WB-02S, WB-02D, WB-03S, WB-03D, WB-04S, WB-04D, WB-05S, WB-05D, WB-06S, WB-06D, WB-07, WB-08, WB-09S, WB-09D, WB-11D, WB-12S, WB-12D, WB-13S, WB-13D, WB-14S and WB-15), as depicted on Figure 7.

Cascade Drilling was contracted to install soil borings in the East Rail and West Rail Areas and completed over the course of two distinct field events. The first field event was conducted from May 16-20, 2019, using a Geoprobe 3230DT DPT drill rig. The second field event was conducted from June 6-25, 2019, using a Boart Longyear BL100C Sonic drill. The switch from DPT to Sonic drilling was necessitated by difficulties encountered during DPT drilling, in which the DPT tooling was unable to advance past 19 feet bgs through a dry dusky red unit (i.e., siltstone and/or mudstone), which was encountered approximately 6-15 feet bgs. A Sonic rig was utilized during the second field effort to advance subsequent soil borings further into and beyond the dry dusky red unit and to isolate the shallow water bearing zone from any deeper water bearing zones for groundwater sampling and hydrogeologic testing[5].

It should be noted that there were a few minor deviations from the boring locations in the Work Plan originally submitted to MDEQ. Table 1 provides a summary of the revised drilling and sampling program. In the East Rail Area, EB-12, and EB-13, which were originally identified as soil borings to be converted to permanent monitoring wells, were removed from the field investigation due to site infrastructure (tank berm height) and the proximity of existing down-gradient permanent monitoring wells MW-91, MW-97 and MW-98. An additional down-gradient soil boring, EB-15, was added to the field investigation and installed outside the Site fence, in the grassy embankment approximately 75 feet east of

[5] The drilling scope was expanded to greater depth due to the elevated photoionization detector (PID) readings observed in the relatively dry dusky red silt at depth below the shallow water bearing intervals and the presence of water bearing strata below the red dusky silt/clay in MW-97 and MW-98 located to the south of the East Rail Rack Area near the Missouri River.

MW-11. No adjustments were made to the proposed soil boring locations in the West Rail Area.

All drilling tooling and equipment was decontaminated at the decontamination station setup near the Site wastewater treatment drain prior to and following the installation of each soil boring. Investigation derived waste (IDW), including soil cuttings and drilling water, was containerized in metal 55-gallon drums, which were labeled and staged onsite in a location designated by CMR staff for waste characterization sampling and appropriate disposal.

3.2 MONITORING WELL INSTALLATION

Five soil borings were converted to permanent monitoring wells: EB-01 to nested pair MW-79S and MW-79D, EB-06 to nested pair MW-81S and MW-81D, EB-04S to MW-100, EB-03S to MW-101 and EB-15 to MW-99. The nested pairs of MW-79S and MW-79D (EB-01) and MW-81S and MW-81D (EB-06) were installed to replace MW-79 and MW-81, which were abandoned June 5-6, 2019, along with MW-80 and MW-82 due to poor condition (well screen seal damaged/removed during installation of flush mount well vaults). Monitoring well couplets MW-79S/MW-79D and MW-81S/MW-81D were designed to differentiate between shallow and deep soil and groundwater impacts immediately down-gradient of the East Rail Rack Loading Area. MW-100 (EB-04S) and MW-101 (EB-03S) were designed to function as source area monitoring points. These soil borings were identified as monitoring well locations due to the presence of free phase product observed in the soil core in EB-04S and soil core and groundwater in EB-03S. MW-99 (EB-15) was installed outside the Site fence to serve as a side/down-gradient monitoring location. This monitoring well was placed down-gradient of the East Rail Area Loading Rack and side-gradient from MW-97, which is impacted with dissolved and free phase product.

Monitoring wells were installed with 2-inch diameter, schedule 40 Polyvinyl Chloride (PVC) riser connected to 2-inch diameter, Schedule 40 PVC screen with 0.01-inch mill slots. Filter pack sand and bentonite chip screen seal were installed in the annular space between the borehole and PVC casing as the drill tooling was slowly removed from the borehole.

3.3 SOIL SAMPLING

Soil samples were collected from the 44 boring locations advanced along the East and West Rail Areas during both drilling mobilizations. A total of 60 soil samples were collected throughout the investigation for laboratory analysis: 32 from the East Rail Area [eight surface (0-2 feet bgs) and 24 subsurface (>2 feet bgs)] and 28 samples from the West Rail Area (four surface and 24 subsurface). A total of 17 geotechnical samples were collected as part of the investigation: 6 from the East Rail Area and 11 from the West Rail Area.

The soil borings were advanced to depths ranging between approximately 5-40 feet bgs utilizing DPT with a Geoprobe drill rig with a 2-inch diameter drive rod and a Sonic drill rig with 6.25-7. 25-inch drill steel. Soil samples were continuously collected from each boring and divided for field screening, laboratory analysis and in-field classification (noting soil

types, moisture, grain size distribution, color and staining or odors, if any). The soil samples were field screened for the presence of VOCs, methane (CH_4), oxygen (O_2) and hydrogen sulfide (H_2S) using a calibrated RKI GX-6000 PID equipped with a 10.6 electron volt (eV) lamp. The PID was calibrated in the field according to manufacturer's instructions, using four gas standard and air (zero gas) and checked between each screening event for proper response. Soil descriptions and PID readings are presented on the soil boring logs, which are included as Appendix D.

All soil samples collected for laboratory analysis were placed in sterile, laboratory provided bottleware and placed in a cooler with ice. Soil samples submitted for laboratory analytical testing were shipped overnight to Shealy Environmental Services, Inc. Analytical Laboratory in Columbia, South Carolina, for analysis of VOCs by EPA Method SW8260B, SVOCs by EPA Method SW8270D, volatile petroleum hydrocarbons (VPH) by MDEQ VPH, extractable petroleum hydrocarbons (EPH) by MDEQ EPH and dissolved metals by EPA Method SW6020B. Relatively undisturbed soil Geotechnical samples were collected at the time of drilling with the DPT drill rig using the core barrel sampler and acetate liners and Shelby tube samplers were driven into the ground to extract soil samples using the Sonic drill rig. Due to depth limitations due to difficult drilling, two samples were collected in the liner bag used inside the 6.25-inch steel casing driven by the Sonic drill rig [CMR-EB07 (deep) 17-18 and CMR-EB11 22. 5-23.5]. The geotechnical samples were kept refrigerated until the time of shipment, when they were placed in a cooler with ice. Geotechnical samples were shipped via FedEx ground to Core Lab in Bakersfield, California, for grain size analysis, moisture content, dry bulk density, porosity, total organic carbon (TOC) and fractional organic carbon analysis. Laboratory reports for the geotechnical samples are included as Appendix E.

3.4 GROUNDWATER SAMPLING

Groundwater samples were collected from temporary monitoring wells and newly installed permanent monitoring wells in the East and West Rail Areas. A total of 35 groundwater samples were collected during the investigation: 16 from the East Rail Area and 17 from the West Rail Area. Temporary monitoring wells were installed at selected soil boring locations by placing 2-inch diameter, schedule 40 PVC riser and a 5-foot section of 2-inch diameter, Schedule 40 PVC screen with 0.01-inch mill slots in the open borehole. No filter pack or seal material was installed in the annular space between the PVC casing and the wall of the borehole. Prior to setting the deep temporary wells the outer drill casing had been set to approximately 10-20 feet bgs (the inner casing removed soil to the appropriate depth and was extracted leaving the outer casing in place to set the well and isolate the sample interval). A Geotech Geopump™ peristaltic pump was used to purge each temporary well approximately 30 minutes prior to sampling, or until turbidity decreased. A Horiba U-52 multiparameter water meter equipped with a flow cell was used to measure the following water quality parameters prior to sample collection: temperature, pH, oxidation-reduction potential (ORP), conductivity, turbidity, and dissolved oxygen (DO). Groundwater water quality parameters were not collected for temporary wells with observable groundwater impacts, such as sheen or hydrocarbon odor (EB-05 and EB-06) or small water column lengths (EB-04D and EB-14). An electronic oil/water interface meter

was used to gauge water levels during sampling. Groundwater grab samples were collected from temporary monitoring wells using a Geotech Geopump™ peristaltic pump.

Newly installed MW-79S and MW-79D (EB-01), MW-81S and MW-81D (EB-06), MW-99 (EB-15) and MW-100 (EB-04S) were sampled using low flow groundwater sampling procedures in accordance with the Sampling and Analysis Plan (SAP) and MDEQ Groundwater Sampling Guidance. Monitoring wells were developed prior to sampling with a submersible pump. Monitoring well development continued until at least three column volumes had been purged or until purged dry at least three times. Purged groundwater was offloaded into the facility wastewater treatment system following the completion of monitoring well development and groundwater sampling activities. A groundwater sample was not collected from monitoring well MW-101 (EB-03S) due to the presence of LNAPL.

All groundwater samples were placed in sterile, laboratory-provided bottleware and placed in a cooler with ice. Groundwater samples were shipped overnight to Shealy Environmental Services, Inc. Analytical Laboratory in Columbia, South Carolina, for analysis of VOCs by EPA Method SW8260B, SVOCs by EPA Method SW8270D, VPH by MDEQ VPH, EPH by MDEQ EPH and dissolved metals by EPA Method SW6020B. An inline 0.45 micron single-use nitrocellulose filter was used to field filter groundwater samples for dissolved metals analyses.

3.5 LNAPL SAMPLING

LNAPL samples were collected from temporary monitoring wells and newly installed permanent monitoring wells in the East and West Rail Areas using a peristaltic pump and clean disposable tubing, where the intake was placed near the top of the layer of LNAPL to reduce the amount of groundwater collected. The LNAPL/water mixture was placed in sterile, laboratory-provided bottleware allowing the LNAPL to separate from the water. LNAPL was pipetted into a 20-milliliter (mL) vials and shipped in accordance with the "excepted quantity" requirements. Ramboll collected LNAPL samples during this investigation and subsequently during groundwater sampling events in 2020, as follows:

- During this investigation, LNAPL samples were collected from temporary monitoring wells from two locations (WB-01S and WB-02S) in the West Rail Area and a newly installed permanent monitoring well in the East Rail Area (EB-03S/MW-101) on June 24, 2019, and July 3, 2019, respectively. LNAPL samples were shipped to SGS North America Inc. in Houston, Texas, for analysis of total sulfur content (ASTM D2622), relative density (ASTM D4052), boiling range distribution (ASTM D7169) and light hydrocarbons in stabilized crude oils (ASTM D7900).

- *LNAPL samples were also collected during the 1st Quarter 2020 (MW-97 and MW-101) and 3rd Quarter 2020 (MW-79D) groundwater sampling events (CMR, 2020b and CMR, 2020c). These samples were analyzed for saturated hydrocarbons by pyrolysis-gas chromatography using a flame ionization detector (GC/FID) by Core Laboratories in Bakersfield, California. An additional compositional analysis performed of the C5-C34 fraction for MW-79D provided further understanding of the type of LNAPL observed at each sample location compared to site specific refined*

products. [6] Details of the pyrochromatography analysis are discussed in Section 6.2.3.2 and located in the 3rd Quarter 2020 Groundwater Sampling Report (CMR, 2020c).

3.6 HYDROGEOLOGIC TESTING

3.6.1 Slug Testing

Slug tests were conducted in temporary well and permanent monitoring well locations to estimate hydraulic conductivity across the East and West Rail Areas. A total of 20 locations were slug tested: 14 in and down-gradient from the East Rail Area (EB-01/MW-79S, EB-01/MW-79D, EB-06/MW-81S, EB-06/MW-81D, EB-07S, EB-07D, EB-09D, EB-10, EB-11, EB-15/MW-99, MW-11, MW-91, MW-97, and MW-98) and six in the West Rail Area (WB-03S, WB-03D, WB-07, WB-09S, WB-11D and WB-13D). Slug test locations during the investigation were identified based on test feasibility (sufficient water column and length to complete test).

All temporary and permanent monitoring well locations were developed prior to slug testing. Temporary wells were developed and purged by removing approximately 1.5 gallons of water with a peristaltic pump (200 mL/minute for 30 minutes) prior to groundwater grab sample collection. Temporary wells converted to monitoring wells were developed and purged with a submersible pump prior to low flow groundwater sampling, in accordance with the RIAIM Work Plan.

Three slug initiation test methods were initially utilized: pneumatic, submersible pump and bailer. Slug test initiation methodology changed in response to the switch from DPT to Sonic drilling as a result of field conditions encountered during the initial field effort and operational issues with the pneumatic equipment. The pneumatic initiation method was attempted at temporary well locations EB-07-S and EB-11, which were completed with DPT during the initial field effort but due to equipment problems the results were questionable[7].

A submersible pump was used to initiate slug tests in EB-09D and EB-07D during the second field effort completed with Sonic drilling. The pump was placed at the bottom of the temporary well and used to remove approximately 4 gallons of water [3 liters (L)/minute for 5 minutes], causing an initial displacement of approximately 2 feet. Depth to water measurements were measured manually with an electronic oil/water interface meter.

The majority (16) of the slug tests were initiated by removing groundwater from the water column with a single 3 foot by 1.5-inch disposable polyethylene bailer during the second field effort completed with Sonic drilling. The calculated initial displacement based on the

[6] Site-specific crude oil fractionation/refined petroleum products at CMR are, as follows: C1-C5 (natural gas), C5-C11 (gasoline), C6-C11 (petroleum naphtha), C10-C14 (kerosene/paraffin), C11-C18 (diesel oil), C18-C25 (lubricating oil), C20-C27 (fuel oil), C25-C30 (grease/waxes) and greater than C30 (bitumen).

[7] The Geoprobe System® Pneumatic testing kit pressurizes the inside of the drill rod, forcing groundwater out of the screen. Subsequently releasing the pressure allows the groundwater back into the drill rod screen to facilitate a rising-head slug test. Water levels are monitored with water level transducers placed downhole prior to test initiation.

bailer dimensions is 0.28 gallons or 1.7 feet of water in a 2-inch diameter well casing. Approximately half of the bailer-initiated slug tests were within 75% of the calculated initial displacement, indicating optimal slug test initiation. The disparity between the calculated and observed initial displacement in the remaining half of the bailer-initiated slug tests is likely attributable to small water column length, partial filling of the bailer, or temporary well construction (absence of filter pack in the annular space between the 2-inch PVC well casing and the 7-inch borehole). Water level transducers (Solinst Levelogger® 3001) and a barometric pressure transducer (Solinst Barologger® 3001) were used to measure and correct water levels for barometric pressure fluctuations. Water level and barometric pressure data were collected in 5 second sampling intervals.

All slug tests were run to near completion (heads within 5% of initial static water level) to the extent practicable. All equipment, including electronic oil/water interface meters and transducers, was decontaminated prior to and following the completion of each slug test. A new disposable polyethylene bailer was used to conduct each bailer-initiated slug test.

Slug test water level response data were processed in AQTESOLV software (HydroSOLVE, Inc.) to estimate hydraulic conductivity (K). Data were processed and analyzed in accordance with the Field Guide for Slug Testing and Data Analysis (Midwest Geosciences Group) and the RIAIM Work Plan. The Bouwer and Rice and KGS curve fitting models (unconfined) were used to generate a best-fit line through the slug test water level response data and estimate a K-value for each test location.

3.6.2 LNAPL Baildown Testing

A LNAPL baildown test was completed to assess LNAPL transmissivity. The LNAPL baildown test was conducted in the East Rail Area at MW-101 (EB-03S) since this was the only location in the East Rail Area with sufficient LNAPL thickness (0.72 feet) to conduct a baildown test. No LNAPL baildown tests were completed in the West Rail Area due to insufficient LNAPL thickness in locations with measurable LNAPL (0.04 feet in both WB-01S and WB-02S). The LNAPL baildown test was completed in accordance with Ramboll standard operating procedures (SOPs) in the SAP. A Geotech Geopump™ peristaltic pump was used to initiate the LNAPL baildown test in MW-101 by removing all LNAPL to the extent practicable. An electronic oil/water interface meter was used to gauge water and LNAPL levels in the well during the recovery period of the test. Fluid levels were gauged in the well until the test was run to completion and the LNAPL thickness had recovered to within 90% of the original gauged thickness.

LNAPL baildown test data were processed and analyzed using the API LNAPL Transmissivity Workbook for Microsoft Excel™. The Bouwer and Rice (1976) and Cooper and Jacob (1946) methods were used to estimate LNAPL transmissivity.

4. GEOLOGY AND HYDROGEOLOGY

As discussed in Section 2.4.3, the Site's geology consists of unconsolidated Pleistocene fluvial and lake deposits and various fill material overlying the fifth member of the Kootenai Formation. Two distinct hydrostratigraphic units were encountered during this investigation. Specific and relevant findings for the Site's geology and hydrogeology are summarized in the sections below and provide support to the Site's Conceptual CSM provided in Appendix A. Cross sections were generated to depict the geology beneath the East Rail in Figures 8, 9A, 9B and 9C and the West Rail in Figures 10, 11A and 11B. A typical stratigraphic column schematic for the Site is presented in Figure 12. Borings logs are provided in Appendix D.

4.1 GEOLOGY

4.1.1 Surficial Deposits

In general, the surficial topography of the RIAs slope from east to the west and to the south towards the Missouri River. The West Rail investigation area and borings installed along the Missouri River are typically lower topographically than the those installed at the East Rail.

The surficial geologic conditions of the East Rail and West Rail Areas are heterogeneous and discontinuous in nature. Approximately the top 10 feet of material is composed of fill and/or reworked native material consisting of gravel with varying amounts of sand, silt, and clay with overall grain size fining with depth. Where present, staining was typically observed within the first 5 feet of material and strong hydrocarbon odor was typically noted within the upper 10 feet. Boring location EB-15 (converted to MW-99) was advanced offsite, adjacent to the river walk near the 10th Street NE bridge and is the one exception that demonstrated fill material to a depth of almost 20 feet bgs. The presence of fill was illustrated by an asphalt cobble identified at 19.5 feet bgs (approx. 3305 feet amsl). Based on fill typically extending to a maximum depth of approximately 10 feet bgs within the RIAs, the depth of fill material at this location is likely attributed to excavation activities associated with the construction of the 10th Street NE bridge and/or erosional processes along the Missouri River. Borings advanced within the drainage ditch immediately south of the West Rail or at the adjacent southern property boundary of the WWTP only noted fill materials within the first 1-5 feet bgs.

4.1.2 Weathered Bedrock

The shallow fill material at East Rail and West Rail is immediately underlain by a unit composed of primarily fine sand, silt, and clay, which is interpreted as the top of weathered and/or fractured bedrock. Direct push drilling was employed at the beginning of the rail investigation along the East Rail and capable of advancing through the surficial fill material into the underlying weathered and/or fractured bedrock to approximately 3,321-3,326 feet amsl before encountering refusal. The material at the depth of refusal (using direct push technology) was predominately composed of dusky-red siltstone or interbedded silt and clay (i.e., siltstone and/or mudstone) that featured horizontal fracturing. Based on the lithologic observations and the capability of DPT to advance into this unit, the approximate depth of refusal has been interpreted as the top of competent bedrock.

At the East Rail, the top of weathered bedrock was a thin gray siltstone overlying a thicker sequence of a dusky-red siltstone, whereas the dusky-red siltstone was the first lithologic unit encountered at the West Rail beneath overlying fill material. The dusky red unit featured weak to strong laminations. The dusky-red unit was not observed at EB-15/MW-99, as shown on the cross-sections depicted on Figure 9A. The absence of this unit is likely related to either mechanical removal during bridge construction and/or erosional processes.

4.1.3 Competent Bedrock

Deeper borings were advanced into the top of competent bedrock using sonic drilling methods, which provided meaningful insights into the differing bedrock stratigraphic units and the vertical extent of hydrocarbon contamination. The top of competent bedrock was based upon the refusal depth of DPT borings (at the East Rail), increased stiffness/density and a precipitous decline in hydrocarbon impacts (i.e., PID readings).

The top of competent bedrock was identified as either a dusky-red siltstone or an interbedded dusky-red and gray siltstone beneath the RIAs with two notable exceptions at the East Rail: EB-10 and MW-79S/D (Figure 9C). The top of competent bedrock at these two locations is interpreted as an underlying gray siltstone at approximately 3,320 feet amsl. On average, the thickness of weathered and/or fractured bedrock was slightly greater at the East Rail compared to the West Rail as demonstrated in Table 2, below.

Area	***Ground Surface Elevation (feet amsl)***	***Depth of Top of Weathered Bedrock (feet amsl)***	***Depth of Top of Competent Bedrock (feet amsl)***
East Rail	*3,327 to 3,345*	*3,328 to 3,336*	*3,318 to 3,323*
West Rail	*3,321 to 3,333*	*3,319 to 3,323*	*3,311 to 3,316*

***Table 2**: Depth of top of weathered and competent bedrock of soil borings and monitoring wells associated with the East Rail and West Rail Areas.*

Hydrocarbon impacts[8] were observed in soil borings and/or monitoring wells in the East Rail (EB-03, EB-04, EB-05, EB-07, EB-09D, EB-10, MW-79S/D and MW-81S/D) and West Rail (WB-01, WB-02, WB-04, WB-08, WB-09, WB-10 and WB-11). Hydrocarbon contamination was observed in the shallow horizon, weathered bedrock, and the top portion of the competent bedrock. Hydrocarbon odors and elevated PID readings were observed no greater than 6 feet into competent bedrock. In general, hydrocarbon impacts within the competent bedrock were observed to be more prevalent in the East Rail

[8] Hydrocarbon impacts refer to staining/sheen (where present), hydrocarbon odors and elevated PID measurements.

compared to the West Rail.[9] *This may be related to a number of factors that include greater degree of bedrock weathering and/or fracturing, vertical migration pathways resulting from construction-related activities and nature and extent of historical releases (see Section 2.1.1)*

In the deepest borings installed at the East Rail (EB-15/MW-99) and West Rail (WB-04D, WB-09D, WB-11D and WB-14D), a well cemented sandstone was encountered. The only boring to be advanced past the sandstone unit was boring WB-14D, located on the adjacent WWTP to the south of West Rail. The unit encountered beneath the sandstone at WB-14D was a dusky red siltstone underlain by a gray siltstone that extended to the terminal depth of the boring as shown on the cross section depicted on Figure 11A. It should be noted that indications of hydrocarbon contamination were not present within or below the well cemented sandstone, with the exception of EB-15D/MW-99, likely due to the removal of the overlying bedrock (i.e., dusky-red unit).

4.2 *HYDROGEOLOGY*

Soil borings were converted into temporary monitoring wells or permanent monitoring wells and installed in the Perched Unconfined and/or Upper Bedrock Semi-Confined hydrostratigraphic units, as discussed in Section(s) 3. 2 and 3. 4 and shown in Table 3 (see below). Field observations, groundwater parameters and slug test results are discussed in the sections below.

Area	***Temporary Wells or Monitoring Wells Installed in the Rail Investigation Areas***
East Rail (16 total)	*EB-01 (MW-79S/MW-79D), EB-02, EB-03S (MW-101), EB-03D, EB-04S (MW-100), EB-04D, EB-05S, EB-06 (MW-81S/MW-81D), EB-07S, EB-07D, EB-09S, EB-09D, EB-10, EB-11S, EB-14S, EB-15 (MW-99), MW-11, MW-97, and MW-98*
West Rail (16 total)	*WB-01S, WB-02S, WB-03S, WB-03D, WB-04S, WB-05S, WB-06S, WB-07, WB-08, WB-09S, WB-10S, WB-11S, WB-12S, WB-13S, WB-14S, and WB-15*

Table 3*: List of temporary wells or monitoring wells associated with the East Rail and West Rail Areas. Three existing monitoring wells (MW-11, MW-97, and MW-98) were included in the list of wells for the East Rail, as slug tests were performed at each location (see Section 4.2.1.2).*

4.2.1 Perched Unconfined Saturated Zone

As discussed in Section 2.4.1, the Perched Unconfined Saturated Zone is a low yield hydrostratigraphic unit present within fill, glaciolacustrine deposits and/or poorly lithified

[9] Elevated PID readings and olfactory evidence were observed to 3,302 ft amsl at monitoring well location EB-15/MW-99 located adjacent to the 10th Street NE bridge. The dusky red unit was notably not observed.

siltstone/mudstone (i.e., weathered and/or fractured bedrock) that contain various amounts of fine sand.

Perched groundwater is primarily associated with moist to wet fill and/or re-worked material observed between 2-10 feet bgs at both RIAs. Moisture content significantly decreased in the upper portions of the weathered bedrock as it transitions to more competent bedrock, which appears to be the primary impediment for vertical migration of surface and groundwater infiltration. Another factor influencing the perched groundwater at the East Rail was a geofabric liner observed at 3 feet bgs in hand-augured boring EB-02 located between the rail tracks. It is not known how far the geotextile liner extends laterally; however, groundwater was perched on this manmade surface and observed to be daylighting to the south of the railroad ballast onto the vehicle road. In general, the upper portions of the weathered bedrock were primarily dry to slightly moist with occasional wet seams. Groundwater within the perched zone was observed to be discontinuous[10] and associated with more permeable lenses (i.e., increased grain size and/or poorly lithified), particularly within the upper portions of the weathered bedrock. Table 4 provides depth to water and groundwater elevations, the groundwater potentiometric surface map for the Perched Unconfined hydrostratigraphic unit is illustrated on Figure 13. It should be emphasized that the groundwater potentiometric surface map does not represent a continuous, homogeneous groundwater zone.

4.2.1.1 Groundwater Quality Parameters

Field measurements for ORP and DO indicate that anaerobic or reducing conditions exist in the shallow water-bearing zones. Anerobic conditions were identified in MW-79S (EB-01), MW-81S (EB-06), MW-100 (EB-04S), WB-02S, WB-09S and WB-12S. The presence of anaerobic conditions in the shallow groundwater is not unexpected given the staining, hydrocarbon odor and elevated PID readings observed during the installation of MW-79S/D, MW-81S and MW-100 and the presence of LNAPL in MW-101 (EB-03S). Boring WB-02S is located near MW-75 from which LNAPL is currently being recovered. WB-09S and WB-12S were advanced north of the interceptor trench which is located just outside the facility security fence at the down-gradient property line. The trench was installed in 2017 to serve as a control mechanism to prevent the migration of dissolved and separate phase hydrocarbon onto the adjacent property. The interceptor trench is 2-4 feet deep at the base, 350 feet long and is reportedly sitting on a low-permeability unit. Down-gradient, shallow monitoring well MW-66 exhibited anaerobic conditions in both May and August of 2019 during quarterly site-wide groundwater monitoring.

[10] Three shallow borings (EB-09S, WB-14S, and WB-15S), advanced within the perched zone, did not produce sufficient groundwater for measurement or sampling for laboratory analytical purposes. The material observed at EB-09S was dry to the terminal depth of the boring. Borings WB-14S and WB-15S were installed on the adjacent wastewater treatment property to the south of the West Rail, fill material at these locations was only encountered to a maximum depth of approximately 5 feet bgs.

4.2.1.2 Hydraulic Conductivity Testing

Summary slug test data, including K-value estimates, are presented in Table 5. Slug test model best fit curves are presented in Appendix F.

EAST RAIL

Eight slug tests were conducted in wells screened in the Perched Unconfined hydrostratigraphic unit in the East Rail Area, as follows: EB-01/MW-79S, EB-01/MW-79D, EB-06/MW-81S, EB-07S, EB-11S, MW-11, MW-97, EB-15/MW-99. The initial slug-testing method employed a pneumatic slug testing apparatus at EB-07S and EB-11S that did not function properly at either location. As such, the hydraulic conductivity values calculated for EB-07S and EB-11S were typical for unconsolidated gravel or clean sand, respectively (Freeze and Cherry, 1979) and were not consistent with the fine grain material that the wells were screened in. Therefore, the calculated values for these two tests were not considered representative values and were excluded in the assessment of hydraulic conductivity for the Perched Unconfined hydrostratigraphic unit. The median hydraulic conductivity for slug tests in the perched zone was 0.14 feet per day [$4.9x10^{-5}$ centimeters per second (cm/sec)][11]. This value falls within the low end of the range of hydraulic conductivity for a silty sand of $1x10^{-1}$ to $1x10^{-5}$ cm/sec (Freeze and Cherry, 1979) and is consistent with the lithology observed in the screened interval of wells completed in the Perched Unconfined Saturated Zone.

Of note, the hydraulic conductivity measured at MW-99 (EB-15) supported the observed absence of the dusky-red unit (which, is typically fine grained, competent, and representative of low transmissivity). The reported hydraulic conductivity at this location was 2. $3x10^{-4}$ cm/sec, representative of a clean sand.

WEST RAIL

Three slug tests were conducted in wells screened in the Perched Unconfined hydrostratigraphic unit at the West Rail Area, as follows: WB-03S, WB-07 and WB-09S. However, there was insufficient initial displacement in WB-03S to obtain an estimate of hydraulic conductivity therefore, this value was excluded in the assessment of hydraulic conductivity. The median (and average) hydraulic conductivity for slug tests successfully conducted in the two wells screened in the perched zone (WB-07 and WB-09S) was 3.0 feet per day ($1.1x10^{-3}$ cm/sec). This value of hydraulic conductivity falls within the lower end of the range of values expected for a sand ($1x10^{-3}$ cm/sec) (Freeze and Cherry 1979). The hydraulic conductivity for these wells is consistent with the sand observed in the screened intervals of WB-07 and WB-09S.

4.2.3 Upper Bedrock Semi-Confined Saturated Zone

As discussed in Section 2.4.1, the Upper Bedrock Semi-Confined Saturated Zone is a low yield hydrostratigraphic unit underlying the Upper Aquitard and is composed of alternating

[11] The Bouwer-Rice model is useful for determining the hydraulic conductivity of an unconfined aquifer such as the Perched Unconfined Saturated Zone present at the Site.

layers of hard massive to laminated siltstone and/or shales with fine to very fine sandstone lenses and/or beds. The heterogenous nature of the lithology results in discontinuous layers of permeability and limits groundwater movement through more permeable lenses/layers or bedding planes. This aquifer appears to be under semi-confining conditions, as indicated by water levels rebounding to a shallower level than originally observed.

A total of four borings and temporary wells along the East Rail (EB-05D, EB-06D, EB-07D and EB-14D) and a total of six borings and temporary wells along the West Rail (WB-02D, WB-03D, WB-04D, WB-06D, WB-09D and WB-13D) were interpreted to be installed within the Upper Bedrock Semi-Confined hydrostratigraphic unit. Table 4 provides depth to water and groundwater elevation information for the Site. A groundwater potentiometric surface map was not generated for the Upper Bedrock Semi-Confined hydrostratigraphic unit due to the insufficient number of monitoring wells installed in this unit to provide an accurate portrayal of groundwater surface conditions. In addition, limited groundwater was detected at temporary wells in the East Rail[12] and West Rail[13] that prevented the collection of field parameters and/or low-flow groundwater samples.

4.2.3.1 Hydraulic Conductivity Testing

Summary slug test data, including K-value estimates, are presented in Table 5. Slug test model best fit curves are presented in Appendix F.

EAST RAIL

Slug tests were conducted in wells screened in the upper bedrock zone (MW-06D/MW-81 and EB-07D) in the East Rail Area, the median hydraulic conductivity was reported to be 0.02 feet per day ($8.2x10^{-6}$ cm/sec)[14]. This value falls within the lower end of the range of hydraulic conductivity expected for silt or fractured shale (Freeze and Cherry, 1979).

WEST RAIL

Two slug tests were conducted in wells screened in the upper bedrock zone of the West Rail Area: WB-03D and WB-13D. The median hydraulic conductivity for slug tests conducted in wells screened in the upper bedrock zone was 0.10 feet per day ($3.4x10^{-5}$ cm/sec). This hydraulic conductivity falls within the low range of hydraulic conductivity for a silty sand ($1x10^{-1}$ to $1x10^{-5}$ cm/sec) and near the middle range of hydraulic conductivity for a sandstone ($1x10^{-4}$ to $1x10^{-8}$ cm/sec) (Freeze and Cherry 1979). This hydraulic conductivity is in good agreement with the moderately cemented sandstone and laminated

[12] Deep borings installed in the East Rail yielded very low volumes of water at EB-05D, EB-07D and EB-14D. Only a grab groundwater sample was collected for laboratory analysis at EB-07D and EB-14D, while EB-05D did not produce sufficient groundwater for field parameter measurements or to collect a sample for laboratory analysis (boring advanced to a total depth of 34 feet bgs, groundwater measured at 33.5 feet bgs).

[13] In the West Rail, no groundwater was measured in six of the ten deep borings that were screened within the Upper Bedrock Semi-Confined hydrostratigraphic unit (WB-02D, WB-04D, WB-06D, WB-09D, WB-14D) or cross-connected between the Perched Unconfined/Upper Bedrock Semi-Confined hydrostratigraphic units (WB-05D).

[14] The KGS model is useful for determining the hydraulic conductivity of unconfined and nonleaky confined aquifers.

siltstone/mudstone observed at the screen intervals for wells WB-03D and WB-13D, respectively.

4.2.4 Cross-Connected Wells

Seven wells along the East Rail and West Rail were interpreted to be cross connected wells between the overlying Perched Unconfined and the Upper Bedrock Semi-Confined hydrostratigraphic units, as follows: EB-09D, EB-10, EB-11D, WB-01D, WB-05D, WB-11D and WB-14D (including two permanent monitoring wells MW-91 and MW-98).

Temporary wells installed at EB-09D, EB-10 and WB-11D were placed within an open borehole. Potential influence from upper, perched saturated zones may have influenced the groundwater sample integrity at these locations. Cross connected wells were dry at EB-11D, WB-01D, and WB-05D.

Monitoring well locations MW-91 and MW-98 are located along the southern boundary of the Site near the Missouri River and were installed at relatively lower topography than locations advanced along the East Rail and West Rail. The dusky red unit is noticeably less thick at these borings than locations advanced further north within the refinery. The lower topography is likely due to increased weathering based on the proximity to the Missouri riverfront. The wells are screened across the overlying fill and/or weathered surficial material into the underlying dusky red and moderately- to well cemented sandstone units, at both locations. Elevated PID readings were observed at both locations to the terminal depth of the borings.

4.2.4.1 Hydraulic Conductivity Testing

The cross-connected wells demonstrated a decent amount of variability of hydraulic conductivity although, all reported values were within the ranges observed from wells screened in the overlying perched and underlying upper bedrock zones. Cross-connected wells reported hydraulic conductivities between $2.7x10^{-5}$ to $8.6x10^{-7}$ cm/sec, these values are comparable to silt or fractured shale, respectively (Freeze and Cherry, 1979).

5. SOIL ANALTYICAL RESULTS

5. 1 REGULATORY CRITERIA

The Tier 1 MDEQ Risk-Based Corrective Action (RBCA) approach is the simplest level of RBCA for petroleum releases in Montana and was applied to the East Rail and West Rail soil analytical data obtained as part of this investigation (MDEQ 2018). For the chemicals of potential concern (COPC), the flowchart evaluation process established by MDEQ was followed (MDEQ 2021)[15]; this approach is described in full in the flowchart included as Appendix G but is briefly summarized below. Soil samples were analyzed for organic compounds, specifically, for VOCs, SVOCs, MDEQ EPH and MDEQ VPH analytical methods. Analysis for inorganic compounds were completed for the USEPA Modified Skinner List of Compounds.

Any chemical with a maximum detected concentration above the MDEQ RBCA Risk-Based Screening Levels (RBSLs) (Commercial/Industrial and Construction) was determined to be a COPC. Based on the MDEQ Guidance Document regarding RBCA for petroleum releases (MDEQ 2018), direct contact MDEQ RBSLs are to be compared to both surface and subsurface soil analytical samples[16]. This guidance is based on the construction scenario that takes into account exposures potentially experienced by construction workers conducting excavation activities.

The MDEQ leaching to groundwater pathway RBSLs are determined based on the distance to groundwater from ground surface and beneath contaminated soil relative to the depth that a soil sample is collected. Due to the discontinuous nature of groundwater in the RIAs presenting as perched zones or permeable lenses, groundwater was observed within less than 10 feet below contamination for all soil samples collected as part of this investigation. Therefore, MDEQ leaching to groundwater pathway RBSLs for soils less than 10 feet to groundwater were utilized for regulatory comparison. Any chemical with a maximum detected concentration above the MDEQ RBCA RBSLs (Migration to Groundwater - <10 feet) was determined to be a COPC.

For both the direct contact and migration to groundwater scenarios, any inorganic compounds (USEPA Modified Skinner List) with a maximum detected concentration below MDEQ background values were not considered COPCs. Those compounds that did exceed background values were evaluated as potential COPCs.

The laboratory analytical results for East Rail and West Rail Area soil samples are presented on Table 6 and Table 7, respectively. In the soil analytical tables, COPC concentrations that exceed the direct contact RBSLs are boldfaced and COPC concentrations that meet or exceed migration (leaching) to groundwater RBSLs are underlined. The laboratory analytical reports, including the geotechnical analyses, are included as Appendix E.

[15] MDEQ surface and subsurface soil screening flowchart was revised in July 2021.

[16] Surface soils are defined as soils less than 2 feet bgs; subsurface soils are defined as soils deeper than 2 feet bgs.

Additional details that define regulatory comparison criteria for this investigation are outlined below:

Direct Contact Screening Levels

- *Detected chemicals without MDEQ RBCA RBSLs were compared to the commercial/industrial USEPA RSLs and any chemical with a maximum concentration greater than the applicable RSL was flagged as a COPC (carcinogens were compared to the cancer RSLs at a target cancer risk of $1x10^{-6}$ and non-carcinogens were compared to the noncancer RSLs at a target hazard quotient of 0.1).*

Migration to Groundwater Screening Levels

- *Detected chemicals without MDEQ RBCA RBSLs were compared to a modified migration to groundwater screening level calculated based on a dilution-attenuation factor of 10. The preferred groundwater target concentration for comparison is the MDEQ-7 human health standards (HHSs) and the USEPA Tapwater RSLs are used where no MDEQ-7 HHSs are available; any chemical with a maximum detected concentration above the modified screening level was determined to be a COPC.*

5.2 EAST RAIL AREA

5.2.1 Surface Soils (0-2 feet)

There were no organic compound direct contact COPC exceedances in surface soils. There were two direct contact COPC exceedances for inorganic compounds in soils (arsenic and cobalt).

The MDEQ background value for arsenic is 22.5 milligrams per kilograms (mg/kg) and the commercial/industrial USEPA RSL for arsenic is 3 mg/kg. Arsenic concentrations at EB-01, EB-07S and EB-10 exceeded the MDEQ background value for arsenic, with a maximum arsenic concentration of 490 mg/kg at EB-10 (0.5-1 foot).

The MDEQ background value for cobalt is 10 mg/kg and the commercial/industrial USEPA RSL for cobalt is 35 mg/kg. The cobalt concentration at EB-10 (0.5-1 foot) (37 mg/kg) exceeded the MDEQ background value and the commercial/industrial USEPA RSL.

Migration (Leaching) to Groundwater of Surface Soils (0-2 feet)

For organic compounds by MDEQ VPH, benzene was detected at the MDEQ Tier 1 Surface Soil screening level of 0.07 mg/kg for migration to groundwater at EB-01 (0.5-1 foot) (detected at an estimated concentration of 0.07 J mg/kg, between the method detection limit and limit of quantitation; "J-flagged"). This level was exceeded at EB-10 (0.5-1 foot) (0.3 J mg/kg).

Inorganic COPCs for migration to groundwater based on the respective MDEQ threshold value and USEPA RSL for migration to groundwater screening exceedances include:

- *Seven (7) Inorganic Compounds:*

- *Antimony: EB-10 (0.5-1 foot);*
- *Arsenic: EB-01 (0.5-1 foot), EB-07S (0-1 foot) and EB-10 (0.5-1 foot);*
- *Barium: EB-02 (0.5-1 foot);*
- *Cadmium: EB-10 (0.5-1 foot);*
- *Cobalt: EB-10 (0.5-1 foot);*
- *Copper: EB-01 (0.5-1 foot), EB-10 (0.5-1 foot); and*
- *Silver: EB-10 (0.5-1 foot).*

5.2.1 Subsurface Soils (>2 feet)

Analytical results for organic compounds exceeded regulatory criteria for direct contact in the saturated perched zone for at least one compound at all sample locations in the East Rail Area except for EB-07S (5.25-5.75 feet), EB-11S (2-2.5 feet), EB-14S (2-2.4 feet) and EB-15 (18-19 feet and 20-21.5 feet). The organic compounds that exceeded direct contact criteria and the respective locations are as follows:

- *Five (5) VOCs:*
  - *Benzene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet);*
  - *Ethylbenzene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-10 (2.5-5 feet);*
  - *Naphthalene: EB-01 (4-5 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-04D (4-5 feet), EB-04D (8-8.5 feet), EB-05S (6-7 feet), EB-07S (7.5-8 feet), EB-10 (2.5-5 feet)*
  - *Meta-xylene: EB-01 (4-5 feet), EB-10 (2.5-5 feet); and*
  - *Total xylenes: EB-01 (4-5 feet), EB-10 (2.5-5 feet).*
- *Two (2) SVOCs:*
  - *2-methylnaphthalene: EB-04D (4-5 feet); and*
  - *Naphthalene: EB-01 (4-5 feet), Duplicate EB-02 (5. 5-6 feet), EB-04D (4-5 feet), EB-04D (8-8. 5 feet), EB-10 (2. 5-5 feet).*
- *Eight (8) MDEQ VPH Compounds:*
  - *C5-C8 aliphatics: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 and 9-10 feet), EB-09S (6-7 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3 feet);*
  - *C9-C12 aliphatics: EB-01 (4-5 feet), EB-02 (5.5-6) Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-04D (4-5 and 8-8.5 feet), EB-09S (6-7 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3 feet);*

- *C9-C10 aromatics: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3 feet);*
- *Benzene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-10(2.5-5 feet);*
- *Ethylbenzene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-09S (6-7 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3);*
- *Naphthalene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-04D (4-5 feet and 8-8.5 feet), EB-05S (6-7 and 11-12 feet), EB-07S (7.5-8 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3 feet);*
- *Meta-xylene: EB-10 (2.5-5 feet); and*
- *Total xylenes: EB-10 (2.5-5 feet).*

- *Two (2) MDEQ EPH Compounds:*
  - *C9-C18 aliphatics: EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-04D (4-5 and 8-8.5 feet), EB-05S (6-7 and 11-12 feet), EB-06S (4.5-5 and 6.25-6.75 feet), EB-07S (7.5-8 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3 feet), EB-15 (18-19 feet); and*
  - *C11-C22 aromatics: EB-04D (4-5 feet).*

Analytical results for inorganic compounds that exceeded regulatory criteria for direct contact in the Perched saturated zone in the East Rail Area at boring locations EB-03D, EB-11S, EB-14S and EB-15. The inorganic compounds that exceeded criteria and the respective locations are as follows:

- *Two (2) Inorganic Compounds:*
  - *Arsenic: EB-11S (2-2.5 feet), EB-14S (2-2.4 feet), EB-15 (18-19); and*
  - *Chromium: EB-03D (5-6 feet).*

Migration (Leaching) to Groundwater of Subsurface Soils (>2 feet)

Analytical results for organic compounds that exceeded regulatory criteria for migration to groundwater in soils within the Perched hydrostratigraphic unit for at least one compound at all sample locations in the East Rail Area. The organic compounds that exceeded migration to groundwater criteria and the respective locations are as follows:

- *Seven (7) VOCs:*
  - *Benzene: EB-01 (4-5 and 14-15 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (4-4.5, 5-6 and 9-10 feet), Duplicate EB-03D (4-4.5 feet), EB-04D (8-8.5 feet), EB-05S (6-7 feet), EB-09S (6-7 feet);*
  - *Ethylbenzene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-10 (2.5-5 feet);*

- *Naphthalene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-04D (4-5 and 8-8.5 feet), EB-05S (6-7 feet), EB-07S (7.5-8 feet), EB-10 (2.5-5 feet);*
- *Toluene: EB-10 (2.5-5 feet);*
- *Meta-xylene: EB-01 (4-5 feet), EB-10 (2.5-5 feet);*
- *Ortho-xylene: EB-10 (2.5-5 feet); and*
- *Xylenes (total): EB-01 (4-5 feet), EB-10 (2.5-5 feet).*

- *Three (3) SVOCs:*
  - *2-methylnaphthalene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-04D (4-5 and 8-8.5 feet), EB-05S (6-7 and 11-12 feet), EB-07S (7.5-8 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3 feet);*
  - *Naphthalene: EB-01 (4-5 feet), Duplicate EB-02 (5.5-6 feet), EB-04D (4-5 and 8-8.5 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3 feet); and*
  - *Pentachlorophenol: EB-15 (15-16 feet).*

- *Eleven (11) MDEQ VPH Compounds:*
  - *C5-C8 Aliphatics: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 and 9-10 feet), EB-04D (8-8.5 feet), EB-09S (6-7 feet), EB-10 (2.5-5 and 7.5-8.5 feet), EB-11S (2.5-3 feet);*
  - *C9-C12 Aliphatics: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-04D (4-5 and 8-8.5 feet), EB-09S (6-7 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3);*
  - *C9-C10 Aromatics: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 and 9-10 feet), EB-04D (4-5 and 8-8.5 feet), EB-05S (6-7 and 11-12 feet), EB-06S (6.25-6.75 feet), EB-07S (7.5-8 feet), EB-09S (6-7 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3);*
  - *Benzene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (4-4.5, 5-6 and 9-10 feet), Duplicate EB-03D (4-4.5), EB-04D (8-8.5 feet), EB-05S (6-7 feet), EB-09S (6-7 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3 feet);*
  - *Ethylbenzene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6), EB-09S (6-7 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3);*
  - *Methyl tert-butyl ether: EB-06S (6.25-6.75 feet), EB-09S (6-7 feet);*
  - *Naphthalene: EB-01 (4-5 feet), EB-02(5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 and 9-10 feet), EB-04D (4-5 and 8-8.5 feet), EB-05S (6-7 and 11-12 feet), EB-07S (7.5-8 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3));*
  - *Toluene: EB-02 (5.5-6 feet), EB-10 (2.5-5 feet);*

- *Meta-xylene: EB-01 (4-5 feet), EB-02 (5.5-6 feet), EB-10 (2.5-5 feet);*
- *Ortho-xylene: EB-10 (2.5-5 feet); and*
- *Xylenes (total): EB-10 (2.5-5 feet).*

- *Two (2) MDEQ EPH Compounds:*
  - *C9-C18 Aliphatics: EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6), EB-03D (5-6 feet), EB-03 (5-6 feet), EB-04D (4-5 and 8-8.5 feet), EB-05S (6-7 and 11-12 feet), EB-06S (4.5-5 and 6.25-6.75 feet), EB-07S (7.5-8 feet), EB-10 (2.5-5), EB-11S (2.5-3 feet), EB-15 (18-19 feet); and*
  - *C11-C22 Aromatics: EB-02 (5.5-6 feet), Duplicate EB-02 (5.5-6 feet), EB-03D (5-6 feet), EB-04D (4-5 and 8-8.5 feet), EB-05S (6-7 and 11-12 feet), EB-06S (4.5-5 and 6.25-6.75 feet), EB-07S (7.5-8 feet), EB-10 (2.5-5 feet), EB-11S (2.5-3 feet), EB-15 (18-19 feet).*

In the East Rail, the most widespread impacts in the subsurface soil are benzene and naphthalene. These compounds are most prevalent near boring EB-03/MW-101 (Figure 14) and naphthalene in the vicinity of EB-04 (Figure 15).

Analytical results for inorganic compounds exceeded regulatory criteria for migration (leaching) to groundwater RBSLs in subsurface soil in the East Rail Area at boring locations EB-01, EB-07S, EB-11S, EB-14S and EB-15. The inorganic compounds that exceeded criteria and the respective locations are as follows:

- *Four (4) Inorganic Compounds:*
  - *Arsenic: EB-11S (2-2.5 feet), EB-14S (2-2.4 feet), EB-15 (18-19 feet);*
  - *Barium: EB-01 (14-15 feet), EB-07S (5.25-5.75 feet);*
  - *Copper: EB-11S (2-2.5 feet), EB-14S (2-2.4 feet); and*
  - *Lead: EB-15 (18-19 feet).*

5.3 *WEST RAIL AREA*

The parameters analyzed for in the West Rail Area soil samples and the process for identifying and screening for COPCs are the same as those previously described in Section 5.1. Soil analytical results are presented in Table 7 for the West Rail Area. The laboratory analytical reports and geotechnical analyses are attached as Appendix E.

5.3.1 Surface Soils (0-2 feet)

Perched zone surface soils at one location, WB-11D (1-2 feet), exceeded the direct contact COPC for C9-C18 aliphatics. There were two direct contact COPC exceedances for inorganic compounds in soils: arsenic and lead.

Arsenic concentrations at WB-01S (1.5-2 feet), WB-03S (0.5-1 feet) and WB-12S (0-1 feet) exceeded the MDEQ background value of 22.5 mg/kg, with the greatest arsenic concentration of 180 mg/kg measured at WB-01S (1.5-2 feet).

The MDEQ background value for lead is 29.8 mg/kg and the Commercial/Industrial USEPA RSL for lead is 800 mg/kg. Lead concentrations exceeded standards at WB-01S (1.5-2 feet) and WB03S (0-1 feet), with the greatest concentration of 1,200 mg/kg detected at WB-01S (1.5-2 feet).

Migration (Leaching) to Groundwater of Surface Soils (0-2 feet)

No VOCs or SVOCs exceeded migration to groundwater standards. For organic compounds by MDEQ VPH, C9-C10 aromatics exceeded its standard of 130 mg/kg at WB-11D (1-2 feet) (260 mg/kg) and benzene exceeded the MDEQ Tier 1 Surface Soil screening level of 0.07 mg/kg for migration to groundwater at WB-03S (0.5-1 feet) at a measured concentration of 0.093 J mg/kg. Per MDEQ EPH, C11-C22 aromatics exceeded its standard of 370 mg/kg at WB-11D (510 mg/kg).

For inorganic compounds, migration to groundwater standards were exceeded for seven (7) compounds:

- *Antimony [WB-01S (1.5-2 feet)];*
- *Arsenic [WB-01S (1.5-2 feet)], WB-03S [(0.5-1 feet) and WB-12S (0-1 feet)];*
- *Barium [WB-12S (0-1 feet)];*
- *Cadmium [WB-01S (1.5-2 feet) and WB-03S (0.5-1 feet)];*
- *Copper [WB-01S (1.5-2 feet)];*
- *Lead [WB-01S (1.5-2 feet) and WB-03S (0.5-1 feet)]; and*
- *Zinc [WB-01S (1.5-2 feet) and WB-03S (0.5-1 feet)].*

5.3.2 Subsurface Soils (>2 feet)

Analytical results for organic compounds exceeded regulatory criteria for direct contact in the West Rail Area Perched Saturated zone at seven borings (WB-01D, WB-02D, WB-04D WB-09D, WB-10, WB-11D, WB-12S) for a limited number of TPH carbon ranges for the MDEQ VPH and MDEQ EPH analytical suites. The organic compounds that exceeded direct contact criteria and the respective locations are as follows:

- *Three (3) MDEQ VPH Compounds:*
  - *C9-C12 aliphatics: WB-01D (6-6.5 feet), Duplicate WB-01D (6-6.5 feet), WB-02D (10-10.75 feet), WB-10 (3-4 feet), WB-11D (3-3.9 feet);*
  - *Ethylbenzene: Duplicate WB-01D (6-6.5 feet); and*
  - *Naphthalene: Duplicate WB-01D (6-6.5 feet).*

- *One (1) MDEQ EPH Compound:*
    - *C9-C18 aliphatics: WB-01D (3-4 feet and 6-6.5 feet), Duplicate WB-01D (6-6.5 feet), WB-02D (10-10.75 feet), WB-04D (8-9 feet), WB-09D (6-6.7 feet), WB-10 (3-4 feet), WB-11D (3-3.9 feet), WB-12S (2-2.5 feet), WB-15 (4-5 feet).*

Analytical results for inorganic compounds exceeded regulatory criteria for direct contact in soils in the West Rail Area at boring locations WB-04D (5-6 feet), WB-10 (6-7 feet), WB-13D (3-3.5 feet) and Duplicate WB-13D (3-3.5 feet). The inorganic compounds that exceeded criteria and the respective locations are as follows:

- *Two (2) Inorganic Compounds:*
    - *Arsenic: WB-04D (5-6 feet), WB-13D (3-3.5 feet), Duplicate WB-13D (3-3.5 feet); and*
    - *Total Chromium: WB-10 (6-7 feet).*

Migration (Leaching) to Groundwater of Subsurface Soils (>2 feet)

Analytical results for organic compounds that exceeded regulatory criteria for migration to groundwater in West Rail Area perched zone soil was limited to VOCs, MDEQ VPH and MDEQ EPH TPH carbon groups at only six boring locations (WB-01D (6-6.5 feet, 6-6.5 feet Field Duplicate), WB-02D (10-10.75 feet), WB-04D (8-9 feet), WB-10 (3-4 feet), WB-11D (3-3.9 feet), WB-15 (4-5 feet). The organic compounds that exceeded migration to groundwater criteria and the respective locations are as follows:

- *One (1) VOC:*
    - *Benzene: WB-02D (10-10.75 feet)*
- *Five (5) MDEQ VPH Compounds:*
    - *C5-C8 aliphatics: WB-01D (6-6.5 feet), Duplicate WB-01D (6-6.5 feet), WB-02D (10-10.75 feet);*
    - *C9-C10 aromatics: WB-01D (6-6.5 feet), Duplicate WB-01D (6-6.5 feet), WB-02D (10-10.75 feet), WB-04D (8-9 feet), WB-10 (3-4 feet), WB-11D (3-3.9 feet), WB-15 (4-5 feet);*
    - *Benzene: WB-02D (10-10.75 feet), WB-10 (3-4 feet);*
    - *Ethylbenzene: Duplicate WB-01D (6-6.5 feet); and*
    - *Naphthalene: WB-01D (6-6.5 feet), Duplicate WB-01D (6-6.5 feet), WB-11D (3-3.9 feet).*
- *One (1) MDEQ EPH Compound:*
    - *C11-C22 aromatics: WB-01D (6-6.5 feet, 6-6.5 feet Duplicate), WB-02D (10-10.75 feet), WB-11D (3-3.9 feet).*

Analytical results for inorganic compounds exceeded regulatory criteria for migration (leaching) to groundwater RBSLs in soil in the West Rail Area at boring locations WB-02D (2-2.5 feet), WB-03D (5-5.5 feet), WB-04D (5-6 feet), WB-06D (10-10.5 feet), WB-10 (6-7 feet and 9-9.5 feet), WB-13D (3-3.5 feet), Duplicate WB-13D (3-3.5 feet) and WB-14D (5-6 feet). The inorganic compounds that exceeded criteria and the respective locations are as follows:

- *Four (4) Inorganic Compounds:*
  - *Arsenic: WB-04D (5-6 feet), WB-13D (3-3.5 feet), Duplicate WB-13D (3-3.5 feet);*
  - *Barium: WB-03D (5-5.5 feet), WB-06D (10-10.5 feet), WB-10 (9-9.5 feet), WB-14D (5-6 feet);*
  - *Cadmium: WB-02D (2-2.5 feet); and*
  - *Zinc: WB-02D (2-2.5 feet).*

6. GROUNDWATER ANALTYICAL RESULTS

6.1 REGULATORY CRITERIA

Measured concentrations of detected COPCs in groundwater were compared to the respective Circular MDEQ-7 Montana Numeric Water Quality Standards (MDEQ-7 Standards). Measured concentrations of constituents for which MDEQ-7 standards have not been established, such as petroleum hydrocarbon fractions, were compared to the respective Montana RBCA RBSLs. Constituents with concentrations for which MDEQ-7 standards or RBSLs have not been established were compared to the respective USEPA RSLs. A summary of constituents in the Perched Unconfined and Upper Bedrock Semi-Confined hydrostratigraphic units (or cross connected wells) exceeding the above criteria are presented below.

6.2 EAST RAIL AREA

Groundwater analytical results are presented in Table 8 for the East Rail Area and laboratory analytical reports are provided in Appendix E. Benzene and naphthalene concentrations, the most widely distributed contaminants in the East Rail Area are plotted on Figure 14 and Figure 15, respectively.

6.2.1 Perched Unconfined Saturated Zone

Measured constituents exceeded regulatory criteria in groundwater obtained from wells installed in the Perched Unconfined hydrostratigraphic unit and locations interpreted to be cross connected between the Perched Unconfined and Upper Bedrock Semi-Confined hydrostratigraphic units (see Table 1). Exceedances were identified at ten sampling locations in the East Rail. These constituents included VOCs [benzene; 1,2-dichloroethane (1,2-DCA), ethylbenzene; and naphthalene], SVOCs (2,4-dimethylphenol; 2-methylnaphthalene, 2-methylphenol and naphthalene), inorganic metals (arsenic, barium, cadmium, chromium (total and cobalt) and petroleum hydrocarbon fractions (C11-C22 and C9-C10 aromatics and C19-C36, C5-C8, C9-C12 and C9-C18 aliphatics). Results are described in further detail below:

- *Seven (7) VOCs:*
  - *Benzene: EB-04D, EB-05S, EB-06, EB-07S, EB-09D, EB-10, MW-79S, MW-79D, MW-81S and MW-100;*
  - *1,2-DCA: EB-10, EB-14D, MW-79S, MW-79D, MW-100;*
  - *Ethylbenzene: EB-04D, EB-05S, EB-07S, EB-09D, EB-10, EB-11S, MW-79S, MW-79D, MW-81S, MW-100;*
  - *Naphthalene: EB-04D, EB-05S, EB-06, EB-07S, EB-09D, EB-10, EB-11S, MW-79S, MW-81S and MW-100;*
  - *Meta-xylene: EB-10, MW-79S;*
  - *Ortho-xylene: MW-79S; and*

- *Total xylenes: EB-10, MW-79S.*

- *Three (3) SVOCs:*
  - *2,4-dimethylphenol: EB-10, MW-79S;*
  - *2-methylnaphathalene: EB-04D, EB-07S, MW-79S, MW-81S and MW-100; and*
  - *Naphthalene: EB-04D, EB-06, EB-07S, EB-09D, EB-10, EB-11S, MW-79S, MW-81S, MW-99, MW-100.*

- *Nine (9) MDEQ VPH Compounds:*
  - *C5-C8 Aliphatics: EB-07S, EB-10, MW-79S, MW-79D;*
  - *C9-C12 Aliphatics: EB-07S, MW-79S;*
  - *C9-C10 Aromatics: EB-05S, EB-07S, EB-10, MW-79S;*
  - *Benzene: EB-04D, EB-05S, EB-06, EB-07S, EB-09D, EB-10, EB-11S, MW-79S, MW-79D, MW-81S, MW-100;*
  - *Ethylbenzene: EB-04D, EB-05S, EB-06, EB-07S, EB-09D, EB-10, EB-11S, MW-79S, MW-81S, MW-100;*
  - *Naphthalene: EB-04D, EB-05S, EB-06, EB-07S, EB-09D, EB-10, EB-11S, EB-14S, MW-79S, MW-81S, MW-100;*
  - *Meta-xylene: EB-10, MW-79S;*
  - *Ortho-xylene: MW-79S; and*
  - *Total xylenes: EB-07S, EB-10, MW-79S.*

- *Three (3) MDEQ EPH Compounds:*
  - *C19-C36 Aliphatics: EB-06, EB-07S;*
  - *C9-C18 Aliphatics: EB-06, EB-07S; and*
  - *C11-C22 Aromatics: EB-06, EB-07S and MW-100.*

- *Five (5) Inorganic Compounds:*
  - *Arsenic: EB-06, EB-07S, EB-09D, EB-10, EB-11S, EB-14S, MW-79S, MW-79D, MW-81S, MW-99, MW-100;*
  - *Barium: EB-06, MW-79S, MW-81S, MW-100;*
  - *Cadmium: EB-11S, EB-14S;*
  - *Total Chromium: EB-06, EB-09D, EB-10, MW-79S; and*
  - *Cobalt: EB-11S, MW-79D.*

6.2.2 Upper Bedrock Semi-Confined Saturated Zone

Measured constituents exceeded regulatory criteria in Upper Bedrock Semi-Confined hydrostratigraphic unit at three (out of four) sampling locations in the East Rail. Temporary monitoring well EB-05D did not produce enough groundwater for sample collection. Results are described in further detail below:

- *Four (4) VOCs:*
  - *Benzene: EB-07D, MW-81D;*
  - *1,2-DCA: EB-14D;*
  - *Ethylbenzene: EB-07D; and*
  - *Naphthalene: EB-07D.*
- *Two (2) SVOCs:*
  - *2-Methylnaphthalene: EB-07D; and*
  - *Naphthalene: EB-07D.*
- *Two (2) MDEQ VPH Compounds:*
  - *Benzene: EB-07D, MW-81D; and*
  - *Naphthalene: EB-07D, MW-81D.*
- *One (1) MDEQ EPH Compounds:*
  - *C9-C18 Aliphatics: EB-14D*
- *One (1) Inorganic Compounds:*
  - *Arsenic: EB-14D*

6.2.3 LNAPL

Only one well installed in the shallow fill, MW-101 (EB-03S) accumulated measurable LNAPL following installation (0.72 feet), while LNAPL slowly accumulated at EB-01/MW-79S and first appeared in 2019. Evidence of hydrocarbon impacts in the shallow fill (fill material staining, odor, elevated PID readings) were observed at most boring locations throughout the East Rail Area generally at a depth of 2-5 feet bgs. A hand augured boring, EB-02 had a thin layer of what appeared to be LNAPL (<0.01 feet) observed in the water in the borehole (6 feet deep borehole). Hydrocarbon sheens were observed during groundwater sampling in EB-05S and EB-06S.

No LNAPL was observed during the investigation within the deeper horizons during the RIAIM investigation below the dusky red siltstone in the immediate East Rail Loading Rack Area. Down-gradient from the East Rail Loading Area at MW-97 a sheen to approximately 0.01 feet of LNAPL has been observed in the perched unconfined zone. MW-97 was

installed in April 2019 for the groundwater monitoring program and is screened within the weathered dusky-red unit.

LNAPL sorbent socks are currently installed in MW-97, MW-70, MW-14R and MW-48 where a sheen has been observed.

6.2.3.1 LNAPL Baildown Testing Results

As indicated in Section 3.6.2, the only location in the East Rail Area with sufficient LNAPL thickness (0.72 feet) to conduct a baildown test was at MW-101 (formerly EB-03S). LNAPL baildown test data were processed and analyzed using the API LNAPL Transmissivity Workbook for Microsoft Excel™. The results indicate estimated LNAPL transmissivities of 1.9 square feet per day (ft^2/day) or 1.8E-01 square meters per second (m^2/sec) using the Bouwer and Rice (1976) method and 4.9 ft^2/day[17] or 4.6E-01 m^2/sec using the Cooper and Jacob (1946) method. LNAPL baildown test data and model best fit curves are presented in Appendix H.

The LNAPL transmissivity values for MW-101 fall within the range generally considered viable for active LNAPL recovery, but the associated areal extent of the recoverable hydrocarbon is questionable. Based on observations during drilling, the LNAPL originates in the fill just below a plastic liner approximately 5 feet bgs (elevated PID readings and wet fill material are noted to approximately 8 feet bgs underlain by dry, dusky-red, weathered siltstone/mudstone). MW-101 is located approximately 20 feet north, upslope from the north rail and the adjacent sewer line that runs parallel to the north side of the tracks. By contrast, MW-101 is located approximately 15 feet south of an east-west leg of the facility sewer that collects surface drainage and process water for delivery to the API for treatment. During installation of a new cleanout on the sewer at a junction to the east of MW-101, the excavation filled with LNAPL and water that appeared to be originating in the fill around the sewer piping. The volume was sufficient to require fluids management for the duration of the repair work. Based on these observations the LNAPL at MW-101 is more likely associated with the sewer piping and drainage in the fill around the piping than releases associated with the East Rail.

6.3 WEST RAIL AREA

Groundwater laboratory reports are provided in Appendix E and analytical results are presented in Table 9 for the West Rail Area. Benzene and naphthalene concentrations, the most widely distributed contaminants in the West Rail Area, are plotted on Figure 16 and Figure 17, respectively.

6.3.1 Perched Unconfined Saturated Zone

Measured constituents exceeded regulatory criteria in the Perched Unconfined hydrostratigraphic unit (or from wells screened across the Perched Unconfined and Upper

[17] LNAPL transmissivities in the range of 0.1-0.8 ft^2/day are considered threshold values for LNAPL recovery (ITRC LNAPL Update, Appendix C – Transmissivity (T_n) Appendix.

Bedrock Semi-Confined zones (i.e., cross-connected) at all but one sample location (WB-11D) in the West Rail Area (see Table 1). These constituents included the following:

- *Four (4) VOCs:*
  - *Benzene: WB-01S, WB-02S, WB-04S, WB-08, WB-09S, WB-10 and WB-11S);*
  - *1,2-DCA: WB-14D;*
  - *Ethylbenzene: WB-01S, WB-02S, WB-04S, WB-09S, WB-10, WB-11S, WB-12S; and*
  - *Naphthalene: WB-01S, WB-02S, WB-04S, WB-09S, WB-10, WB-11S.*
- *Two (2) SVOCs:*
  - *Naphthalene: WB-02S, WB-04S, WB-10, WB-11S; and*
  - *Pentachlorophenol: WB-01S.*
- *Five (5) MDEQ VPH Compounds:*
  - *C9-C12 Aliphatics: WB-11S;*
  - *C9-C10 Aromatics: WB-11S;*
  - *Benzene: WB-01S, WB-02S, WB-04S, WB-08, WB-09S, WB-10, WB-11S;*
  - *Ethylbenzene: WB-01S, WB-02S, WB-04S, WB-09S, WB-10, WB-11S, WB-12S; and*
  - *Naphthalene: WB-01S, WB-02S, WB-04S, WB-09S, WB-10, WB-11S and WB-12S.*
- *Two (2) MDEQ EPH Compounds:*
  - *C9-C18 Aliphatics: WB-02S, WB-04S, WB-08, WB-09S, WB-10, WB-11S, WB-12S; and*
  - *C19-C36 Aromatics: WB-10*
- *Four (4) Inorganic Compounds:*
  - *Arsenic: WB-02S, WB-03S, WB-04S, WB-05S, WB-06S, WB-07, WB-08, WB-09S, WB-10, WB-11S, WB-12S and WB-13S;*
  - *Barium: WB-10 and WB-11S;*
  - *Total Chromium: WB-01S, WB-06S, WB-08, WB-11S and WB-12S; and*
  - *Cobalt: WB-04S, WB-05S, WB-06S, WB-08, WB-09S and WB-12S.*

6.3.2 Upper Bedrock Semi-Confined Saturated Zone

Measured constituents exceeded regulatory criteria in the Upper Bedrock Semi-Confined hydrostratigraphic unit at two sampling locations (WB-03D and downgradient temporary

well, WB-13D) both located on the western portion of the West Rail Area. These constituents included the following:

- *One (1) SVOC:*
  - *Naphthalene: WB-03D*
- *One (1) MDEQ EPH Compounds:*
  - *C9-C18 Aliphatics: WB-03D*
- *Three (3) Inorganic Compounds:*
  - *Arsenic: WB-03D*
  - *Barium: WB-03D*
  - *Total chromium: WB-13D*

6.3.3 LNAPL

LNAPL accumulated on groundwater in temporary wells WB-01S (0.04 feet) and WB-02S (0.04 feet) installed in the perched horizon above the dusky red horizon at the bottom of the shallow fill. Evidence of lesser hydrocarbon impacts in the shallow fill (fill material staining, odor, elevated PID readings) were observed generally at a depth of 2-5 feet bgs at WB-04 (located near the current recovery wells where LNAPL recovery is ongoing) and south of the recovery wells, down slope surface grade and groundwater gradient, to the interceptor recovery trench at WB-08, WB-09, WB-10 and WB-11. Total fluids recovery is ongoing at the interceptor trench, LNAPL recovery estimates are included in the monthly reports. Based on the July 2019 site gauging data LNAPL was measured in the three operating recovery wells (MW-73, MW-75, and MW-76) with thicknesses ranging from 0.04-1.39 feet[18]. LNAPL is being monitored in monitoring well MW-74 where LNAPL thickness is minimal.

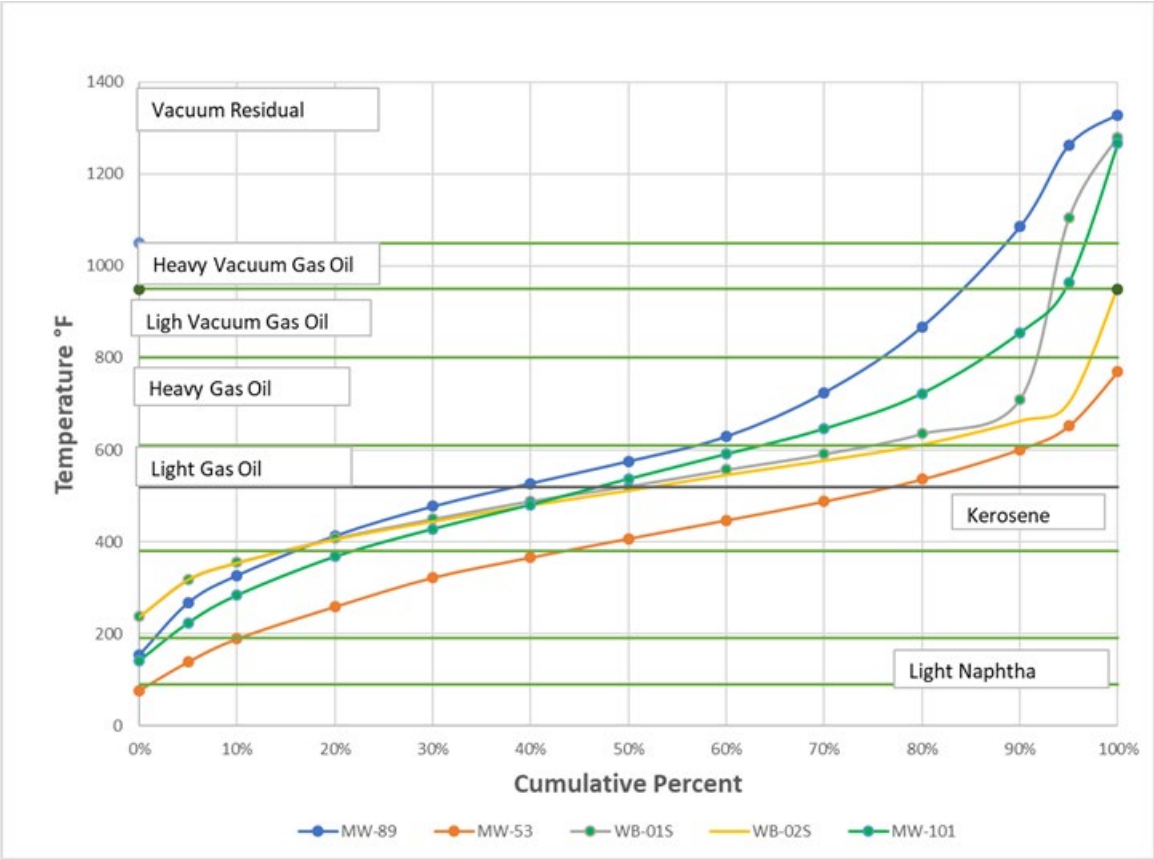
Due to the limited amount of LNAPL measured in the temporary wells in the West Rail Area, LNAPL Baildown Testing was not able to be performed. No LNAPL was observed during the investigation within the Upper Bedrock Semi-Confined stratigraphic unit in the West Rail Area.

6.4 LNAPL FINGERPRINTING RESULTS

As discussed in Section 3.5, LNAPL samples were collected from temporary monitoring wells from the West Rail Area (WB-01S and WB-02S) and a newly installed permanent monitoring well in the East Rail Area (EB-03S/MW-101) on June 24, 2019, and July 3, 2019, respectively. LNAPL fingerprinting samples were analyzed for total sulfur content (ASTM D2622), relative density (ASTM D4052), boiling range distribution (ASTM D7169) and light hydrocarbons in stabilized crude oils (ASTM D7900). The distillation curves for each sample location are shown in the chart below. Additional LNAPL sample locations (MW-53 and MW-89) are also plotted in the chart. These locations are not associated with

[18] July 2019 Monthly Interim Measures Report

the East or West Loading Rack; however, they are useful for comparative analysis.[19] The fingerprinting results are provided in Appendix C.



LNAPL samples collected from the West Rail Area (WB-01S and WB-02S) had similar characteristics with respect to their distillation curves and light hydrocarbon concentrations provided by ASTM D7900.[20] Each sample contains roughly 4% of the lower boiling compounds.[21] In addition, the paraffin, isoparaffin, aromatic, naphthene and olefin (PIANO) distributions are similar. Specific gravities are comparable between WB-01S (0.8382) and WB-02S (0.8436); however, the sulfur content is higher at WB-02S (1,130 mg/kg) compared to WB-01S (241 mg/kg). Overall, LNAPL from both West Rail Area locations display a strong resemblance to one other.

One LNAPL sample was collected from the East Loading Rack (EB-01/MW-101). The sulfur content at EB-03S/MW-101 (1.09%) was significantly higher compared to WB-01S (0.0241%) and WB-02S (0.113%). The East Rail Area location has an intermediate sulfur content and specific gravity compared to MW-89 (1.64% and 0.8876) and MW-53 (0.014% and 0.8047). EB-03S/MW-101 has a slightly higher specific gravity compared to the West

[19] MW-53, down-gradient of AOC 16 near the Truck Loading Rack, is representative of a heavy naphtha to light gas used in the production of gasoline, jet fuel, kerosene, and No. 2 diesel fuel products. MW-89 is representative of a medium to heavy crude.
[20] ASTM D7900 data provides a detailed breakdown of the low boiling fractions (C1 – C10).
[21] Lower boiling compounds refer to those that boil below 300°F.

Rail locations. The sulfur content in the LNAPL sample collected from the East Rail Area location is representative of a sour crude, while the sulfur content in the LNAPL samples collected from the West Rail Area locations are more representative of a sweet crude.[22] Based on sulfur content, LNAPL samples collected from MW-53 and WB-01S are similar to a low-sulfur diesel.[23]

The East and West Rail Area locations have distillation curves between MW-53 and MW-89. However, West Rail Area locations (WB-01S and WB-02) have a lower percentage of low boiling compounds at approximately 4%, compared to MW-89 (7% lower boiling compounds) and EB-03S/MW-101 (12% lower boiling compounds). MW-53 has much larger fraction of lower boiling compounds at approximately 29%.

In addition, LNAPL samples were also collected during the 1st Quarter 2020 (MW-97 and MW-101) and 3rd Quarter 2020 (MW-79D) groundwater sampling events in the East Rail Area (CMR 2020b and CMR 2020c). Based on the review of chromatogram and hydrocarbon peak ratios, LNAPL samples collected from MW-79S indicates a predominately gasoline signature whereas MW-97 indicates both gasoline and diesel signature. In MW-101, a gasoline and diesel signature are also observed and based on the presence of heavier hydrocarbons, may contain other refined (and possibly weathered) products obscured by the unresolved complex mixture (e.g., fuel oil), suggesting a mixture from multiple sources.

[22] A sweet crude contains less than 0.5% sulfur.
[23] A low-sulfur diesel contains less than 500 parts per million (ppm) (0.05%) sulfur and an ultra-low sulfur diesel contains less than 15 ppm (0.0015%) sulfur.

7. QUALITY ASSURANCE/QUALITY CONTROL

Following the lab analysis of all samples, Ramboll completed a separate Quality Assurance/Quality Control (QA/QC) review of the reported laboratory data in accordance with the Quality Assurance Project Plan (QAPP). This step (referred to generally as validation) consisted of an additional independent review of quality control information provided by the laboratory as well as quality control samples collected in the field by sampling staff. The review was equivalent to the Stage 2A validation as defined by USEPA (USEPA 2009). To ensure the validation process was consistent and rigorous a worksheet format was used to assess each sample delivery group report. Completed memorandums and worksheets are provided in Appendix D with the laboratory analytical reports. Validation principles and guidance were based on the USEPA National Functional Guidelines (USEPA 2017).

During the review, Ramboll did not find any significant data quality issues that effected the overall usability of the lab data. All results were acceptably complete and largely met the data quality objectives as laid out in the QAPP. Minor issues existed in some sample delivery groups (SDGs), but these issues were either isolated to non-constituents of concern or only affected a subset of sample results. These non-conformances are addressed individually in each SDG's validation worksheet and memorandum. Two common usability concerns seen in the project data and their implications are listed below:

- Blank Detections: In multiple SDGs some analytes were detected in blank samples, either within the laboratory analytical process or from the field. These blank detections indicate possible cross-contamination concerns. In general, these results were validated as non-detect as the source of the possible contamination could not be determined.
- Spike Recovery Non-Conformances: In multiple SDGs for multiple analytes some spike sample (matrix spikes, lab control spikes) recoveries were out of criteria. These out of criteria results indicate a possible accuracy bias. In order to account for this possible bias these results were validated as estimated.

Following the validation and usability review Ramboll summarized the results by applying validation qualifiers to the final result data. These qualifiers communicate the biases found during validation efforts. Qualifiers were uploaded to the project EQuIS database and will be presented with project results in all reporting and engineering tasks to ensure that all data users are aware of quality and usability limitations.

8. CONCLUSIONS AND RECOMMENDATIONS

In summary, the investigation revealed information that modifies our interpretation of the subsurface conditions in the Rail areas and the CMR site. Our understanding of the CSM and groundwater movement has changed substantially from our expectations during development of the RIAIM Work Plan. Also, the extent of LNAPL in the area was discovered to be far less than originally believed based on past investigations, particularly the results of the LIF/UVOST® investigation in 2017. Specific conclusions drawn from these investigative activities and associated recommendations are discussed below.

8.1 CONCLUSIONS

8.1.1 CSM

Previous investigation activities at the CMR facility have documented the presence of unconsolidated Pleistocene fluvial and lake deposits and various fill material at the ground surface immediately beneath the Site. These surficial units have been encountered at variable depths across the Site that range as much as 10-20 ft bgs. The fifth member of the Kootenai formation is encountered sitewide immediately beneath the surficial Pleistocene deposits and/or fill material. Based on the current understanding of the Site's geology, an updated CSM, included in Appendix A, identified two distinct hydrostratigraphic units that have been encountered at depth across the Site and overlie the shallowest potable aquifer present in the Great Falls area (Sunburst Sandstone Semi-Confined Aquifer) and regional limestone aquifer (Confined Madison Aquifer). The current understanding of the Site's hydrostratigraphy is as follows:

- *The **Perched Unconfined Saturated Zone** is a low yield hydrostratigraphic unit present within fill, glaciolacustrine deposits and/or poorly lithified mudstone/siltstone that contain various amounts of fine sand. The top of competent bedrock is encountered and appears laterally continuous across the Site as a dusky-red siltstone. The weathered portion of the dusky-red siltstone is moist and constitutes the base of the Perched Unconfined Saturated Zone. Due to the heterogenous nature of re-worked surficial deposits, perched groundwater was observed to be discontinuous. Groundwater elevations in the perched hydrostratigraphic unit shows a rapid response to infiltration of surface water from rain and/or snowmelt.*
- *The **Upper Aquitard** which hydraulically separates the overlying Perched Unconfined Saturated Zone and the underlying Upper Bedrock Semi-Confined Saturated Zone is comprised of the dry dusky-red siltstone. This unit is composed of a well lithified siltstone/mudstone interbedded with moderately to well cemented sandstone. The Upper Aquitard is continuous across the Site except for a few locations where it has been either removed by excavation or erosional processes. The low permeable strata of the aquitard impedes the hydraulic communication between the overlying Perched Unconfined Saturated Zone and the underlying Upper Bedrock Semi-Confined Saturated Zone.*

- *The **Upper Bedrock Semi-Confined Saturated Zone** is a low yield hydrostratigraphic unit underlying the Upper Aquitard and is composed of alternating layers of hard massive siltstone and/or shales with fine to very fine sandstone lenses and/or beds.*

Groundwater flow in the Perched Unconfined and Upper Bedrock Semi-Confined hydrostratigraphic units is south towards the Missouri River, located directly down-gradient of the Site. Perched Unconfined groundwater does not have an apparent connection to the adjacent Missouri River as the base of the perched saturated zone daylights to the riverbank above the level of the river. Upper Bedrock Semi-Confined groundwater may also daylight along the riverbank above the river level and/or may discharge into the riverbank below the level of the river.

The Updated CSM Report for the CMR facility, provided as Appendix A, presents the findings from an investigation of geologic outcrops along the northern bank of the Missouri River. Along with a literature review, the findings from the geologic outcrop investigation were integrated with previous field investigations, including a review of the boring logs and well construction information and historic groundwater elevations, down-gradient of the AOC-16 along North River Road, West Rail, East Rail and along the Missouri River.

8.1.2 Potential Historical Sources

There are 16 current or former SWMUs and AOCs in and surrounding the East Rail Area and five current or former SWMUs and AOCs in the vicinity of the West Rail Area. Historic releases from these SWMUs/AOCs are likely contributing to the impacts observed in these areas as demonstrated by the following:

- Historically, coal and/or ore material was transported by rail through the present-day East and West Rail Areas to the former Anaconda Copper Mining (ACM) Company Smelter and Refinery approximately 1 mile east of CMR, which is currently on the National Priorities List (NPL).
- The chlorinated VOC 1,2-DCA is present above the screening level in groundwater at the East Rail Area. This compound was used in leaded gasoline as a lead scavenger to prevent the buildup of lead deposits that foul internal combustion engine prior to the mid-1980s. 1,2-DCA was found in shallow groundwater in shallow well MW-79S and in deep groundwater in MW-79D, deep boring EB-10 and deep boring EB-14. 1,2-DCA was the only exceedance of screening levels in EB-14 (deep) and was not present in shallow groundwater at EB-14S.
- Several large gasoline spills, over 1,000 gallons, have been documented at AOC 12 (north of the East Rail Area). Five occurred between 1995 and 2001, one of which was over 10,000 gallons.
- Over 8,000 gallons of gas oil and water were released from the Refinery sewer system (SWMU 20) that runs through the East Rail Area in 2000.
- Two spills of over 1,000 gallons reached SWMU 9 (Oxidization Pond located north of the West Rail Area). A diesel spill in 2001 and a gas oil spill in 2013.

- In the late 1940s, the drainage ditch south of the East Rail Area present in 1922 has been dammed and a pond exists at this location.
- A small pond is present in the vicinity of EB15/MW-99 from the mid-1950s through the mid-1960s.
- By the early 1960s two impoundments are present at the current location of the onsite WWTP and an additional small pond has been added south of the original pond located east of the impoundments and west of the API separator/DAF units. The eastern most of these two impoundments corresponds to SWMU 1 (Diversion Pond).
- In the mid-1990s, the west impoundment is still present but the east impoundment is now circular in nature and appears to be in the current configuration of the open-top SWMU 3 (Wastewater Surge Tank). The west impoundment was decommissioned sometime before the mid-2000s.
- LNAPL fingerprinting conduct on product collected from MW-70 in 2017 showed that it was composed of a mixture of No. 2 fuel oil or diesel fuel and gasoline (or similar product). The sample also contained TEL indicating that at least a portion of the gasoline was an historic variant. The presence of TEL in the MW-70 LNAPL sample and presence of weathered or heavier fuel oil components suggests some contribution from both a recent release and historic gasoline release. LNAPL fingerprinting analytical results are provided in Appendix C.
- LNAPL fingerprinting samples collected as part of this investigation indicates, based on sulfur content, that the LNAPL present in the East Rail Area (EB-03/MW-101) is representative of a sour crude, while the sulfur content in the LNAPL samples collected from the West Rail Area locations (WB-01S and WB-02S) are more representative of a sweet crude or a low sulfur diesel. LNAPL from both West Rail Area locations (WB-01S and WB-02S) display a strong resemblance to one other. LNAPL fingerprinting analytical results are provided in Appendix C.
- *LNAPL samples collected since this 2019 work during the 1st Quarter 2020 (MW-97 and MW-101) and 3rd Quarter 2020 (MW-79D) groundwater sampling events in the East Rail Area (CMR 2020b and CMR 2020c) indicates the following: LNAPL at MW-79S has a predominately gasoline signature whereas at MW-97 both a gasoline and diesel signature are present. In MW-101, a gasoline and diesel signature are also observed and based on the presence of heavier hydrocarbons, may contain other refined (and possibly weathered) products obscured by the unresolved complex mixture (e.g., fuel oil), suggesting a mixture from multiple sources.*

8.1.3 Soil Impacts

All significant soil impacts in the rail areas are limited to the shallow lithologic zone (i.e., present in the upper 10 feet of heavily reworked material). Since this is the case and shallow groundwater has no connection to the adjacent Missouri River (receptor), an argument can be made that the migration (leaching) to groundwater criteria could be excluded for comparison. However, for the purposes of this report a discussion screening against these criteria has been included.

Elevated inorganics concentrations in the shallow soil horizon may in part be due to naturally elevated levels in site soil and/or historic rail operations.

EAST RAIL AREA

Surface Soil

- *The primary impacts for direct contact in the surface soil in the East Rail Area are associated with arsenic (EB-01, EB-07 and EB-10) and cobalt (EB-10).*
- *The primary impacts for migration (leaching) to groundwater are benzene (EB-10), antimony (EB-10), arsenic (EB-01, EB-07S and EB-10), barium (EB-02), cadmium (EB-10), silver (EB-10) and copper (EB-01, EB-10).*

Subsurface Soil

- *The impacts exceeding standards for direct contact in the subsurface soil in the East Rail Area are associated with organic compound classes VOC, SVOC, MDEQ VPH and MDEQ EPH and inorganic compounds arsenic and chromium.*
- *The impacts exceeding migration (leaching) to groundwater criteria include VOC, SVOC, MDEQ VPH and MDEQ EPH and inorganic compounds, arsenic, barium, copper, and lead.*

In the East Rail, the most widespread impacts in soil are benzene and naphthalene. These compounds are most prevalent near boring EB-03/MW-101 and naphthalene in the vicinity of EB-04.

WEST RAIL AREA

Surface Soil

- *The primary impacts for direct contact in the surface soil in the West Rail Area are limited to C9-C18 (WB-11D), arsenic (WB-01S, WB-03S, WB-12S) and lead (WB-01S, WB-03S).*
- *The primary impacts for migration (leaching) to groundwater are benzene at WB-03S, C9-C10 aromatics at WB-11D and C11-C22 aromatics at WB-11D (510 mg/kg). Inorganic COPCs for migration to groundwater include antimony (WB-01S), arsenic (WB-01S, WB-03S, WB-12S), barium (WB-12S), cadmium (WB-01S, WB-03S), copper (WB-01S), lead (WB-01S, WB-03S) and zinc (WB-01S, WB-03S).*

Subsurface Soil

- *The impacts exceeding standards for direct contact in the subsurface soil in the West Rail Area are associated with organic compound classes MDEQ VPH and MDEQ EPH and inorganic compounds arsenic and chromium.*
- *The impacts exceeding migration (leaching) to groundwater criteria include VOCs (benzene), MDEQ VPH and MDEQ EPH and inorganic compounds, arsenic, barium, cadmium, and zinc.*

The primary impacts in soil in the West Rail Area are associated with boring locations WB-01, WB-02, WB-10 and WB-11.

8.1.4 Groundwater Impacts

EAST RAIL AREA

Petroleum hydrocarbon impacts in the East Rail Area in both the Perched Unconfined and Upper Bedrock Semi-Confined hydrostratigraphic units or saturated zones are more prevalent in the eastern and central portions of the area than the western portion.

Perched Unconfined Saturated Zone

The discussion of the groundwater results from the Perched Unconfined Saturated Zone includes those borings and wells interpreted to be cross connected between the Perched Unconfined and Upper Bedrock Semi-Confined saturated zones.

- *No groundwater was measured (dry) in EB-09S. Abundant water was anticipated in this boring due to the sheet piling in the area that surrounds the onsite WWTP sludge tank. The sheet piling was thought to influence groundwater flow in the perched horizon and likely does on a very local level; however, an adjacent boring being dry illustrates the heterogeneous nature of the Perched Unconfined hydrostratigraphic unit and discontinuity of groundwater flow.*
- *A geo-fabric liner observed at 3 feet bgs in hand-augured boring EB-02 located between the rail tracks in the East Rail Area. It is not known how far the geotextile liner extends; however, groundwater was observed to be perched on this manmade surface and was observed to be daylighting to the south of the railroad ballast onto the vehicle road.*
- *Benzene and naphthalene are the primary contaminants in the Perched Unconfined Saturated Zone and were present above screening levels in most all the wells on the eastern and central portion of the East Rail Area. Groundwater samples from the following borings exceeded either or both COPC screening levels [EB-01S/MW-79S, EB-01D/MW-79D, EB-04S/MW-100, EB-04D, EB-05S, EB-06S/MW-81S, EB-06, EB-07S, EB-09D (cross connected) and EB-10 (cross connected)].*
- *Other VOCs and SVOCs present include ethylbenzene, 2,4-dimethylphenol, 2-methylnaphathalene and 1,2-DCA in EB01S/MW-79S; 2,4-dimethylphenol and 1,2-DCA in EB-10; 1,2-DCA in EB-01D/MW-79D; 2-methylnaphathalene in EB-07, EB-04D and EB-06S/MW-81S. The relevance of the 1,2-DCA in groundwater was previously discussed. It should be noted that 1,2-DCA was also present at a concentration below the screening level at EB-04S/MW-100.*
- *Petroleum hydrocarbon fractions were found in excess of screening levels at in the eastern and center portion of the East Rail Area at EB-05, EB-06, EB-07, EB-10, EB-04S/MW-100, EB01S/MW-79S and EB01D/MW-79D.*
- *Inorganics present in the Perched Unconfined groundwater in excess of screening levels include arsenic, barium, and cadmium. Arsenic and barium were in EB-06, MW-79S, MW-81S and EB-04S/MW-100. Arsenic and cadmium were found in EB-11*

and only cadmium in EB-14. Only arsenic was present in EB-01D/MW-79D, EB-10 and EB-15/MW-99.

Upper Bedrock Semi-Confined Saturated Zone

- *VOCs measured at concentrations exceeding relevant criteria include benzene and naphthalene in EB-06D/MW-81D and EB-07D, ethylbenzene in EB-07D and 1,2-DCA in EB-14D. The presence of 1,2-DCA being indicative of historic releases was previously discussed; however, the distribution of the 1,2-DCA in the deeper zone gives some insight as to the source. EB-14D is located on the western side of the East Rail Area in closest proximity to SWMU 11 (Past Leaded Sludge Oxidation Area South of Tank 52). 1,2-DCA was not present in perched groundwater at EB-14S.*
- *The SVOC 2-methylnaphathalene exceeded the screening level in EB-07D.*
- *Petroleum hydrocarbon fractions and the inorganic arsenic were measured above relevant criteria at EB-14D.*

WEST RAIL AREA

Petroleum hydrocarbon impacts in the West Rail Area are primarily limited to the Perched Unconfined Saturated Zone. These impacts are far less extensive than had been anticipated and are present at locations in close proximity to areas where LNAPL is present.

Perched Unconfined Saturated Zone

- *No groundwater was measured (dry) in the perched horizon borings WB-14S and WB-15 located south of the West Rail Area on the Great Falls WWTP property.*
- *Benzene is the primary contaminant found in groundwater in the West Rail Area. Not surprisingly the benzene concentrations are found in the boring closest to the LNAPL recovery wells (WB-01S, WB-02S, WB-04S) and along the interceptor trench (WB-08, WB-09S, WB-10, WB-11S).*
- *Though there were no exceedances of methyl tertiary butyl ether (MTBE) it was detected below screening levels in two shallow boring in the West Rail Area; WB-02S located near recovery wells on the northside of the area and WB-10 along the interceptor trench. MTBE an octane enhancer additive in gasoline that was widely used from 1992 through the mid-2000s as a replacement for lead. The lead scavenger 1,2-DCA was found in WB-14D located south of the West Rail Area.*
- *Petroleum hydrocarbon fractions in excess of screening levels are limited to the borings closest to the LNAPL recovery wells (WB-01S, WB-02S) and along the interceptor trench (WB-08, WB-09S, WB-10, WB-11S, WB-12S).*
- *Arsenic is the primary inorganic present in the perched horizon in the West Rail Area. It was present in excess of the screening level in all shallow borings completed within this zone except for WB-01S. Also found in excess of screening levels was barium in WB-10 and WB-11, total chromium in WB-01S, WB-06S, WB-8, WB-11S and WB-12S and cobalt in WB-04S, WB-05S, WB-6S, WB-08, WB09S and WB-12s).*

Upper Bedrock Semi-Confined Saturated Zone

- *Groundwater samples were collected from two of the six borings advanced into the Upper Bedrock Semi-Confined Zone. The other borings were dry (WB-02D, WB-04D, WB-06D and WB-09D).*
- *Naphthalene, petroleum hydrocarbon fractions and the inorganics arsenic and barium exceed screening levels the groundwater samples collected from WB-03D, the northwestern most location in the West Rail Area.*
- *Total chromium exceeds its screening level in downgradient location WB-13D.*
- *Given the remote locations and depth, the inorganics in these boring may be related to sources unrelated with the West Rail Area.*

8.1.5 Occurrence of LNAPL

EAST RAIL AREA

LNAPL was only present in one of the borings/monitoring wells (EB-03/MW-101) installed as part of this rail investigation and in MW-79S which was replaced as part of this effort. In MW-101 LNAPL was originally measured at 0.85 feet. The presence of free product has been continuous in the western portions of the East Rail at MW-79S and MW-101 throughout all groundwater monitoring events which ended in first quarter 2021. No LNAPL was observed during the investigation within the Upper Bedrock Semi-Confined zone during the RIAIM investigation in the immediate East Rail Area. Down-gradient from the East Rail Loading Area at MW-97 a sheen to approximately 0. 01 feet of LNAPL has been observed in the perched unconfined zone.

Based on recent chromatograms and hydrocarbon peak ratios, LNAPL samples collected from MW-79S indicates a predominately gasoline signature whereas MW-97 indicates both gasoline and diesel signature. In MW-101, a gasoline and diesel signature are also observed and based on the presence of heavier hydrocarbons, may contain other refined (and possibly weathered) products obscured by the unresolved complex mixture (e.g., fuel oil), suggesting a mixture from multiple sources. This fact, along with the fact that the when the new sewer clean out was installed in the area near MW-101, the trench filled with a product/water mixture, indicates that the source of the LNAPL in MW-101 may be from recent releases associated with the refinery sewer line.

The LNAPL transmissivity values for MW-101, calculated from the baildown tests performed as part of this investigation, fall within the range generally considered viable for active LNAPL recovery.

WEST RAIL AREA

LNAPL accumulated on groundwater in WB-01S and WB-02S at 0. 04 feet in both. These two borings are nearest to recovery wells MW-73, MW-75, and MW-76. LNAPL was measured at 0. 09 feet in MW-73, 0.83 feet in MW-75 and 0.94 feet in MW-76 during the

August 3rd quarter groundwater monitoring. LNAPL within the West Rail Area is defined as a sweet crude or a low sulfur diesel.

8.1.6 Contaminant Migration

Groundwater within the Perched Unconfined Saturated Zone does not have an apparent connection to the adjacent Missouri River, nor does there appear to be substantive vertical migration of the groundwater through the dry dusky red Upper Aquitard unit to the Upper Bedrock Semi-Confined Saturated Zone units. Therefore, contaminant migration via perched groundwater is limited.

Groundwater flow in the Perched Unconfined and Upper Bedrock Semi-Confined hydrostratigraphic units is south towards the Missouri River, located directly down-gradient of the Site. Perched groundwater does not have an apparent connection to the adjacent Missouri River as the base of the perched saturated zone daylights to the riverbank above the level of the river. Upper Bedrock Semi-Confined groundwater may also daylight along the riverbank above the river level and/or may discharge into the riverbank below the level of the river. Hydraulic conductivities measured in the down-gradient wells near the river are quite low, indicative of a silt or possibly cemented sand. These low hydraulic conductivities minimize the volume of impacted groundwater reaching the river.

8.2 RECOMMENDATIONS

Based on the results of this and previous investigative work in the rail areas and the conclusions presented above IM response actions recommended for the East and West RIAs are fairly limited. Specifically, CMR makes the following recommendations regarding path forward:

EAST RAIL AREA

LNAPL/Source Area

Continue the recovery activities using sorbent socks that are currently installed in MW-97, MW-70, MW-14R and MW-48 in and downgradient of the East Rail. Consider LNAPL recovery activities using sorbent socks at MW-79S and MW-101 if LNAPL thicknesses increase.

Further evaluate the sewer line (SWMU 20) in the vicinity of MW-101S to determine if releases from this sewer line are the source of the LNAPL observed in this well. If confirmed as the source, repair of the sewer line (SWMU 20) in the vicinity of MW-101 is recommended.

Soil

CMR has developed a soil management plan to guide any potential excavation and utility work in the East Rail Area for the purposes of limiting exposure to contaminants by construction workers and to appropriately manage the waste soil generated.

Determine appropriate facility-specific background concentrations in shallow soil as part of the upcoming RFI, with the collection of background samples from unimpacted areas that are representative of natural conditions. The background data collected will be used to evaluate if the elevated inorganic concentrations in the shallow soil horizon are at least in part naturally occurring background levels.

Groundwater

No additional actions are recommended regarding impacted groundwater at this time. The following activities are anticipated to be included as part of the upcoming RFI:

- *Characterization of the groundwater quality in the Upper Bedrock Semi-Confined Saturated Zone down-gradient of the East Rail;*
- *Abandonment and replacement of one crossed connected monitoring well (MW-91) with one monitoring well cluster to be installed in the Perched and Upper Bedrock Saturated Zones (MW-91S/MW-91D); and*
- *Installation of one Upper Bedrock Saturated Zone monitoring well (MW-79D2).*

WEST RAIL AREA

LNAPL/Source Area

Operation of the existing product recovery system should continue. The system was recently upgraded (October 2020) with the addition of skimmer pumps to replace the total fluid recovery pumps. Further evaluation of potential upgrades related to the system, both the wells and the interceptor trench, to include valving so that product recovery volumes from each well and the trench can be measured separately. Based on the recovery information, the need for any additional upgrades to the system in this area may need to be assessed.

Soil

CMR has developed a soil management plan to guide any potential excavation and utility work in the West Rail Area for the purposes limiting exposure to contaminants by construction workers and to appropriately manage the waste soil generated.

Determine appropriate facility-specific background concentrations in shallow soil as part of the upcoming RFI, with the collection of background samples from unimpacted areas that are representative of natural conditions. As with the East Rail Area, the background data collected will be used to evaluate if the elevated inorganics concentrations in the shallow soil horizon are at least in part naturally occurring background levels.

Groundwater

No additional actions are recommended regarding impacted groundwater. However, as part of the upcoming RFI CMR it is anticipated that characterization of the groundwater quality in the Perched Unconfined Saturated Zone down-gradient of the West Rail will be included.

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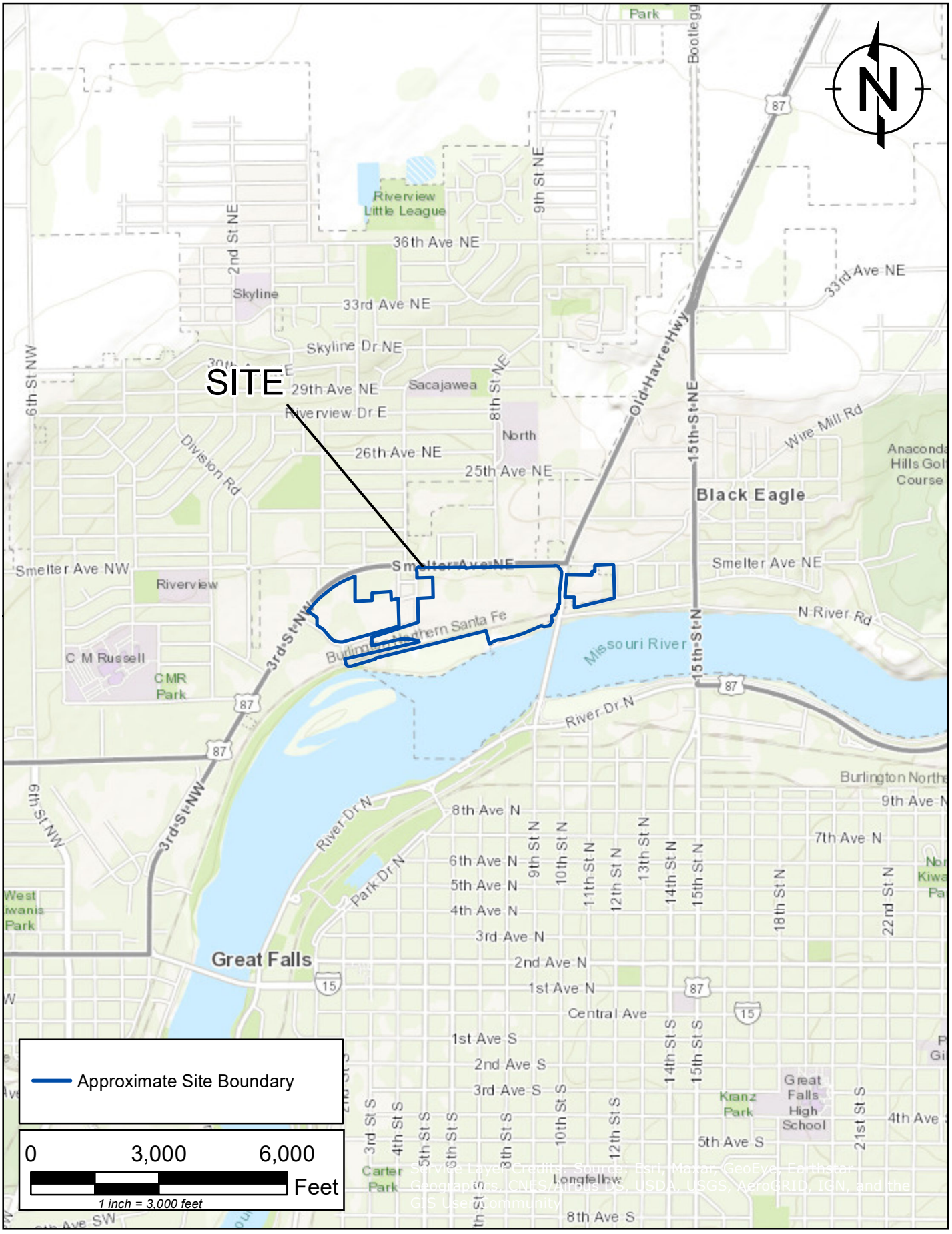
FIGURES



RAMBOLL

DRAFTED BY: DFM | Date: 9/9/2021

Site Location
CALUMET MONTANA REFINING, LLC
1900 10TH STREET NORTHEAST
GREAT FALLS, MT

FIGURE 1

PROJECT: 1690013825

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Chemical Storage Pad (contained)
Fuel Tanks
Office
Fire Rescue
Chemical Storage for Water Treatment
Lube Storage
Office
Lab Chemical Storage
Totes
Northwest Tank Farm
Former Land Farm Area
Tank Farm
Process Area
Truck Loading Rack (East Property)
Fuel
Refinery Warehouse (Former Shopping Mall)
Southwest Tank Farm
East Rail Rack
Fuel
Fuel
Fuel
Wastewater Treatment Plant
West Rail Rack
Maintenance Building
Water Jet
Energy Substation
90 Day Hazardous Waste Storage Pad

N

0 200 400
SCALE IN FEET

- Facility Boundary
- Non-API 650 Storage Tanks
- Plant Truck Loading Rack
- Process Area
- Wastewater Treatment Area
- Tank Farm Area

Site Layout and Operations Map

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

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FIGURE 2

DRAFTED BY: DFM | DATE: 8/27/2021 | PROJECT: 1690013825

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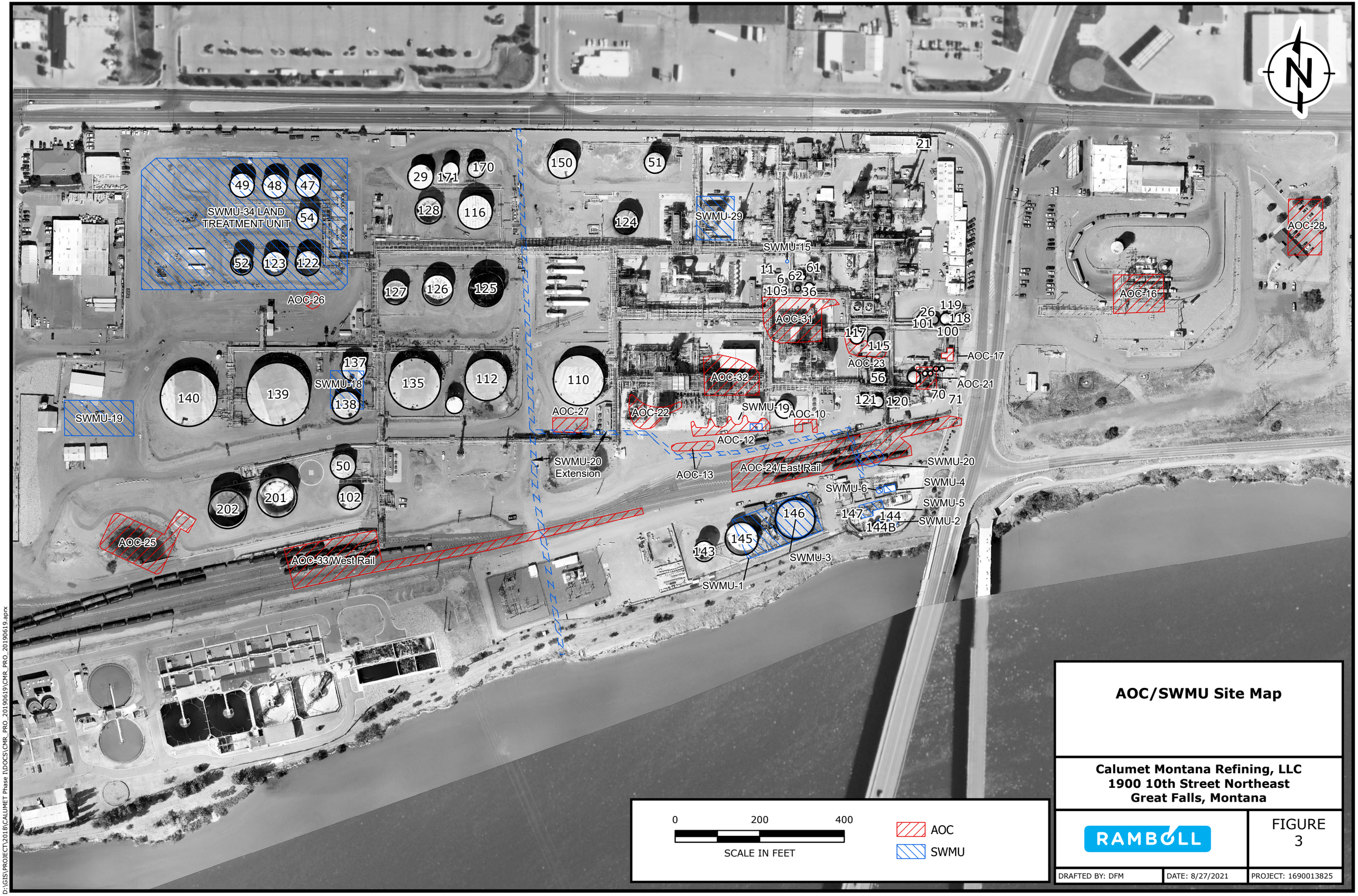

AOC/SWMU Site Map

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE 3

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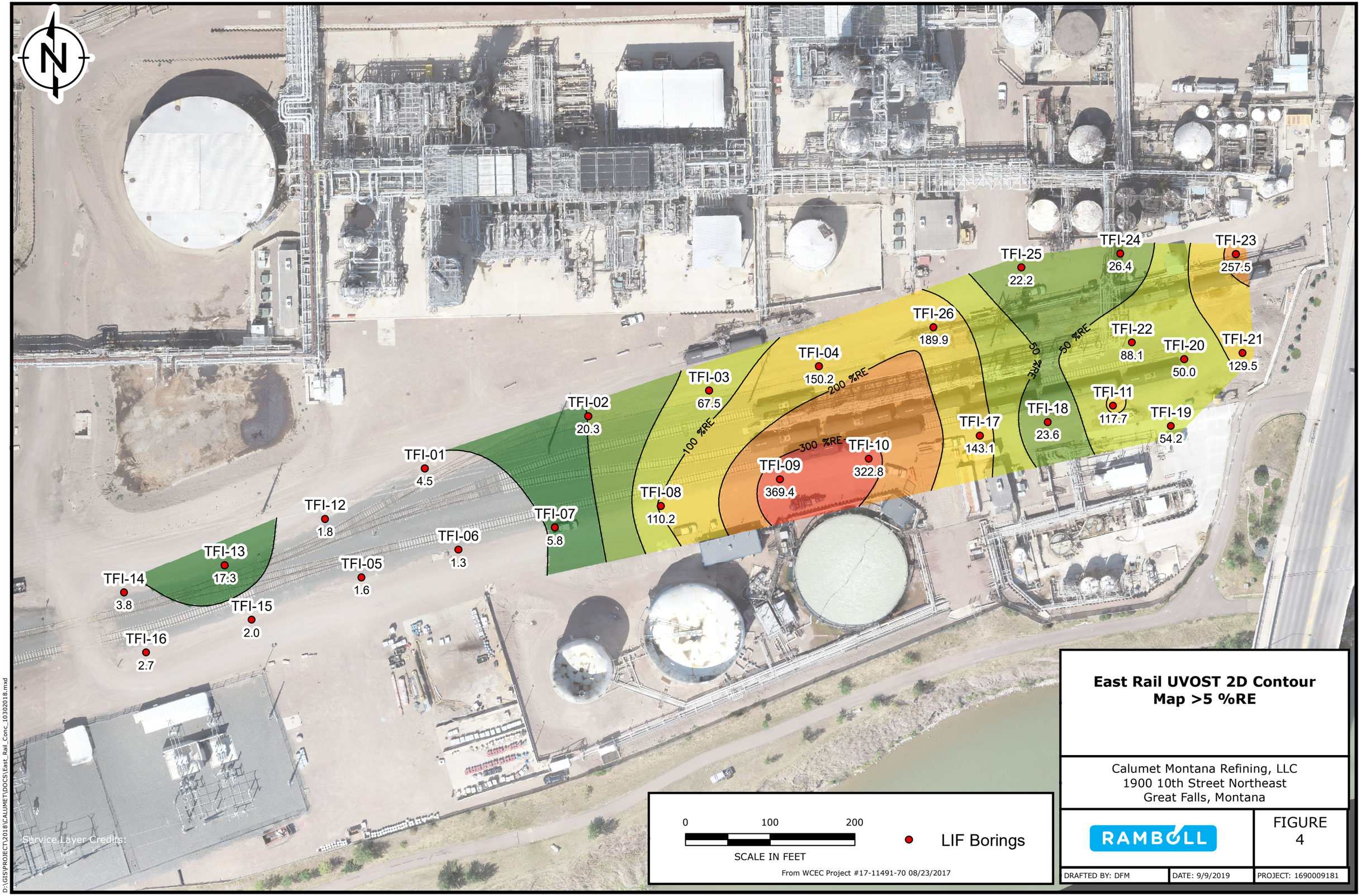

East Rail UVOST 2D Contour
Map >5 %RE

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE
4

DRAFTED BY: DFM	DATE: 9/9/2019	PROJECT: 1690009181

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West Rail UVOST
2D Contour Map > 5 %RE

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE
5

DRAFTED BY: DFM	DATE: 9/9/2019	PROJECT: 1690009181

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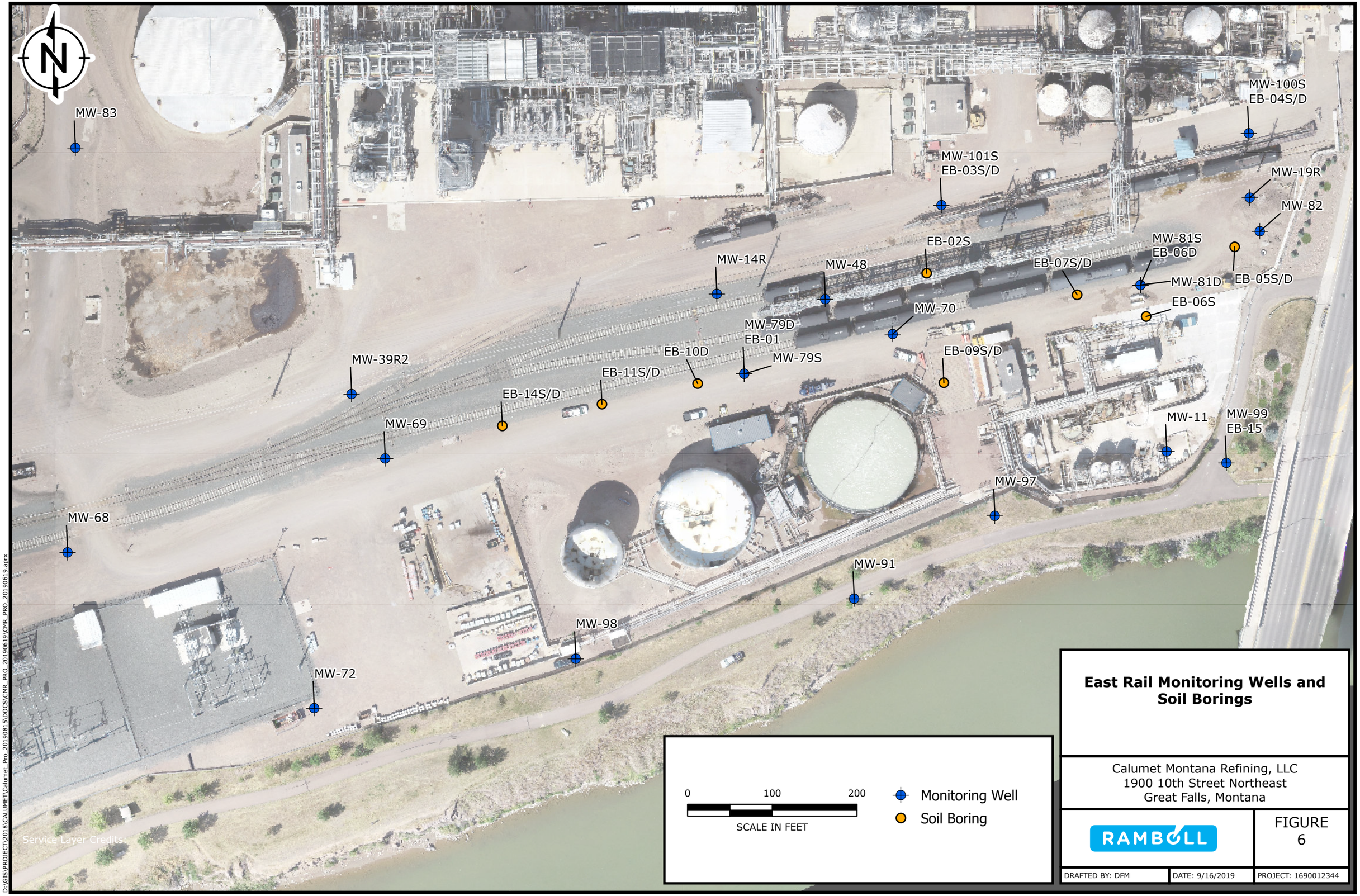

East Rail Monitoring Wells and Soil Borings

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE 6

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West Rail Monitoring Wells and Soil Borings

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE 7

DRAFTED BY: DFM	DATE: 9/17/2019	PROJECT: 1690012344

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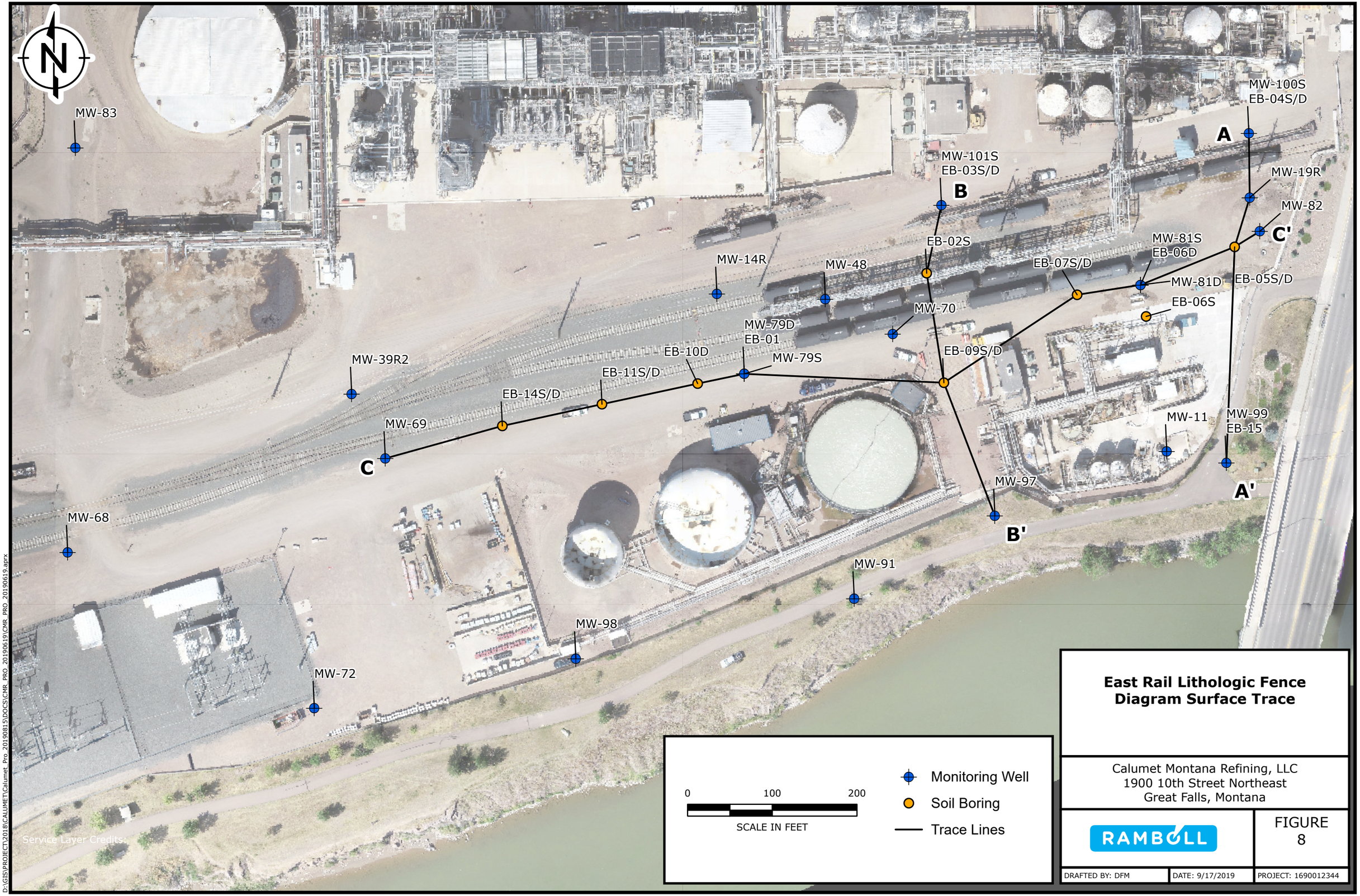

East Rail Lithologic Fence Diagram Surface Trace

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

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FIGURE 8

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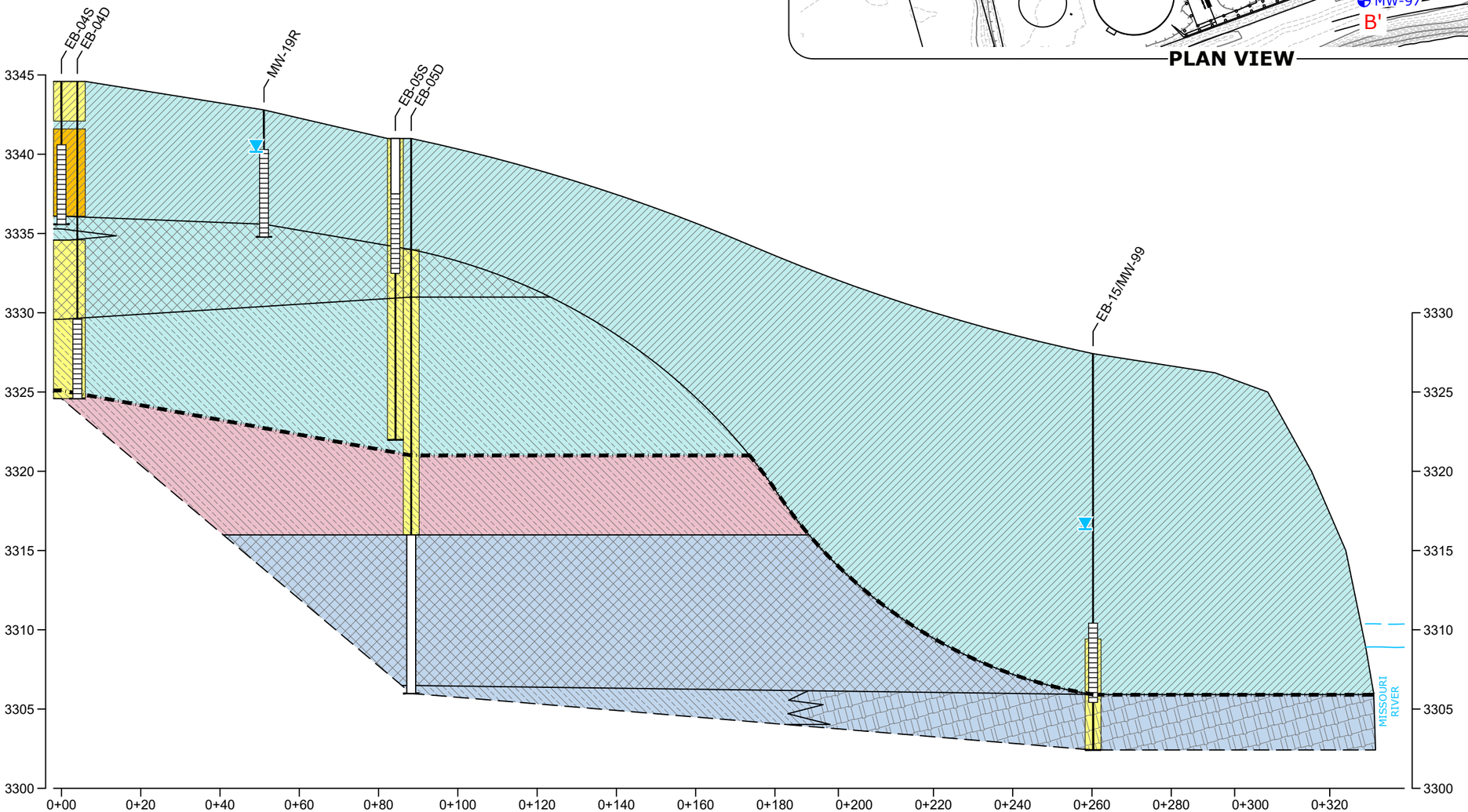
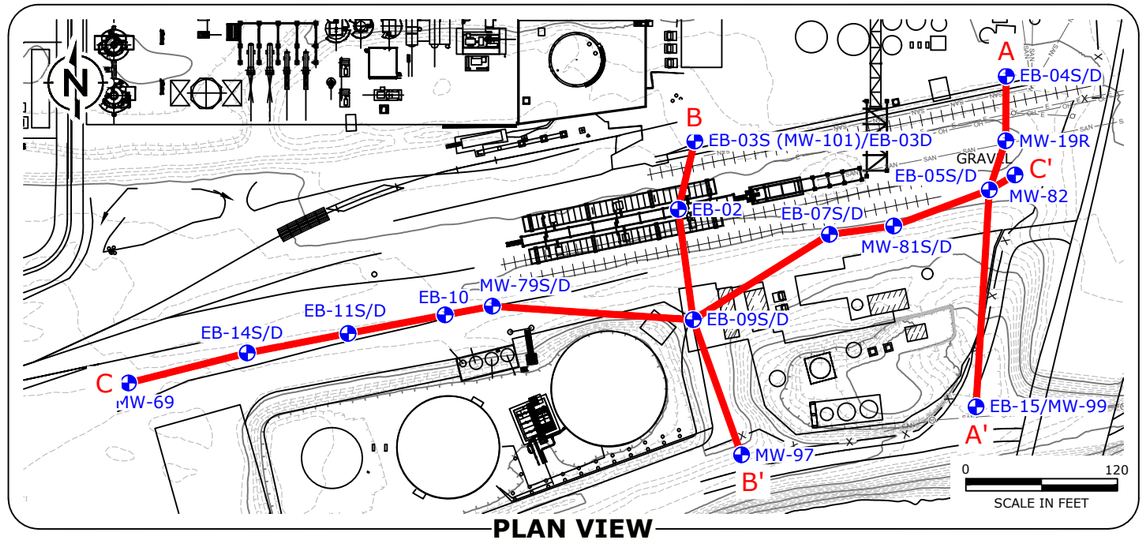
CROSS SECTION
A - A'





PLAN VIEW

LEGEND

- SAMPLE LOCATION END OF BORING
- LITHOLOGY CONTACT
- INFERRED LITHOLOGY UNIT BOUNDARY
- MONITORING WELL SCREEN INTERVAL
- FILL / NATIVE SANDS AND SILTS
- WELL CEMENTED SANDSTONE
- BROWN SANDSTONE
- DUSKY-RED SILTSTONE
- GRAY SILTSTONE
- INTERBEDDED DUSKY-RED SILTSTONE / GRAY SILTSTONE
- TOP OF COMPETENT BEDROCK (APPROXIMATE)
- WATER LEVEL (JULY 2019)
- SIGNS OF HC CONTAMINATION (STAINING/SHEEN/ODOR)
- SIGNS OF HC CONTAMINATION (ODOR)
- PERCHED UNCONFINED SATURATED ZONE
- UPPER AQUITARD
- UPPER BEDROCK SEMI-CONFINED SATURATED ZONE

NOTE:
1. Only water levels from monitoring wells installed within the Perched Unconfined Saturated Zone are shown.
2. The water level of the Missouri River is based on fluctuation of water level at sand point well MW-43 in 2020 and 2021.

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DATE

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FILE LOCATION: L:\Lhoe Project Files_CAD\1690019871_Calumet_2021_RCRA\-006\9ABC-11AB_Geologic XS.dwg

DRAFTED BY: CKL

DATE: 9/13/2021

DESIGNED BY: KC

APPROVED BY: KC

RAMBOLL

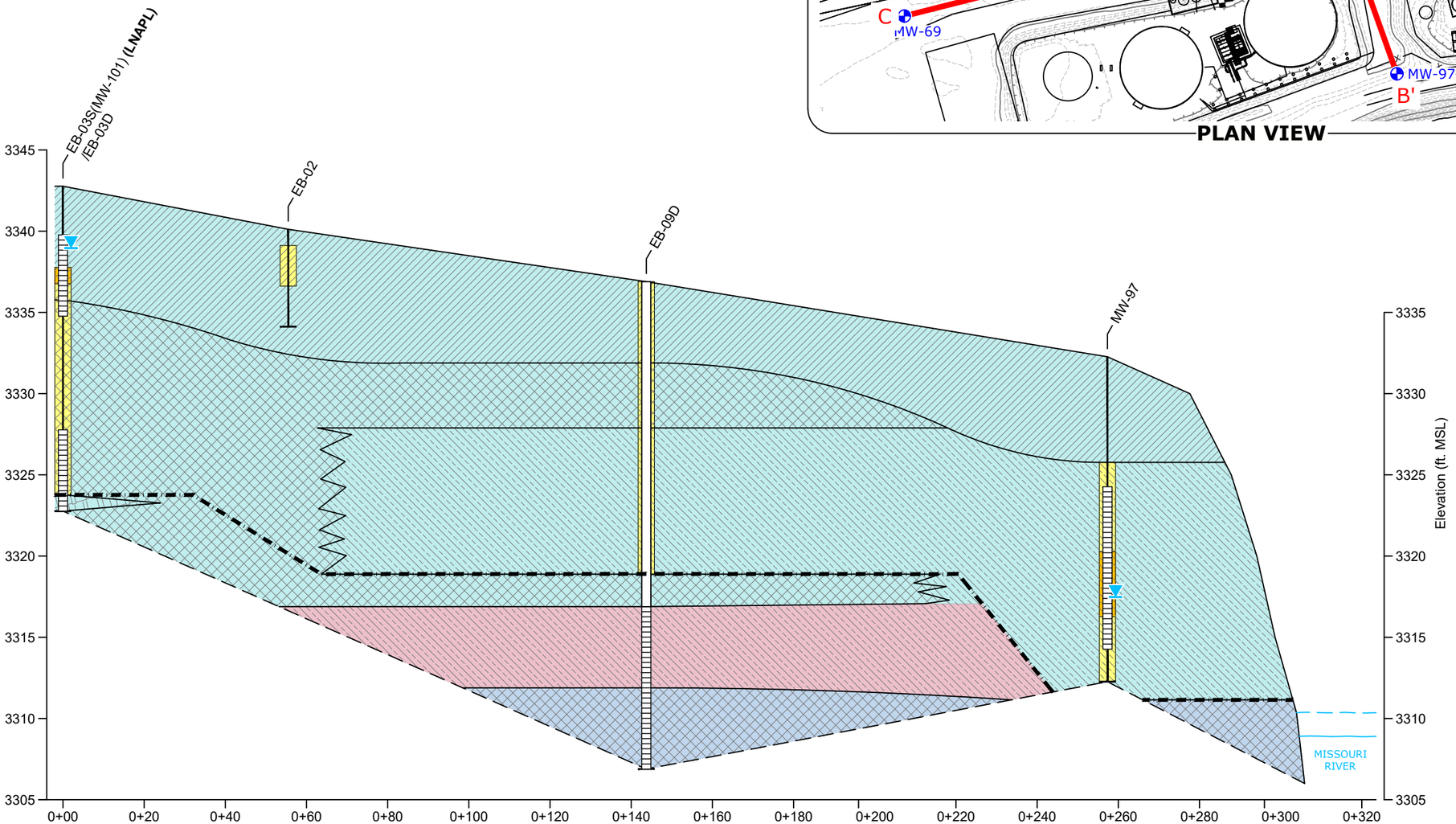
UPDATED CONCEPTUAL SITE MODEL (CSM) REPORT

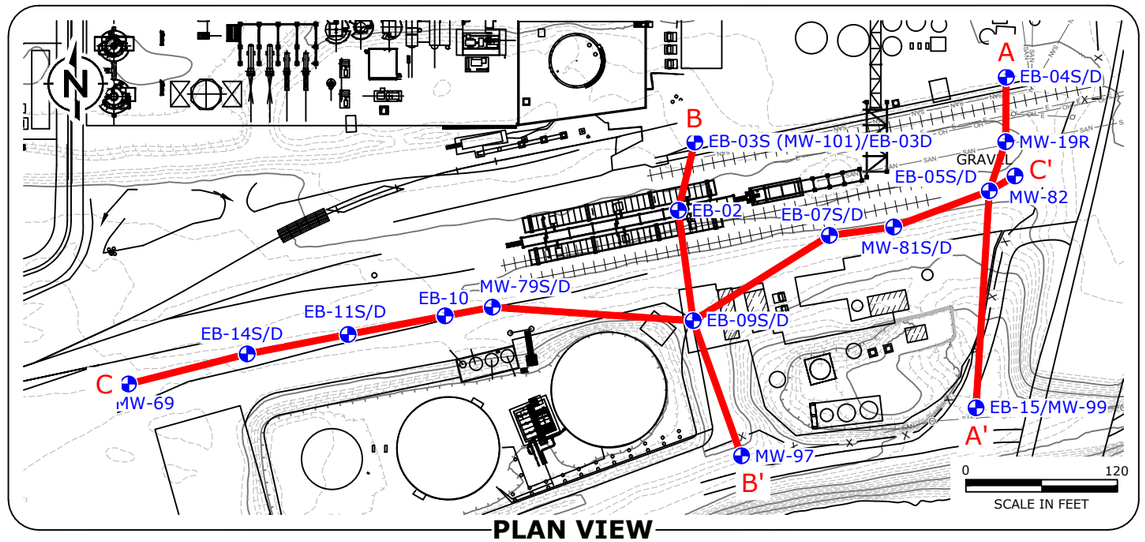
GEOLOGIC CROSS-SECTION A-A' - EAST RAIL LOADING AREA

1690019871-002

FIGURE
9A

CROSS SECTION
B - B'





PLAN VIEW

LEGEND

- SAMPLE LOCATION END OF BORING
- LITHOLOGY CONTACT
- INFERRED LITHOLOGY UNIT BOUNDARY
- MONITORING WELL SCREEN INTERVAL
- FILL / NATIVE SANDS AND SILTS
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- GRAY SILTSTONE
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- TOP OF COMPETENT BEDROCK (APPROXIMATE)
- WATER LEVEL (JULY 2019)
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- UPPER BEDROCK SEMI-CONFINED SATURATED ZONE

NOTE:
1. Only water levels from monitoring wells installed within the Perched Unconfined Saturated Zone are shown.
2. The water level of the Missouri River is based on fluctuation of water level at sand point well MW-43 in 2020 and 2021.

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DATE: 9/13/2021

DESIGNED BY: KC

APPROVED BY: KC

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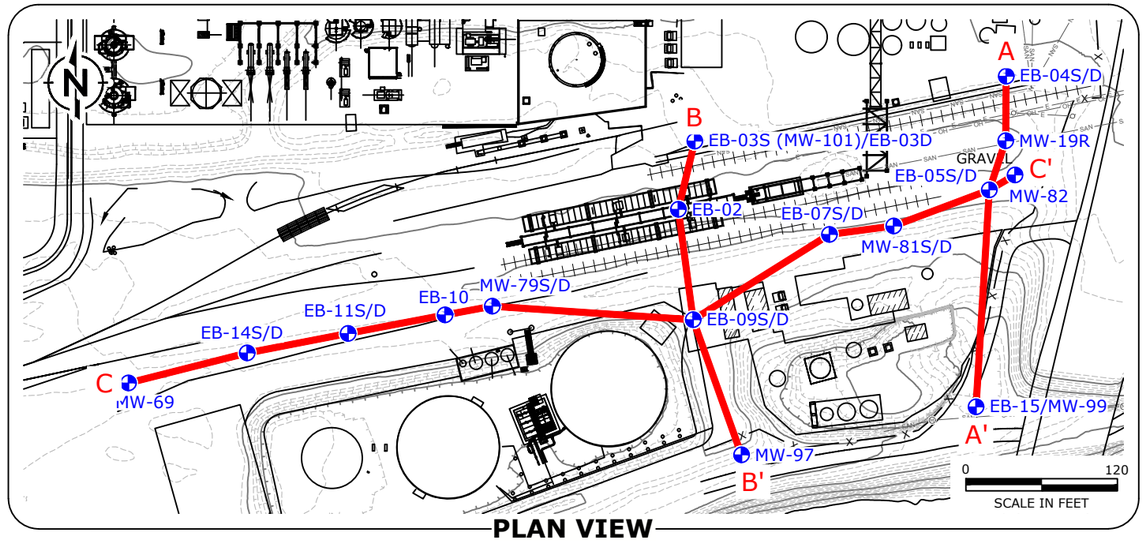
UPDATED CONCEPTUAL SITE MODEL (CSM) REPORT

GEOLOGIC CROSS-SECTION B-B' - EAST RAIL LOADING AREA

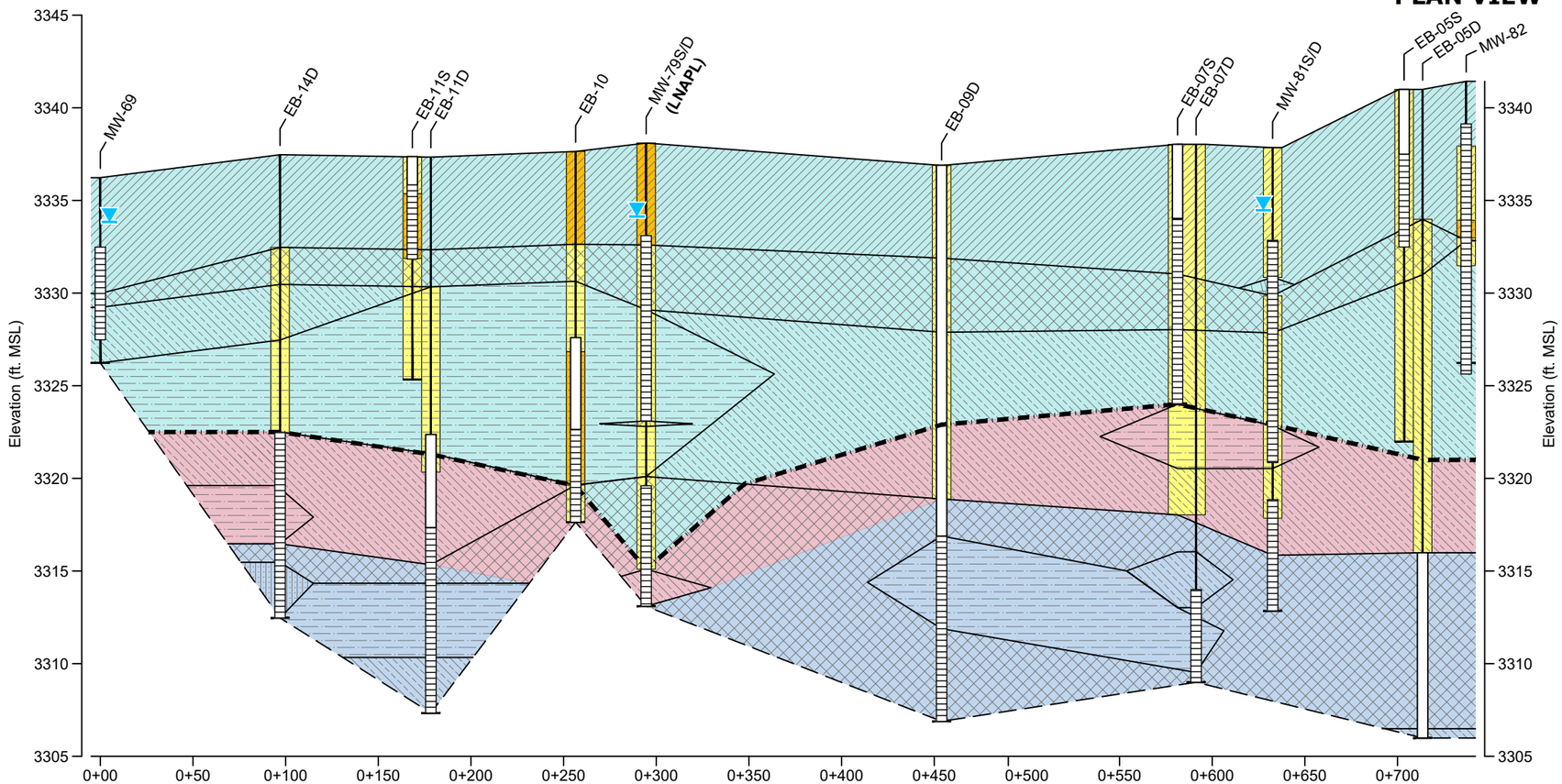
1690019871-002

FIGURE
9B

CROSS SECTION
C - C'



PLAN VIEW



LEGEND

- SAMPLE LOCATION END OF BORING
- LITHOLOGY CONTACT
- INFERRED LITHOLOGY UNIT BOUNDARY
- MONITORING WELL SCREEN INTERVAL
- FILL / NATIVE SANDS AND SILTS
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- TOP OF COMPETENT BEDROCK (APPROXIMATE)
- WATER LEVEL (JULY 2019)
- SIGNS OF HC CONTAMINATION (STAINING/SHEEN/ODOR)
- SIGNS OF HC CONTAMINATION (ODOR)
- PERCHED UNCONFINED SATURATED ZONE
- UPPER AQUITARD
- UPPER BEDROCK SEMI-CONFINED SATURATED ZONE

NOTE:
1. Only water levels from monitoring wells installed within the Perched Unconfined Saturated Zone are shown.

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APPROVED BY: KC

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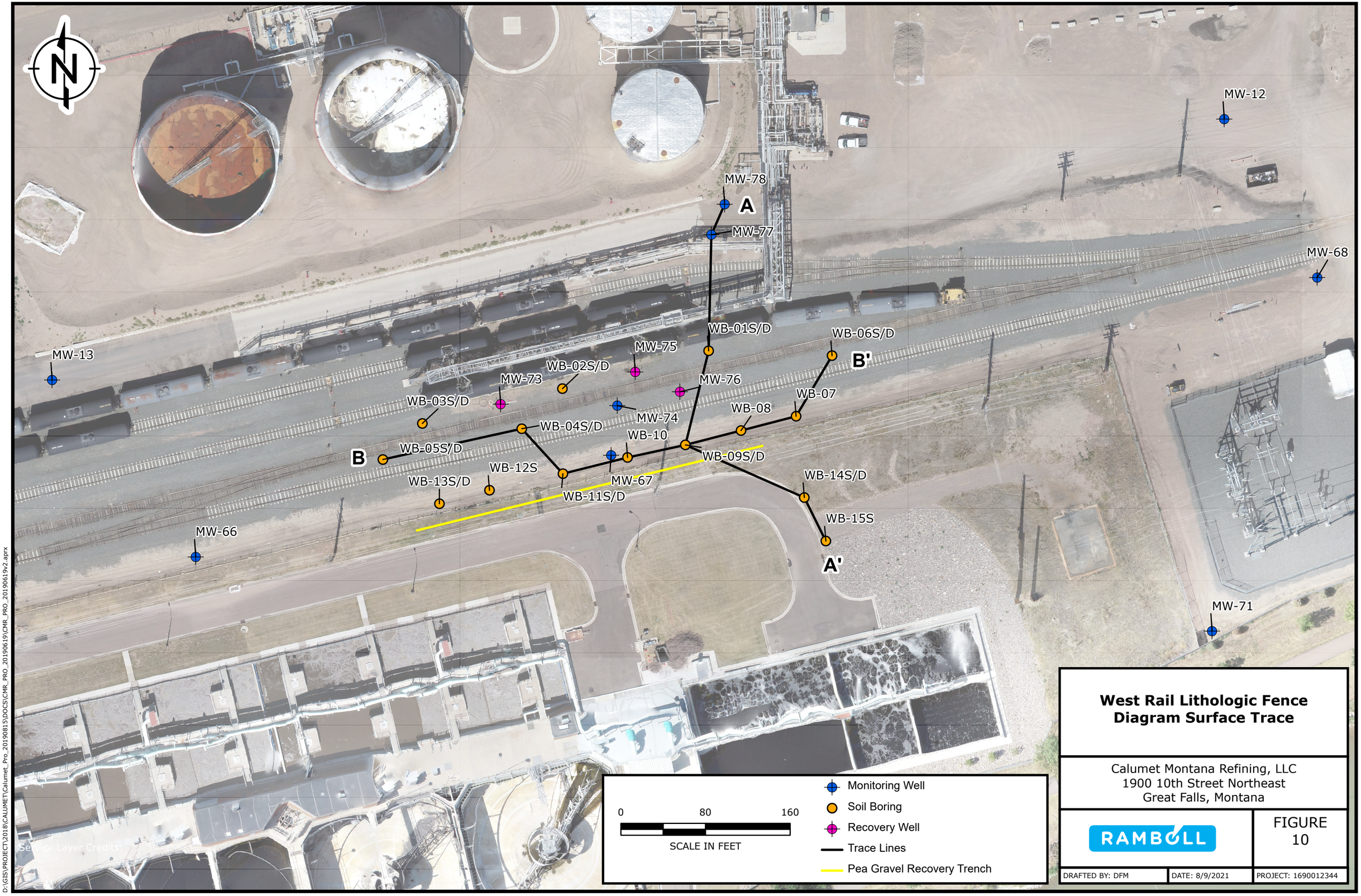
UPDATED CONCEPTUAL SITE MODEL (CSM) REPORT

GEOLOGIC CROSS-SECTION C-C' - EAST RAIL LOADING AREA

1690019871-002

FIGURE
9C



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West Rail Lithologic Fence Diagram Surface Trace

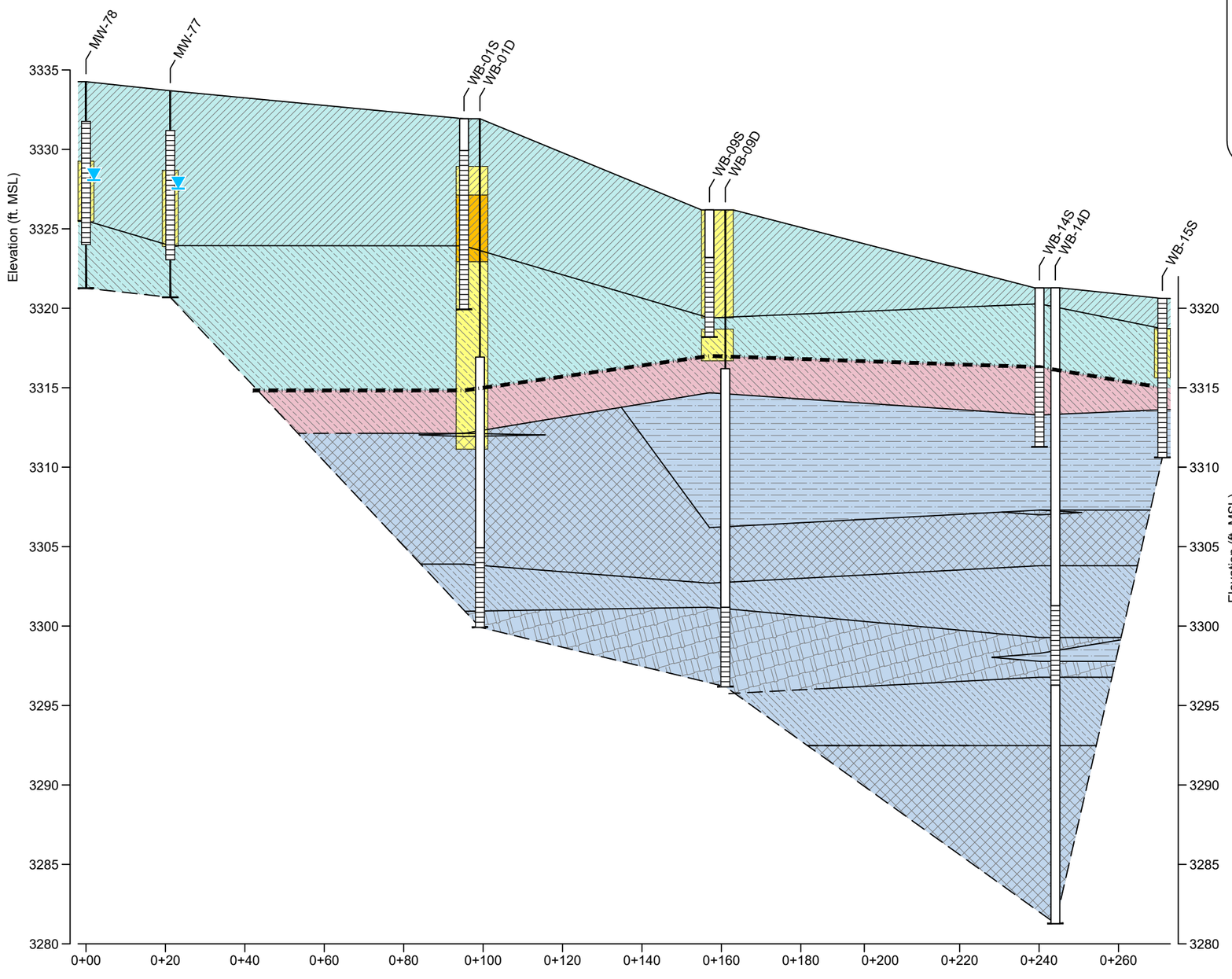
Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

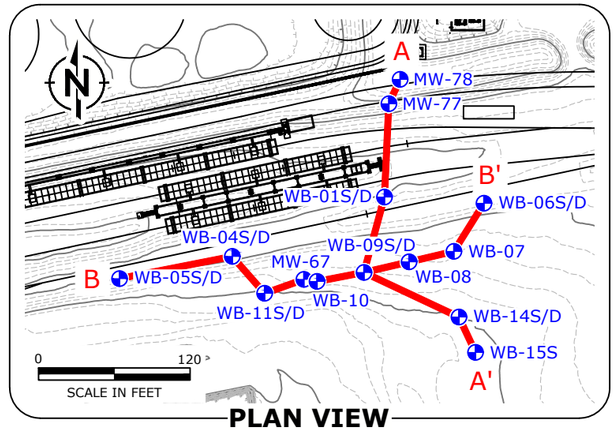
RAMBOLL

FIGURE 10

DRAFTED BY: DFM	DATE: 8/9/2021	PROJECT: 1690012344

CROSS SECTION
A - A'





PLAN VIEW

LEGEND

- SAMPLE LOCATION END OF BORING
- LITHOLOGY CONTACT
- INFERRED LITHOLOGY UNIT BOUNDARY
- MONITORING WELL SCREEN INTERVAL
- FILL / NATIVE SANDS AND SILTS
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NOTE:
1. Only water levels from monitoring wells installed within the Perched Unconfined Saturated Zone are shown.

DRAFT

DATE

SIGNATURE

FILE LOCATION: L:\Jobs Project Files_CAD\1690019871_Calumet_2021_RCRA\-006\9ABC-11AB_Geologic XS.dwg

DRAFTED BY: CKL

DESIGNED BY: KC

DATE: 9/13/2021

APPROVED BY: KC

RAMBOLL

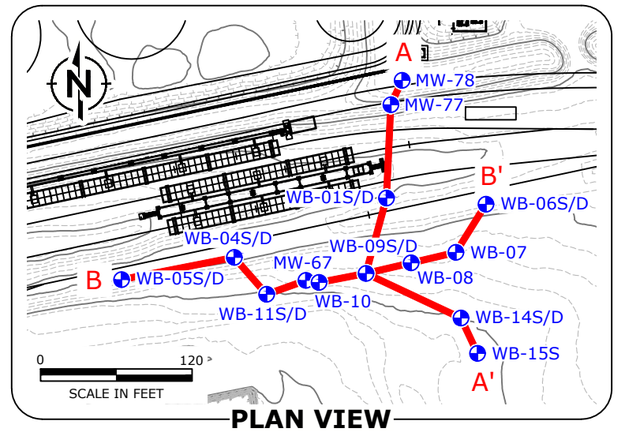
UPDATED CONCEPTUAL SITE MODEL (CSM) REPORT

GEOLOGIC CROSS-SECTION A-A' - WEST RAIL LOADING AREA

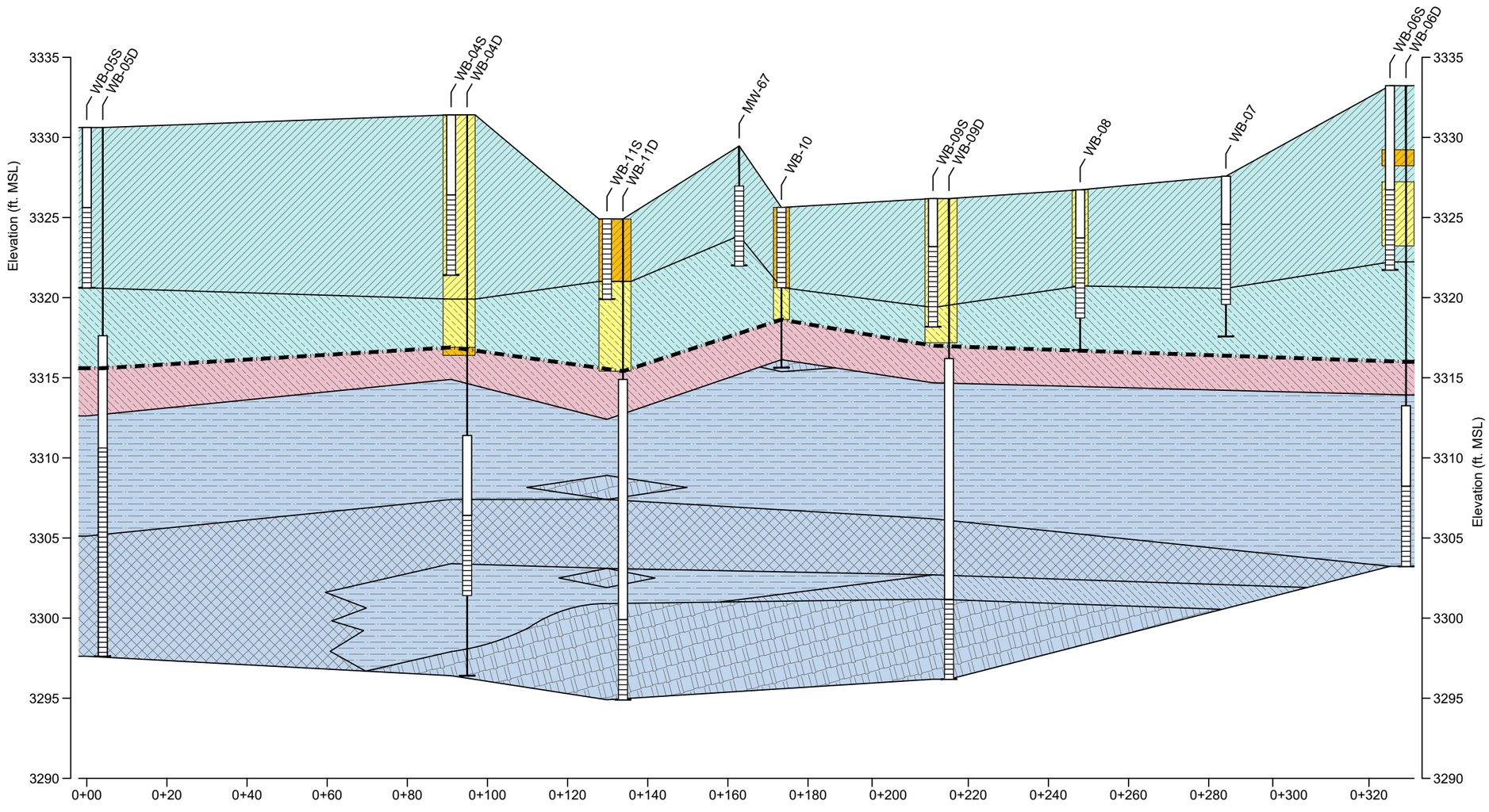
1690019871-002

FIGURE
11A

CROSS SECTION
B - B'



PLAN VIEW



LEGEND

- SAMPLE LOCATION END OF BORING
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- UPPER AQUITARD
- UPPER BEDROCK SEMI-CONFINED SATURATED ZONE

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DRAFTED BY: CKL

DATE: 9/13/2021

DESIGNED BY: KC

APPROVED BY: KC

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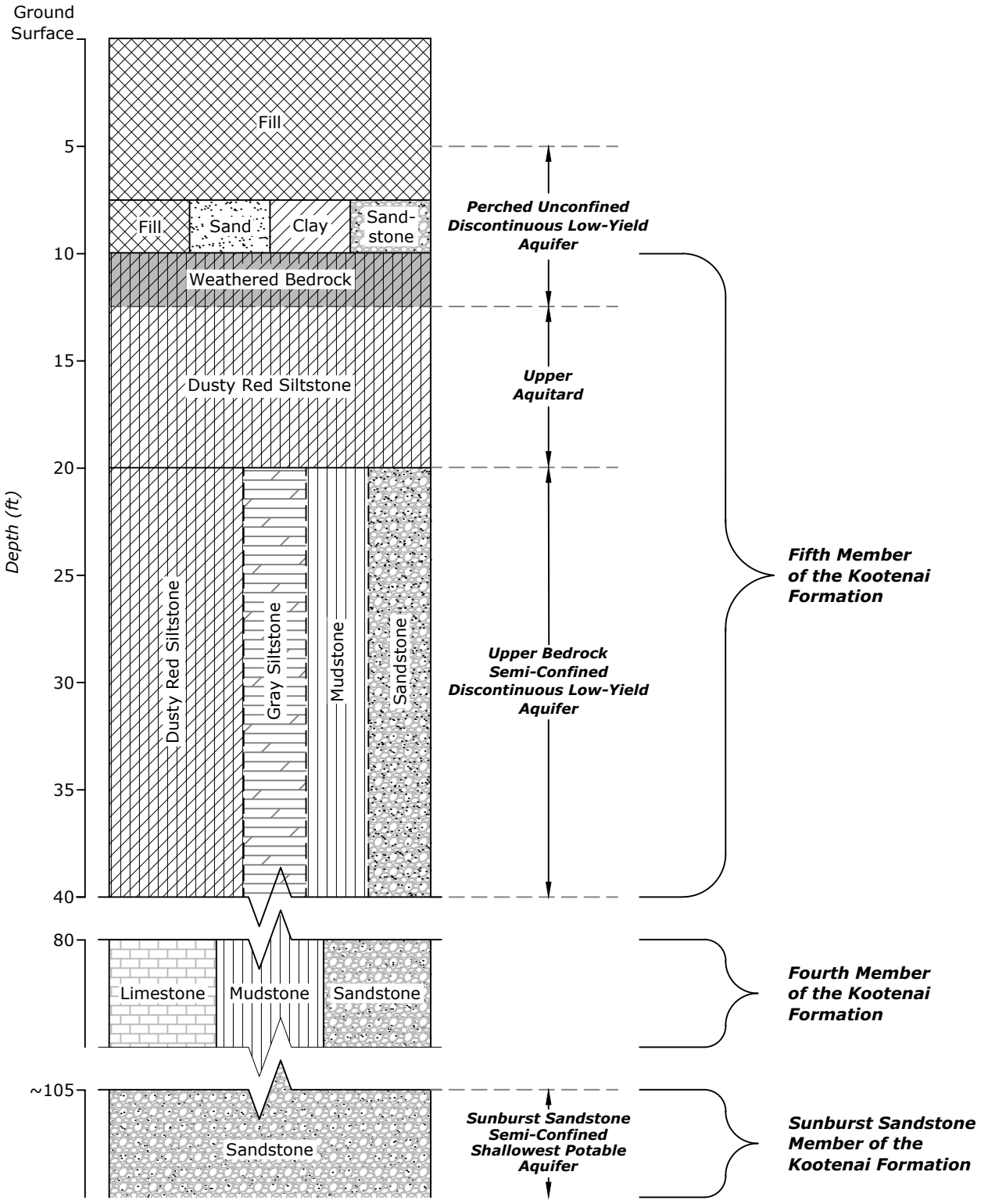
UPDATED CONCEPTUAL SITE MODEL (CSM) REPORT

GEOLOGIC CROSS-SECTION B-B' - WEST RAIL LOADING AREA

1690019871-002

FIGURE
11B



Note:

i. The depths associated with each stratigraphic unit are approximate and intended to be illustrative of the geology encountered beneath the Calumet Montana Refinery.

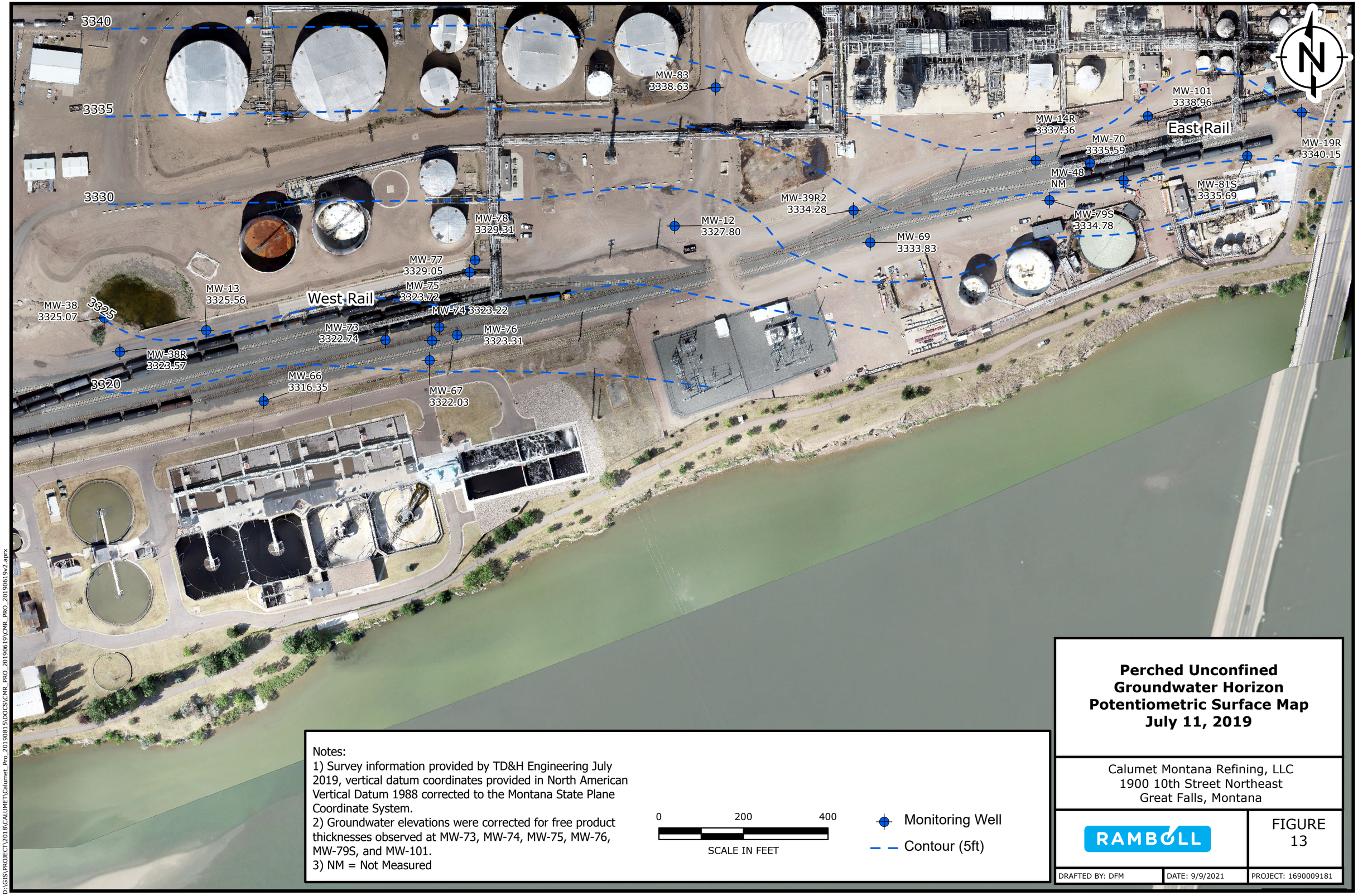
RAMBOLL

CMR Lithology - Typical Stratigraphic Column Schematic

FIGURE 12

DRAFTED BY: APR/CKL | DATE: 5/6/2021 | 1690019871

L:\Loop Project Files_CAD\1690019871_Calumet_2021_RCRA\-002\07_CMR Lith-Typ Stratigraphic Column Schematic.dwg



Notes:
1) Survey information provided by TD&H Engineering July 2019, vertical datum coordinates provided in North American Vertical Datum 1988 corrected to the Montana State Plane Coordinate System.
2) Groundwater elevations were corrected for free product thicknesses observed at MW-73, MW-74, MW-75, MW-76, MW-79S, and MW-101.
3) NM = Not Measured

0 200 400
SCALE IN FEET

Monitoring Well
Contour (5ft)

Perched Unconfined Groundwater Horizon Potentiometric Surface Map July 11, 2019

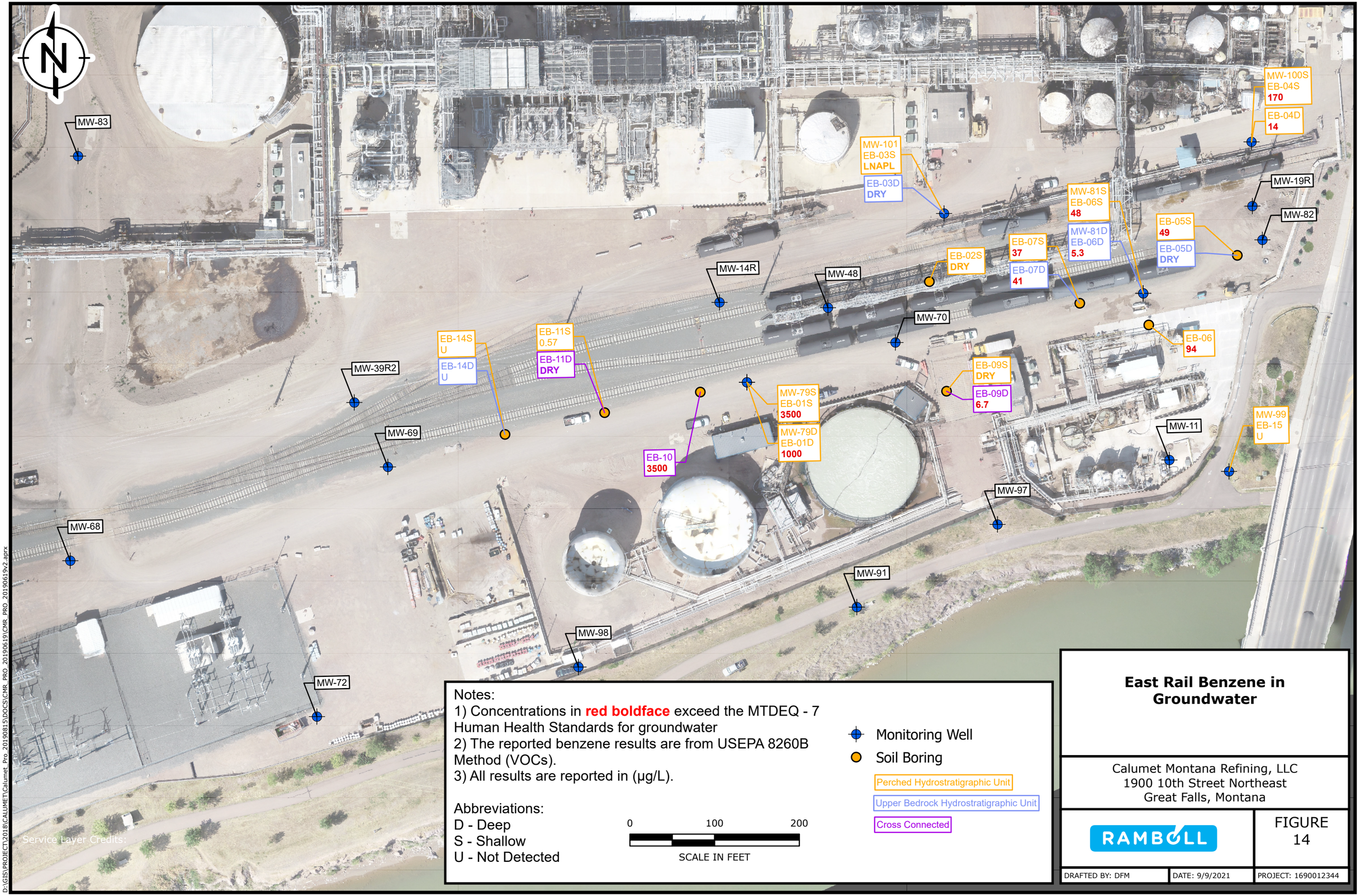
Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE 13

DRAFTED BY: DFM | DATE: 9/9/2021 | PROJECT: 1690009181

D:\GIS\PROJECT\2018\CALUMET\Calumet_Pro_20190815\DOCS\CMR_PRO_20190619\CMR_PRO_20190619v2.aprx



Notes:
1) Concentrations in **red boldface** exceed the MTDEQ - 7 Human Health Standards for groundwater
2) The reported benzene results are from USEPA 8260B Method (VOCs).
3) All results are reported in (µg/L).

Abbreviations:
D - Deep
S - Shallow
U - Not Detected

0 100 200
SCALE IN FEET

- Monitoring Well
- Soil Boring
- Perched Hydrostratigraphic Unit
- Upper Bedrock Hydrostratigraphic Unit
- Cross Connected

East Rail Benzene in Groundwater

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE 14

DRAFTED BY: DFM | DATE: 9/9/2021 | PROJECT: 1690012344

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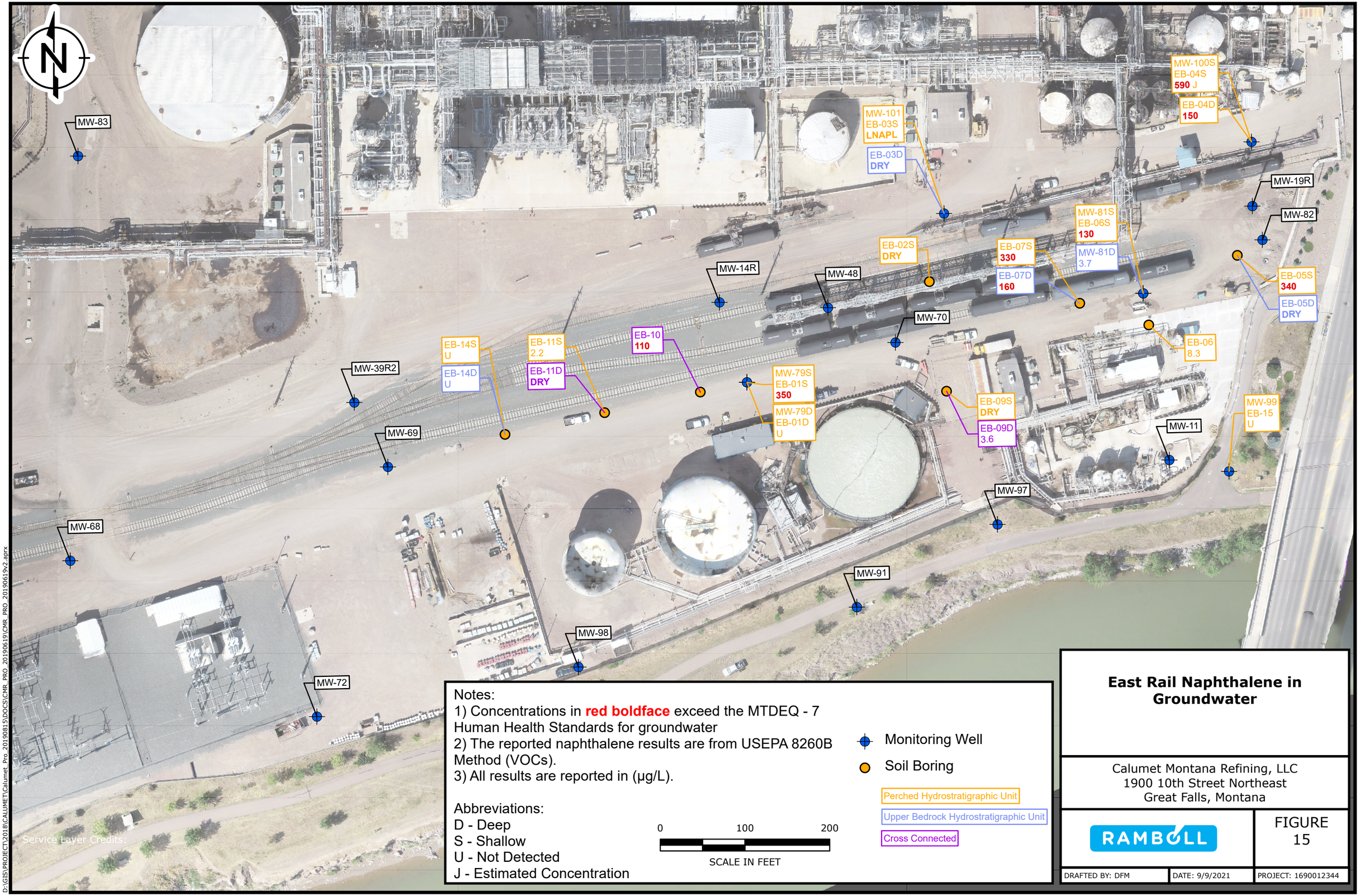

Notes:
1) Concentrations in **red boldface** exceed the MTDEQ - 7 Human Health Standards for groundwater
2) The reported naphthalene results are from USEPA 8260B Method (VOCs).
3) All results are reported in (µg/L).

Abbreviations:
D - Deep
S - Shallow
U - Not Detected
J - Estimated Concentration

0 100 200
SCALE IN FEET

Monitoring Well
Soil Boring
Perched Hydrostratigraphic Unit
Upper Bedrock Hydrostratigraphic Unit
Cross Connected

East Rail Naphthalene in Groundwater

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE 15

DRAFTED BY: DFM | DATE: 9/9/2021 | PROJECT: 1690012344

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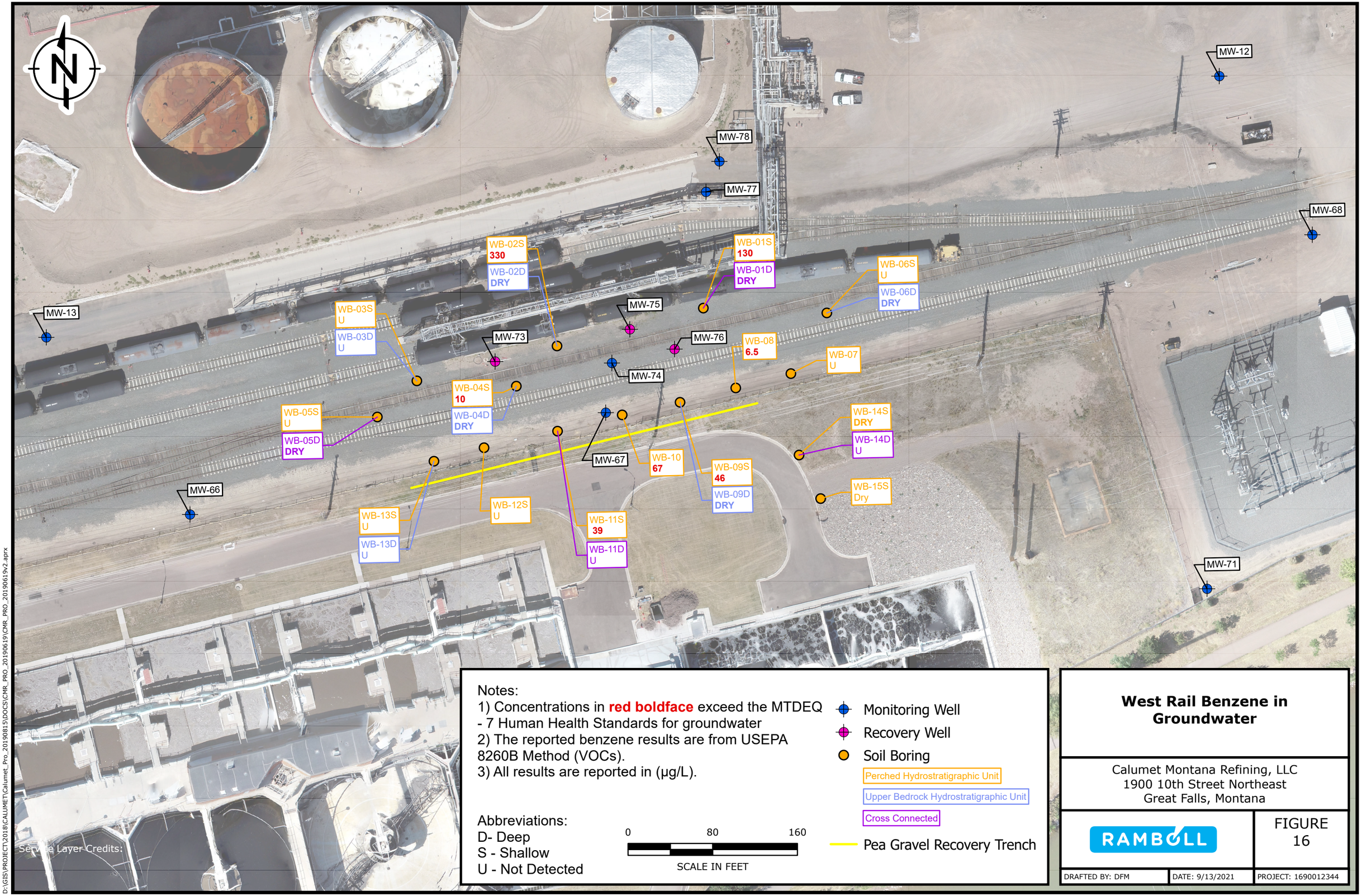


Notes:
1) Concentrations in **red boldface** exceed the MTDEQ - 7 Human Health Standards for groundwater
2) The reported benzene results are from USEPA 8260B Method (VOCs).
3) All results are reported in (µg/L).

Abbreviations:
D- Deep
S - Shallow
U - Not Detected

0 80 160
SCALE IN FEET

- Monitoring Well
- Recovery Well
- Soil Boring
- Perched Hydrostratigraphic Unit
- Upper Bedrock Hydrostratigraphic Unit
- Cross Connected
- Pea Gravel Recovery Trench

West Rail Benzene in Groundwater

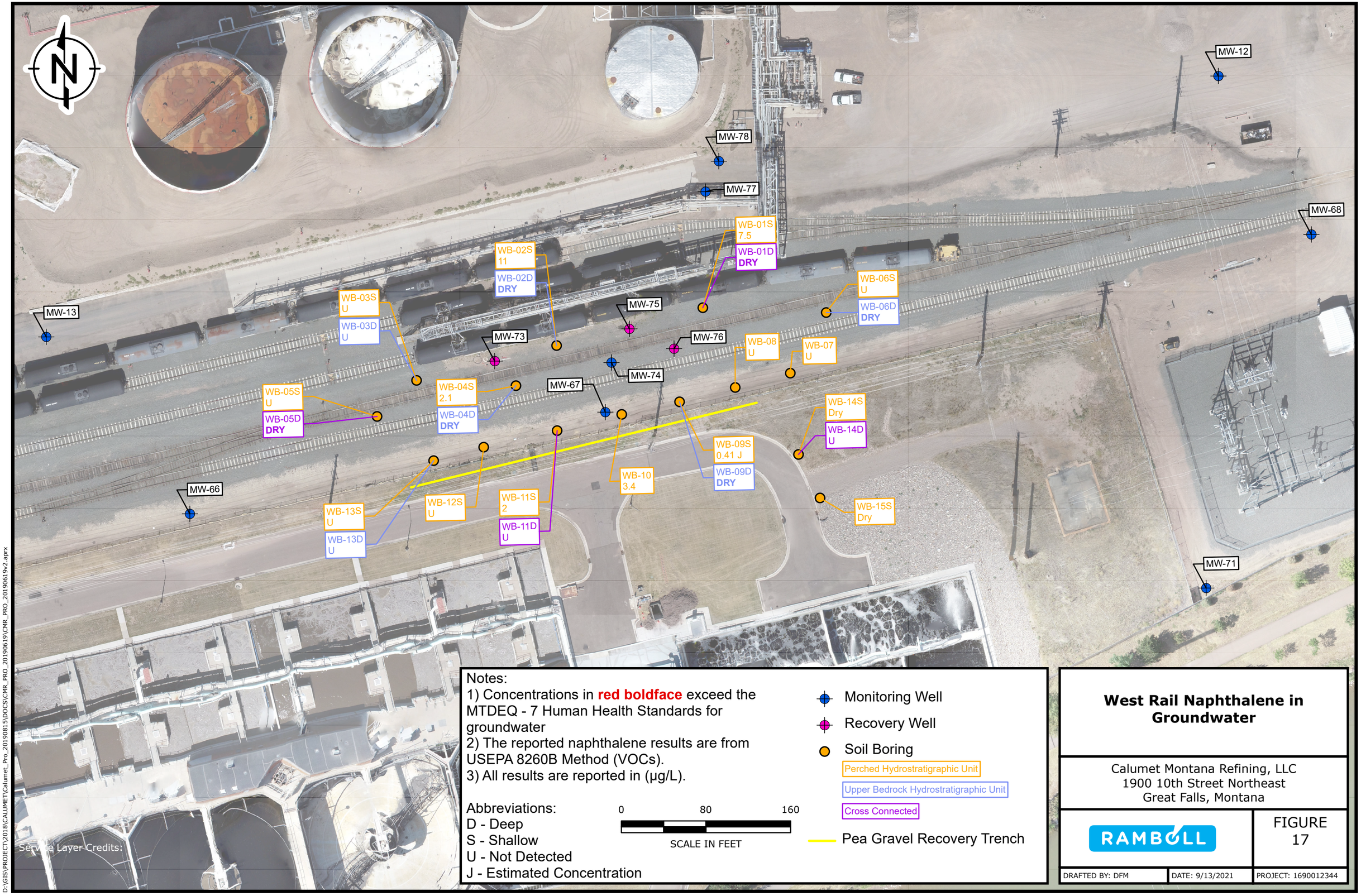
Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE 16

DRAFTED BY: DFM | DATE: 9/13/2021 | PROJECT: 1690012344

D:\GIS\PROJECT\2018\CALUMET\Calumet_Pro_20190815\DOCS\CMR_PRO_20190619\CMR_PRO_20190619v2.aprx



Notes:
1) Concentrations in **red boldface** exceed the MTDEQ - 7 Human Health Standards for groundwater
2) The reported naphthalene results are from USEPA 8260B Method (VOCs).
3) All results are reported in (µg/L).

Abbreviations:
D - Deep
S - Shallow
U - Not Detected
J - Estimated Concentration

0 80 160
SCALE IN FEET

- Monitoring Well
- Recovery Well
- Soil Boring
- Perched Hydrostratigraphic Unit
- Upper Bedrock Hydrostratigraphic Unit
- Cross Connected
- Pea Gravel Recovery Trench

West Rail Naphthalene in Groundwater

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE 17

DRAFTED BY: DFM	DATE: 9/13/2021	PROJECT: 1690012344

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TABLES

TABLE 1
REVISED SAMPLING AND ANALYSIS PLAN
Calumet Montana Refining, LLC - Great Falls, Montana

Description	Boring ID	Well ID	Drilling Method	Total Depth of Borehole (ft bgs)	Total Depth of Borehole (ft AMSL)[1]	Screen Interval (ft bgs)	Screen Interval (ft AMSL)[1]	Hydrostratigraphic Unit[2]	Purpose	Groundwater Analytical Sample Collection[3]	Soil Interval Analytical Sample Collection[4]	Other Testing
EAST RAIL												
SOIL BORING AND MONITORING WELL LOCATIONS (East Rail Investigation)												
Source Area	EB-01S	MW-79S	Sonic	15	3323.1	5 - 15	3333 - 3323	Perched	Completed as nested wells MW-79S and MW-79D	Low Flow	0.5-1 ft bgs 4-5 ft bgs 14-15 ft bgs	Slug Test
	EB-01D	MW-79D	Sonic	25	3313	18.5 - 26	3319 - 3312			Low Flow		Slug Test
Source Area	EB-02	--	Hand Auger	6	3334	--	--	Perched	Soil boring only, completed with hand auger due to proximity to active rail lines	--	0.5-1 ft bgs 5.5-6 ft bgs (Duplicate)	--
Up-Gradient	EB-03S	MW-101	Sonic	8	3335	3 - 8	3340 - 3335	Perched	Completed as MW-101 (field decision due to presence of LNAPL)	--	0-1 ft bgs 4-4.5 ft bgs (Duplicate)	--
	EB-03D	EB-03D	Sonic	20	3323	15 - 20	3328 - 3323		Temporary well - did not produce groundwater	--	5-6 ft bgs 9-10 ft bgs	Geotech (8-11.5 ft bgs)
Source Area	EB-04S	MW-100	Sonic	10	3335	4 - 10	3340 - 3334	Perched	Completed as MW-100	Low Flow	0-1 ft bgs 4-5 ft bgs 8-8.5 ft bgs	--
	EB-04D	EB-04D	Sonic	20	3325	15 - 20	3330 - 3325		Temporary well - did not produce groundwater	Grab		Geotech (7.5-10 ft bgs)
Down-Gradient	EB-05S	EB-05S	Direct Push	19	--	3.5 - 8.5	--	Perched	Temporary well	Grab	6-7 ft bgs 11-12 ft bgs	--
	EB-05D	EB-05D	Sonic	34	3307	20 - 30	3321 - 3311	Upper Bedrock	Temporary well - did not produce groundwater	--		--
Cross-gradient	EB-06	EB-06	Direct Push	14	3321	2 - 7	3333 - 3328	Perched	Temporary well	Grab	4-5 ft bgs 6.25-6.75 ft bgs	--
	EB-06S	MW-81S	Sonic	17	3321	5 - 12	3332 - 3325	Perched	Completed as nested wells MW-81S and MW-81D at sonic borehole location	Low Flow	4.5-5 ft bgs 6.25-6.75 ft bgs	Slug Test
	EB-06D	MW-81D	Sonic	25	3313	19 - 25	3319 - 3313	Upper Bedrock		Low Flow		--
Cross-gradient	EB-07S	EB-07S	Direct Push	14	--	4 - 14	--	Perched	Offset location(s) to MW-80 which was abandoned	Grab	0-1 ft bgs 5.25-5.75 ft bgs 7.5-8 ft bgs	Slug Test
	EB-07D	EB-07D	Sonic	29	3309	19 - 29	3319 - 3309	Upper Bedrock		Grab		Slug Test Geotech (17-18 ft bgs)
Source Area	EB-09S	--	Direct Push	14	--	--	--	Perched	Soil boring only	--	6-7 ft bgs	--
	EB-09D	EB-09D	Sonic	30	3307	20 - 30	3317 - 3307	Cross-Connected	Temporary well	Grab		Slug Test
Cross-gradient	EB-10	EB-10	Sonic	20	3318	15 - 20	3323 - 3318	Cross-Connected	Temporary well	Grab	0.5-1 ft bgs 2.5-5 ft bgs 7.5-8.5 ft bgs	Slug Test
Cross-gradient	EB-11S	EB-11S	Direct Push	12	--	1.5 - 5.5	--	Perched	Temporary well	Grab	2-2.5 ft bgs 2.5-3 ft bgs	Slug Test Geotech (2-2.5 ft bgs and 2.5-3 ft bgs)
	EB-11D	EB-11D	Sonic	30	3307	20 - 30	3317 - 3307	Cross-Connected	Temporary well - did not produce groundwater	--		Geotech (22.5-23.5 ft bgs)
Cross-gradient	EB-14S	--	Direct Push	15	--	3 - 7	--	Perched	Temporary well(s)	Grab	0.5-1.5 ft bgs 2-2.4 ft bgs	--
	EB-14D	EB-14D	Sonic	25	3312	15 - 25	3322 - 3312	Upper Bedrock		Grab		--
Down-Gradient	EB-15	MW-99	Sonic	25	3302	17 - 22	3310 - 3305	Perched	Completed as MW-99; Location added as part of June 2019 RIAIM Addendum - located east of MW-11	Low Flow	0.5-1 ft bgs 15-16 ft bgs 18-19 ft bgs 20.5-21.5 ft bgs	Slug Test
ADDITONAL MONITORING WELL TESTING (Previously Installed Monitoring Wells)												
Down-gradient Perimeter Monitoring Wells	--	MW-11	--	13	3307	8 - 13	3312 - 3307	Perched	Down-gradient monitoring well located near API unit	Sampled May 2019 Quarterly GW Monitoring Event	--	Slug Test
	--	MW-91	--	24	3308	7 - 22	3324 - 3309	Cross-Connected	Down-gradient monitoring well located outside of refinery perimeter next to Missouri River	Sampled May 2019 Quarterly GW Monitoring Event	--	Slug Test
	--	MW-97	--	20	3312	8 - 18	3324 - 3314	Perched	Down-gradient monitoring well located immediately outside of refinery perimeter	Sampled May 2019 Quarterly GW Monitoring Event	--	Slug Test
	--	MW-98	--	26	3310	10 - 25	3326 - 3311	Cross-Connected	Down-gradient monitoring well located immediately inside of refinery perimeter	Sampled May 2019 Quarterly GW Monitoring Event	--	Slug Test

RAMBOLL

TABLE 1
REVISED SAMPLING AND ANALYSIS PLAN
Calumet Montana Refining, LLC - Great Falls, Montana

Description	Boring ID	Well ID	Drilling Method	Total Depth of Borehole (ft bgs)	Total Depth of Borehole (ft AMSL)[1]	Screen Interval (ft bgs)	Screen Interval (ft AMSL)[1]	Hydrostratigraphic Unit[2]	Purpose	Groundwater Analytical Sample Collection[3]	Soil Interval Analytical Sample Collection[4]	Other Testing
WEST RAIL												
SOIL BORING AND MONITORING WELL LOCATIONS (West Rail Investigation)												
Source Area	WB-01S	WB-01S	Sonic	12	3320	2 - 12	3330 - 3320	Perched	Temporary well	Grab	1.5-2 ft bgs 3-4 ft bgs 6-6.5 ft bgs (Duplicate)	Geotech (8-10.5 ft bgs)
	WB-01D	WB-01D	Sonic	32	3300	27 - 32	3305 - 3300	Cross-Connected	Temporary well - did not produce groundwater	--		--
	WB-02S	WB-02S	Sonic	12	3320	2 - 12	3330 - 3320	Perched	Temporary well	Grab	2-2.5 ft bgs 10-10.75 ft bgs	Geotech (8.5-11 ft bgs)
	WB-02D	WB-02D	Sonic	32	3300	27 - 32	3305 - 3300	Upper Bedrock	Temporary well - did not produce groundwater	--		--
	WB-03S	WB-03S	Sonic	11.5	3319	6.5 - 11.5	3324 - 3319	Perched	Temporary well(s)	Grab	0.5-1 ft bgs 3.5-4 ft bgs 5-5.5 ft bgs	Slug Test
	WB-03D	WB-03D	Sonic	35	3296	30 - 35	3301 - 3296	Upper Bedrock		Grab		Slug Test Geotech (8-11.5 ft bgs)
	WB-04S	WB-04S	Sonic	10	3321	5 - 10	3326 - 3321	Perched	Temporary well	Grab	5-6 ft bgs 8-9 ft bgs	Geotech (8-10 ft bgs)
	WB-04D	WB-04D	Sonic	35	3296	25 - 30	3306 - 3301	Upper Bedrock	Temporary well - did not produce groundwater	--		--
Cross-gradient	WB-05S	WB-05S	Sonic	10	3321	5 - 10	3326 - 3321	Perched	Temporary well	Grab	7.5-8.5 ft bgs	--
	WB-05D	WB-05D	Sonic	33	3298	20 - 33	3311 - 3298	Cross-Connected	Temporary well - did not produce groundwater	--		--
	WB-06S	WB-06S	Sonic	11.5	3322	6.5 - 11.5	3327 - 3322	Perched	Temporary well	Grab	6-6.2 ft bgs 10-10.5 ft bgs	Geotech (9-11.5 ft bgs)
	WB-06D	WB-06D	Sonic	30	3303	25 - 30	3308 - 3303	Upper Bedrock	Temporary well - did not produce groundwater	--		--
Down-gradient	WB-07	WB-07	Sonic	10	3318	3 - 8	3325 - 3320	Perched	Temporary well	Grab	5-6 ft bgs	Slug Test
	WB-08	WB-08	Sonic	10	3317	3 - 8	3324 - 3319	Perched	Temporary well	Grab	5-6 ft bgs	Geotech (5-7 ft bgs)
	WB-09S	WB-09S	Sonic	8	3318	3 - 8	3323 - 3318	Perched	Temporary well	Grab	2-3 ft bgs 6-6.7 ft bgs	Slug Test Geotech (5-7.5 ft bgs)
	WB-09D	WB-09D	Sonic	30	3296	25 - 30	3301 - 3296	Upper Bedrock	Temporary well - did not produce groundwater	--		--
	WB-10	WB-10S	Sonic	10	3316	0 - 5	3326 - 3321	Perched	Temporary well	Grab	3-4 ft bgs 6-7 ft bgs 9-9.5 ft bgs	Geotech (2.5-5 ft bgs)
	WB-11S	WB-11S	Sonic	5	3320	0 - 5	3325 - 3320	Perched	Temporary well	Grab	1-2 ft bgs 3-3.9 ft bgs	Geotech (2.5-5 ft bgs)
	WB-11D	WB-11D	Sonic	30	3295	25 - 30	3300 - 3295	Cross-Connected	Temporary well	Grab		Slug Test
	WB-12S	WB-12S	Sonic	10	3314	0 - 5	3324 - 3319	Perched	Temporary well	Grab	0-1 ft bgs 2-2.5 ft bgs	--
	WB-13S	WB-13S	Sonic	5	3318	0 - 5	3323 - 3318	Perched	Temporary well(s)	Grab	3-3.5 ft bgs (Duplicate)	Slug Test Geotech (2-4.5 ft bgs)
	WB-13D	WB-13D	Sonic	30	3293	23 - 28	3300 - 3295	Upper Bedrock		Grab		--
	WB-14S	WB-14S	Sonic	10	3311	5 - 10	3316 - 3311	Perched	Temporary well - did not produce groundwater, located on adjacent waste water treatment property south of CMR	--	5-6 ft bgs 20-21 ft bgs (Duplicate)	Geotech (5-7 ft bgs)
	WB-14D	WB-14D	Sonic	40	3281	20 - 25	3301 - 3296	Cross-Connected	Temporary well, located on adjacent waste water treatment property south of CMR	Grab		--
	WB-15	WB-15	Sonic	10	3311	0 - 10	3321 - 3311	Perched	Temporary well - did not produce groundwater	--	4-5 ft bgs	--

TABLE 1
REVISED SAMPLING AND ANALYSIS PLAN
Calumet Montana Refining, LLC - Great Falls, Montana

Description	Boring ID	Well ID	Drilling Method	Total Depth of Borehole (ft bgs)	Total Depth of Borehole (ft AMSL)[1]	Screen Interval (ft bgs)	Screen Interval (ft AMSL)[1]	Hydrostratigraphic Unit[2]	Purpose	Groundwater Analytical Sample Collection[3]	Soil Interval Analytical Sample Collection[4]	Other Testing
SOIL BORING AND MONITORING WELL LOCATIONS REMOVED FROM INVESTIGATION												
Did not install during this investgiation	EB-08	--	--	--	--	--	--	--	Removed from investigation	--	--	--
	EB-12	--	--	--	--	--	--	--	Removed from investigation due to proximity to down-gradient boring location EB-09 and down-gradient well, MW-97	--	--	--
	EB-13	--	--	--	--	--	--	--	Removed from investigation due to location within tank dike and position of down-gradient wells, MW-98 and MW-91	--	--	--

NOTES:

Table updated in Setpember 2021.

VOC: Volatile organic compound
SVOC: Semi-volatile organic compound
VPH: Volatile petroleum hydrocarbon
EPH: Extractable petroleum hydrocarbon
USEPA: United States Environmental Protection Agency
AMSL Above mean sea level
ft: feet
ft bgs: feet below ground surface
--: Not measured

[1] Survey information provided by TD&H Engineering July 2019, vertical datum coordinates provided in North American Vertical Datum 1988 corrected to the Montana State Plane Coordinate System.
[2] Monitoring well screen intervals are identified as the following: "perched" unconfined wells, "upper bedrock" semi-confined wells, or cross-connected wells. The perched and upper bedrock units are separated by a shallow aquitard (i.e. a dry dusky-red unit composed primarily of silts and clays).
[3] Groundwater laboratory analytical samples submitted for analysis of VOCs (USEPA Method 8260B), SVOCs (USEPA Method 8270D), EPH (Montana EPH), VPH (Montana VPH), and Metals (USEPA Method 6020B).
[4] Soil laboratory analytical samples submitted for analysis of VOCs (USEPA Method 8260B), SVOCs (USEPA Method 8270D), EPH (Montana EPH), VPH (Montana VPH), and Metals (USEPA Method 6020B).

TABLE 4
SUMMARY OF GROUNDWATER ELEVATIONS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	Hydrostratigraphic Unit[2]	TOC Elevation (ft AMSL)[1]	Depth to Product (ft BTOC)	Depth to Water (ft BTOC)	Corrected Water Elevation (ft BTOC)	Groundwater Elevation (ft AMSL)	Depth to TOS (ft BTOC)	Depth to BOS (ft BTOC)	TOS Elevation	BOS Elevation
EAST RAIL											
MW-014R	7/11/2019	Perched	3342.22	--	4.86	--	3337.36	2.50	9.80	3339.72	3332.42
MW-019R	7/11/2019	Perched	3342.79	--	2.64	--	3340.15	2.50	7.50	3340.29	3335.29
MW-039R2	7/11/2019	Perched	3340.79	--	6.51	--	3334.28	4.60	10.60	3336.19	3330.19
MW-048	7/11/2019	Perched	3341.02	--	3.58		3337.44	4.00	9.00	3337.02	3332.02
MW-069	7/11/2019	Perched	3335.78	--	1.95	--	3333.83	3.75	8.75	3332.03	3327.03
MW-070	7/11/2019	Perched	3338.32	--	2.73	--	3335.59	3.00	9.50	3335.32	3328.82
MW-079S[3]	7/11/2019	Perched	3337.88	3.09	3.15	3334.78	3334.73	5.00	15.00	3332.88	3322.88
MW-079D	7/11/2019	Perched	3337.72	--	4.75	--	3332.97	18.50	25.00	3319.22	3312.72
MW-081S	7/11/2019	Perched	3337.46	--	1.77	--	3335.69	5.00	17.00	3332.46	3320.46
MW-081D	7/11/2019	Upper Bedrock	3337.60	--	4.46	--	3333.14	19.00	25.00	3318.60	3312.60
MW-100	7/11/2019	Perched	3344.49	--	3.05	--	3341.44	4.00	10.00	3340.49	3334.49
MW-101[3]	7/11/2019	Perched	3342.66	3.63	4.13	3338.96	3338.53	3.00	8.00	3339.66	3334.66
WEST RAIL											
MW-012	7/11/2019	Perched	3334.90	--	7.10	--	3327.80	3.50	8.00	3331.40	3326.90
MW-013	7/11/2019	Perched	3329.80	--	4.24	--	3325.56	4.75	9.75	3325.05	3320.05
MW-038	7/11/2019	Perched	3328.00	--	2.93	--	3325.07	6.50	11.50	3321.50	3316.50
MW-038R	7/11/2019	Perched	3326.61	--	3.04	--	3323.57	6.50	11.50	3320.11	3315.11
MW-066	7/11/2019	Perched	3323.92	--	7.57	--	3316.35	2.50	12.00	3321.42	3311.92
MW-067	7/11/2019	Perched	3329.51	--	7.48	--	3322.03	2.50	7.50	3327.01	3322.01
MW-068	7/11/2019	Perched	3335.67	--	9.09	--	3326.58	5.00	15.00	3330.67	3320.67
MW-073[3]	7/11/2019	Perched	3330.80	8.05	8.09	3322.74	3322.71	2.20	10.20	3328.60	3320.60
MW-074[3]	7/11/2019	Perched	3330.79	7.56	7.60	3323.22	3323.19	2.50	9.50	3328.29	3321.29
MW-075[3]	7/11/2019	Perched	3330.96	7.02	8.41	3323.72	3322.55	2.50	9.40	3328.46	3321.56
MW-076[3]	7/11/2019	Perched	3330.77	7.31	8.27	3323.31	3322.50	2.50	9.14	3328.27	3321.63
MW-077	7/11/2019	Perched	3332.78	--	3.73	--	3329.05	2.50	10.64	3330.28	3322.14
MW-078	7/11/2019	Perched	3333.26	--	3.95	--	3329.31	2.50	10.25	3330.76	3323.01
DOWNGRADIENT WELLS - EAST RAIL											
MW-011	7/11/2019	Perched	3319.98	--	1.84	--	3318.14	5.00	13.00	3314.98	3306.98
MW-072	7/11/2019	Perched	3337.59	--	14.82	--	3322.77	7.13	17.13	3330.46	3320.46
MW-091	7/11/2019	Cross-Connected	3331.33	--	11.51	--	3319.82	7.00	22.00	3324.33	3309.33
MW-097	7/11/2019	Perched	3332.12	--	14.65	--	3317.47	8.00	18.00	3324.12	3314.12
MW-098	7/11/2019	Cross-Connected	3336.08	--	15.05	--	3321.03	10.00	25.00	3326.08	3311.08
MW-099	7/11/2019	Perched	3326.95	--	10.61	--	3316.34	17.00	22.00	3309.95	3304.95

NOTES:

Table updated in September 2021.

AMSL: Above mean sea level
BOTC: Below top of casing
TOC: Top of casing
TOS: Top of screen
BOS: Bottom of screen
--: Not measured
ft: feet

[1] Survey information provided by TD&H Engineering July 2019, vertical datum coordinates provided in North American Vertical Datum 1988 corrected to the Montana State Plane Coordinate System.

[2] Monitoring well screen intervals are identified as the following: "perched" unconfined wells, "upper bedrock" semi-confined wells, or cross-connected wells. The perched and upper bedrock units are separated by a shallow aquitard (i.e. a dry dusky-red unit composed primarily of silts and clays).

[3] Groundwater elevations were corrected for free product thicknesses at MW-101. The correction factor was determined by thickness of the free product multiplied by the specific gravity. Specific gravity results for MW-101 (0.8641) were determined by SGS North America Inc. Due to proximity and visual appearance, the correction factor determined at monitoring wells with known specific gravity measurements were applied to other monitoring wells with the presence of LNAPL, as follows:
- MW-101 applied to MW-79S; and
- WB-01 and WB-02 (0.84) collected during the 2019 RIAIM Field Investigation applied to MW-73, MW-74, MW-75, and MW-76.

TABLE 5
SLUG TEST RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Boring ID/ Monitoring Well ID	Well Type	Hydrostratigraphic Unit[1]	Lithologic Description of Screened Material	Manual DTW Reading Prior to Test (feet)	Falling/ Rising	Initiation Method	Initial Displacement H_2O (feet)	Hydraulic Conductivity (feet/day)		Hydraulic Conductivity (cm/sec)	
								Bouwer-Rice[2]	KGS Model[3]	Bouwer-Rice[2]	KGS Model[3]
EAST RAIL											
EB-07S*	Temporary	Perched	· Fill (Silt, Clay) · Weathered Bedrock	4.60	Rising	Pneumatic	0.84	48.00	76.00	1.7E-02	2.7E-02
EB-11S*	Temporary	Perched	· Fill (Sand, Gravel)	0.40	Rising	Pneumatic	0.50	7.90	9.65	2.8E-03	3.4E-03
EB-15/MW-99	Monitoring	Perched	· Fill (Silt, Clay, Sand)	11.12	Rising	Bailer	1.00	0.64	0.43	2.3E-04	1.5E-04
EB-06D/MW-81S	Monitoring	Perched	· Fill (Silt, Clay) · Weathered Bedrock	1.41	Rising	Bailer	0.96	0.08	0.10	2.8E-05	3.5E-05
EB-01/MW-79S	Monitoring	Perched	· Fill (Silt, Clay) · Weathered Bedrock	2.55	Rising	Bailer	1.30	0.07	0.07	2.5E-05	2.5E-05
EB-01/MW-79D	Monitoring	Perched	· Weathered Bedrock · Competent Bedrock	4.97	Rising	Bailer	1.20	0.04	0.01	1.5E-05	3.1E-06
MW-11	Monitoring	Perched	· Fill (Clay) · Competent Bedrock	3.68	Rising	Bailer	1.70	0.01	0.01	1.8E-06	2.3E-06
MW-97	Monitoring	Perched	· Fill (Clay) · Weathered Bedrock	11.82	Rising	Bailer	1.50	0.001	0.001	2.1E-07	3.8E-07
East Rail - Summary Statistics (Perched Unconfined)							**Average**	0.14	0.10	4.9E-05	3.6E-05
							Median	0.06	0.04	2.0E-05	1.4E-05
							Min	0.00	0.001	2.1E-07	3.8E-07
							Max	0.64	0.43	2.3E-04	1.5E-04
EB-06D/MW-81D	Monitoring	Upper Bedrock	· Competent Bedrock	5.36	Rising	Bailer	0.57	0.04	0.04	1.6E-05	1.6E-05
EB-07D	Temporary	Upper Bedrock	· Competent Bedrock	16.55	Rising	Bailer	0.15	0.03	0.002	9.0E-06	6.5E-07
East Rail - Summary Statistics (Upper Bedrock Semi-Unconfined)							**Average**	0.04	0.02	1.2E-05	8.2E-06
							Median	0.04	0.02	1.2E-05	8.2E-06
							Min	0.03	0.00	9.0E-06	6.5E-07
							Max	0.04	0.04	1.6E-05	1.6E-05
MW-98	Monitoring	Cross-Connected	· Fill (Clay, Sand) · Weathered Bedrock · Competent Bedrock	15.60	Rising	Bailer	1.60	0.09	0.09	3.2E-05	3.2E-05
MW-91	Monitoring	Cross-Connected	· Weathered Bedrock · Competent Bedrock	11.70	Rising	Bailer	1.30	0.002	0.01	8.6E-07	2.7E-06
EB-09D	Temporary	Cross-Connected	· Weathered Bedrock · Competent Bedrock	13.03	Rising	Submersible pump	2.00	0.01	0.01	3.7E-06	3.5E-06
EB-10	Temporary	Cross-Connected	· Weathered Bedrock · Competent Bedrock	4.11	Rising	Submersible pump	2.00	0.04	0.05	1.3E-05	1.7E-05
East Rail - Summary Statistics (Cross-Connected)							**Average**	0.04	0.04	1.2E-05	1.4E-05
							Median	0.02	0.03	8.3E-06	1.0E-05
							Min	0.00	0.01	8.6E-07	2.7E-06
							Max	0.04	0.09	3.2E-05	3.2E-05
WEST RAIL											
WB-03S[4]	Temporary	Perched	· Fill (Clay, Sand)	9.28	Rising	Bailer	<0.05	NA	NA	NA	NA
WB-07	Temporary	Perched	· Fill (Clay, Sand) · Weathered Bedrock	6.30	Rising	Bailer	1.10	3.79	0.43	1.3E-03	1.5E-04
WB-09S	Temporary	Perched	· Fill (Sand) · Weathered Bedrock	4.51	Rising	Bailer	1.38	2.17	2.79	7.7E-04	9.8E-04
West Rail - Summary Statistics (Perched Unconfined)							**Average**	2.98	1.61	1.1E-03	5.7E-04
							Median	2.98	1.61	1.1E-03	5.7E-04
							Min	2.17	0.43	7.7E-04	1.5E-04
							Max	3.79	2.79	1.3E-03	9.8E-04
WB-03D	Temporary	Upper Bedrock	· Competent Bedrock	10.13	Rising	Bailer	0.15	0.17	0.14	6.1E-05	4.8E-05
WB-13D	Temporary	Upper Bedrock	· Competent Bedrock	12.28	Rising	Bailer	0.38	0.06	0.05	2.0E-05	1.9E-05
West Rail - Summary Statistics (Upper Bedrock Semi-Unconfined)							**Average**	0.12	0.10	4.1E-05	3.4E-05
							Median	0.12	0.10	4.1E-05	3.4E-05
							Min	0.06	0.05	2.0E-05	1.9E-05
							Max	0.17	0.14	6.1E-05	4.8E-05
WB-11D	Temporary	Cross-Connected	· Weathered Bedrock · Competent Bedrock	18.00	Rising	Bailer	0.31	0.08	0.07	2.7E-05	2.6E-05
West Rail - Summary Statistics (Cross-Connected)							**Average**	0.08	0.07	2.7E-05	2.6E-05
							Median	0.08	0.07	2.7E-05	2.6E-05
							Min	0.08	0.07	2.7E-05	2.6E-05
							Max	0.08	0.07	2.7E-05	2.6E-05

NOTES:

Table updated in September 2021.

The bailer dimension used to conduct slug testing = 3 feet X 0.125 feet. These dimensions are estimated to displace approximately 0.28 gallons or 1.7 feet of water in a 2 inch diameter well.

Submersible pump used to initiate slug tests in EB-09D and EB-10.

Pneumatic method used to initiate slug tests in EB-07S and EB-11.

cm/sec: Centimeters per second

DTW: Depth to water

KGS: Kansas Geological Survey

* The pneumatic slug testing apparatus used to conduct slug testing at EB-07S and EB-11S did not function properly, as a result the hydraulic conductivity values calculated for EB-07S and EB-11S were typical for unconsolidated gravel or clean sand, respectively (Freeze and Cherry, 1979) and are not consistent with the fine grain material that the wells were screened in at the time of slug-testing. Therefore the calculated values do not suggest a representable value, as such these data points have been excluded from the average calculations.

[1] Monitoring well screen intervals are identified as the following: "perched" unconfined wells, "upper bedrock" semi-confined wells, or cross-connected wells. The perched and upper bedrock units are separated by a shallow aquitard (i.e. a dry dusky-red unit composed primarily of silts and clays).

[2] The Bouwer-Rice model is useful for determining the hydraulic conductivity of an unconfined aquifer.

[3] The KGS model is useful for determining the hydraulic conductivity of unconfined and nonleaky confined aquifers.

[4] Insufficient water displacement in WB-03S due to small water column length; no hydraulic conductivity estimate.

TABLE 6
EAST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	EB-01	EB-01	EB-01	EB-02	EB-02
Field Sample ID										CMR-EB01-0.5-1.0-190607	CMR-EB01-14.0-15.0-190607	CMR-EB01-4.0-5.0-190607	CMR-EB02-0.5-1.0-190521	CMR-EB02-5.5-6.0-190521
Lab Sample ID										UF08028-001	UF08028-003	UF08028-002	UE22021-001	UE22021-002
Collection Depth (ft bgs)										0.5 - 1	14 - 15	4 - 5	0.5 - 1	5.5 - 6
Sample Method										Sonic	Sonic	Sonic	Hand Auger	Hand Auger
Sample Date										6/7/2019	6/7/2019	6/7/2019	5/21/2019	5/21/2019
Comments														
VOLATILE ORGANIC COMPOUNDS														
Acetone			67000	NC	67000					U (0.22)	U (0.2)	U (12)	0.034 (0.0072)	U (6.1)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.11)	0.45 (0.098)	**11 J (6)**	0.0082 J (0.0018)	**23 J (3)**
2-Butanone			19000	NC	19000					U (0.22)	U (0.2)	U (12)	U (0.0036)	U (6.1)
Carbon Disulfide			350	NC	350					U (0.11)	U (0.098)	U (6)	U (0.0018)	U (3)
Cumene			990	NC	990					U (0.11)	0.26 (0.098)	10 J (6)	U (0.0018)	11 (3)
Cyclohexane			2700	NC	2700					0.22 J (0.11)	1.5 (0.098)	75 (6)	0.12 (0.0018)	53 (3)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	0.21 J (0.11)	0.81 (0.098)	**75 (6)**	U (0.0018)	**44 (3)**
Methyl Acetate			120000	NC	120000					U (0.11)	U (0.098)	U (6)	0.029 (0.0018)	U (3)
Methylcyclohexane			2700	NC	2700					0.78 J (0.11)	4.7 J (0.098)	180 J (6)	0.15 (0.0018)	97 (3)
Methylene Chloride			320	NC	320		0.013	RSL - MCL	0.013	U (0.11)	U (0.098)	U (6)	U (0.0018)	U (3)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	0.25 J (0.11)	0.48 (0.098)	**44 (6)**	U (0.0018)	15 J (3)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	0.28 (0.11)	0.12 J (0.098)	16 (6)	U (0.0018)	4.2 J (3)
meta-xylene			240	NC	240		100	MT-Scaled	100	1.4 (0.11)	1.6 (0.098)	**320 (6)**	0.0056 (0.0018)	48 (3)
ortho-xylene			280	NC	280		100	MT-Scaled	100	0.66 (0.11)	0.15 J (0.098)	69 (6)	0.025 (0.0018)	4.2 J (3)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	2.1 (0.22)	1.8 (0.2)	**390 (12)**	0.031 (0.0036)	52 (6.1)
SEMI VOLATILE ORGANIC COMPOUNDS														
Acenaphthene		3800	4500	NC	3800	27	7.26	MT-Scaled	27	U (0.091)	U (0.0046)	0.23 J (0.099)	U (0.0093)	U (0.054)
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	U (0.056)	U (0.0028)	0.18 J (0.061)	U (0.0057)	0.48 J (0.033)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	U (0.064)	U (0.0033)	U (0.07)	U (0.0066)	U (0.038)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	U (0.072)	U (0.0037)	U (0.078)	0.0099 J (0.0074)	U (0.043)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	0.11 J (0.055)	U (0.0028)	U (0.059)	U (0.0056)	U (0.032)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.071)	U (0.0036)	U (0.077)	0.011 J (0.0073)	U (0.042)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.052)	U (0.0027)	U (0.057)	U (0.0054)	U (0.031)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	U (0.049)	U (0.0025)	U (0.053)	U (0.0051)	U (0.029)
Dibenzofuran			100	NC	100					U (0.55)	U (0.028)	U (0.59)	U (0.056)	0.75 J (0.32)
2,4-Dimethylphenol			1600	NC	1600		1.2	MT-Scaled	1.2	U (0.55)	0.036 J (0.028)	U (0.59)	U (0.056)	U (0.32)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	0.079 J (0.046)	U (0.0023)	U (0.05)	0.0077 J (0.0047)	U (0.027)
Fluorene		2500	3000	NC	2500	35	9.31	MT-Scaled	35	U (0.062)	U (0.0032)	U (0.068)	U (0.0064)	1.7 J (0.037)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.11)	U (0.0056)	U (0.12)	U (0.011)	U (0.065)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	0.43 (0.11)	0.056 (0.0055)	38 (0.12)	0.017 J (0.011)	13 J (0.064)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	0.19 J (0.11)	0.042 (0.0054)	**21 (0.12)**	0.012 J (0.011)	9.9 J (0.063)
Pentachlorophenol			4	C	4		0.014	RSL - MCL	0.014	U (2.7)	U (0.14)	U (3)	U (0.28)	U (1.6)
Phenanthrene			2300	NC	2300					0.091 J (0.079)	U (0.004)	0.65 (0.085)	U (0.0081)	1.5 (0.047)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	0.11 J (0.055)	U (0.0028)	0.098 J (0.059)	0.011 J (0.0056)	0.14 J (0.032)
MDEQ VOLATILE PETROLEUM HYDROCARBON														
C5-C8 Aliphatics		290	220	NC	290	220			220	45 (0.77)	3.2 J (0.87)	**2400 (39)**	U (0.93)	**5400 (26)**
C9-C12 Aliphatics		360			360	11000			11000	74 (0.77)	0.92 J (0.87)	**1500 (39)**	U (0.93)	**3100 (26)**
C9-C10 Aromatics		1000			1000	130			130	45 (0.51)	1.7 (0.58)	**1100 (26)**	U (0.62)	**2100 (17)**
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	0.07 J (0.035)	U (0.04)	**7.2 J (1.8)**	U (0.042)	**68 J (1.2)**
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	1.1 (0.032)	0.055 J (0.036)	**62 (1.6)**	U (0.039)	**160 (1.1)**
Methyl tert-butyl ether		230	210	C	230	0.078	0.069	MT-Scaled	0.078	U (0.055)	U (0.063)	U (2.8)	U (0.067)	U (1.9)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	2.5 (0.13)	U (0.15)	**48 (6.7)**	U (0.16)	**93 J (4.5)**
Petroleum Hydrocarbons (Total)										180 (1.8)	7.1 J (1.8)	4800 (70)	U (1.8)	11000 (35)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	0.47 (0.041)	U (0.047)	17 (2.1)	U (0.05)	21 (1.4)
meta-xylene			240	NC	240		100	MT-Scaled	100	1.9 (0.057)	0.08 J (0.065)	190 (2.9)	U (0.07)	120 (1.9)
ortho-xylene			280	NC	280		100	MT-Scaled	100	1.8 (0.029)	U (0.033)	58 (1.4)	U (0.035)	29 (0.96)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	3.7 (0.057)	0.08 J (0.065)	248 (2.9)	U (0.07)	149 (1.9)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON														
C9-C18 Aliphatics		540	44	NC	540	53000			53000	67 (10)	U (11)	490 (12)	41 (11)	**3600 (13)**
C19-C36 Aliphatics		200000			200000					24 (10)	U (11)	20 (12)	73 (11)	470 (13)
C11-C22 Aromatics		3900			3900	370			370	U (10)	U (11)	180 (12)	40 J (11)	1400 J (13)
Petroleum Hydrocarbons (Extractable)														
INORGANICS														
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	1.5 J (0.17)	0.23 J (0.17)	UJ (0.19)	U (0.19)	U (0.21)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	**90 (0.17)**	2.8 (0.17)	5.5 (0.19)	6.8 (0.19)	6.5 (0.21)
Barium	429		22000	NC	22000		421	MT-Scaled	421	270 (0.26)	1200 (0.27)	300 (0.3)	500 (0.29)	360 (0.33)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	0.57 (0.029)	0.49 (0.03)	1.1 (0.033)	0.73 (0.032)	0.71 (0.036)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	3.2 (0.021)	0.51 (0.022)	0.18 (0.024)	0.27 (0.024)	0.16 (0.026)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	9.8 (0.47)	29 (0.48)	24 (0.53)	17 B (0.52)	17 B (0.58)
Cobalt	10		35	NC	35					6.7 (0.26)	11 (0.26)	6.9 (0.29)	6.3 (0.28)	6.6 (0.32)
Copper	165		4700	NC	4700		460	RSL - MCL	460	1000 (2.8)	25 (0.28)	15 (0.31)	26 (0.31)	16 (0.34)
Lead	29.8		800	NC	800		140	RSL - MCL	140	74 (0.058)	5.7 (0.059)	15 (0.065)	68 (0.064)	17 (0.072)
Mercury			4.07	NC	4.066		1	RSL - MCL	1	0.21 (0.021)	U (0.022)	U (0.021)	U (0.02)	U (0.027)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	11 (0.26)	24 (0.26)	18 (0.29)	15 (0.28)	15 (0.32)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.4)	U (0.41)	U (0.45)	0.58 J (0.45)	U (0.5)
Silver	0.3		580	NC	580		8.5	MT-Scaled	8.5	1.3 (0.051)	0.067 J (0.052)	0.08 J (0.057)	0.092 J (0.057)	0.087 J (0.063)
Vanadium	52.6		580	NC	580					27 (0.21)	82 (0.22)	49 (0.24)	44 (0.24)	36 (0.26)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	480 (4.3)	U (0.44)	U (0.48)	75 (0.47)	45 (0.53)

TABLE 6
EAST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location										EB-02	EB-03D	EB-03D	EB-03D	EB-03D
Field Sample ID	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	CMR-EB02-5.5-6.0-190521-FD	CMR-EB03-0.0-1.0-190612	CMR-EB03-4.0-4.5-190612	CMR-EB03-5.0-6.0-190612	CMR-EB03-9.0-10.0-190612
Lab Sample ID										UE22021-003	UF13022-001	UF13022-002	UF13022-004	UF13022-005
Collection Depth (ft bgs)										5.5 - 6	0 - 1	4 - 4.5	5 - 6	9 - 10
Sample Method										Hand Auger	Sonic	Sonic	Sonic	Sonic
Sample Date										5/21/2019	6/12/2019	6/12/2019	6/12/2019	6/12/2019
Comments										Field Duplicate				
VOLATILE ORGANIC COMPOUNDS														
Acetone			67000	NC	67000					U (4.6)	0.012 J (0.0039)	0.29 (0.0044)	U (6.1)	U (0.34)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	**24 J (2.3)**	U (0.0019)	0.26 J (0.0022)	**14 J (3.1)**	0.49 J (0.17)
2-Butanone			19000	NC	19000					U (4.6)	U (0.0039)	0.012 J (0.0044)	U (6.1)	U (0.34)
Carbon Disulfide			350	NC	350					U (2.3)	U (0.0019)	U (0.0022)	U (3.1)	U (0.17)
Cumene			990	NC	990					16 (2.3)	U (0.0019)	0.0037 J (0.0022)	6.8 J (3.1)	0.71 (0.17)
Cyclohexane			2700	NC	2700					50 (2.3)	U (0.0019)	0.18 J (0.0022)	22 J (3.1)	3.4 J (0.17)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	**69 (2.3)**	U (0.0019)	0.0072 (0.0022)	**47 (3.1)**	1 (0.17)
Methyl Acetate			120000	NC	120000					U (2.3)	U (0.0019)	U (0.0022)	U (3.1)	U (0.17)
Methylcyclohexane			2700	NC	2700					110 (2.3)	U (0.0019)	0.15 J (0.0022)	90 J (3.1)	9 J (0.17)
Methylene Chloride			320	NC	320		0.013	RSL - MCL	0.013	U (2.3)	U (0.0019)	U (0.0022)	U (3.1)	U (0.17)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	**28 J (2.3)**	U (0.0019)	U (0.0022)	**20 (3.1)**	1.3 (0.17)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	4.8 J (2.3)	U (0.0019)	0.012 (0.0022)	4 J (3.1)	0.22 J (0.17)
meta-xylene			240	NC	240		100	MT-Scaled	100	59 (2.3)	U (0.0019)	0.011 (0.0022)	98 (3.1)	0.34 J (0.17)
ortho-xylene			280	NC	280		100	MT-Scaled	100	8.4 (2.3)	U (0.0019)	0.0063 (0.0022)	19 (3.1)	U (0.17)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	67 (4.6)	U (0.0039)	0.017 (0.0044)	120 (6.1)	0.48 J (0.34)
SEMI VOLATILE ORGANIC COMPOUNDS														
Acenaphthene		3800	4500	NC	3800	27	7.26	MT-Scaled	27	U (0.094)	U (0.00085)	U (0.048)	0.54 J (0.051)	0.02 J (0.009)
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	1.8 J (0.058)	U (0.00052)	U (0.03)	0.76 J (0.032)	0.024 J (0.0055)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	0.33 (0.067)	U (0.0006)	U (0.034)	0.17 J (0.037)	U (0.0064)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	U (0.075)	U (0.00067)	U (0.038)	0.12 J (0.041)	U (0.0072)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	U (0.057)	U (0.00051)	U (0.029)	0.2 J (0.031)	U (0.0054)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.074)	U (0.00066)	U (0.038)	0.051 J (0.04)	U (0.0071)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.054)	U (0.00049)	U (0.028)	U (0.03)	U (0.0052)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	0.47 (0.051)	U (0.00046)	U (0.026)	0.22 J (0.028)	U (0.0049)
Dibenzofuran			100	NC	100					1.6 (0.57)	U (0.0051)	U (0.29)	U (0.31)	0.057 J (0.054)
2,4-Dimethylphenol			1600	NC	1600		1.2	MT-Scaled	1.2	U (0.57)	U (0.0051)	U (0.29)	U (0.31)	U (0.054)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	0.57 (0.048)	U (0.00043)	U (0.024)	0.22 J (0.026)	U (0.0046)
Fluorene		2500	3000	NC	2500	35	9.31	MT-Scaled	35	3.9 J (0.065)	U (0.00058)	U (0.033)	1.6 J (0.035)	0.099 J (0.0062)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.11)	U (0.001)	U (0.058)	U (0.062)	U (0.011)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	56 J (1.1)	U (0.001)	0.11 J (0.057)	21 J (0.061)	1.5 J (0.011)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	**31 J (0.11)**	U (0.00099)	U (0.056)	7.3 J (0.06)	0.58 J (0.011)
Pentachlorophenol			4	C	4		0.014	RSL - MCL	0.014	U (2.8)	U (0.026)	U (1.5)	U (1.5)	U (0.27)
Phenanthrene			2300	NC	2300					7.7 (0.082)	U (0.00074)	U (0.042)	3 J (0.045)	0.097 J (0.0078)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	1.6 (0.057)	U (0.00051)	0.069 J (0.029)	0.75 J (0.031)	0.025 J (0.0054)
MDEQ VOLATILE PETROLEUM HYDROCARBON														
C5-C8 Aliphatics		290	220	NC	290	220			220	**3600 (18)**	U (0.88)	30 J (0.87)	**1200 J (8.8)**	**480 J (1.2)**
C9-C12 Aliphatics		360			360	11000			11000	**1800 (18)**	1.2 J (0.88)	3.2 J (0.87)	**870 (8.8)**	350 (1.2)
C9-C10 Aromatics		1000			1000	130			130	**1300 (12)**	U (0.58)	3.6 (0.58)	570 (5.9)	210 (0.78)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	**46 J (0.83)**	U (0.04)	0.62 J (0.039)	**17 J (0.4)**	1.5 J (0.053)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	**120 (0.75)**	U (0.036)	0.18 J (0.036)	**43 (0.36)**	9.5 (0.048)
Methyl tert-butyl ether		230	210	C	230	0.078	0.069	MT-Scaled	0.078	U (1.3)	U (0.063)	U (0.063)	U (0.63)	U (0.084)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	**79 J (3.2)**	U (0.15)	U (0.15)	**62 (1.5)**	13 (0.2)
Petroleum Hydrocarbons (Total)										6400 (35)	3 J (1.8)	31 J (1.8)	2700 J (18)	1000 J (1.8)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	19 (0.97)	U (0.047)	0.12 J (0.046)	5.6 (0.47)	2 (0.062)
meta-xylene			240	NC	240		100	MT-Scaled	100	76 (1.4)	U (0.065)	U (0.065)	16 (0.66)	2 (0.087)
ortho-xylene			280	NC	280		100	MT-Scaled	100	29 (0.68)	0.055 J (0.033)	0.31 (0.032)	15 (0.33)	13 (0.044)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	105 (1.4)	0.055 J (0.065)	0.31 (0.065)	31 (0.66)	15 (0.087)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON														
C9-C18 Aliphatics		540	44	NC	540	53000			53000	**2600 (11)**	U (10)	U (12)	**6800 (58)**	120 (10)
C19-C36 Aliphatics		200000			200000					340 (11)	U (10)	U (12)	2600 (58)	52 (10)
C11-C22 Aromatics		3900			3900	370			370	1700 J (11)	U (10)	U (12)	2400 (58)	15 (10)
Petroleum Hydrocarbons (Extractable)														
INORGANICS														
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	U (0.18)	U (0.17)	U (0.22)	U (0.21)	U (0.18)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	6.8 (0.18)	3.4 (0.17)	10 (0.22)	10 (0.21)	7.1 (0.18)
Barium	429		22000	NC	22000		421	MT-Scaled	421	290 (0.28)	420 (0.27)	200 (0.34)	250 (0.32)	180 (0.29)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	0.65 (0.031)	0.21 B (0.03)	0.87 B (0.037)	0.79 B (0.035)	1.2 B (0.031)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.2 (0.023)	0.032 J (0.022)	0.46 (0.027)	0.75 (0.026)	1 (0.023)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	16 B (0.51)	U (0.48)	23 B (0.61)	**45 B (0.58)**	21 B (0.51)
Cobalt	10		35	NC	35					5.6 (0.28)	2.8 (0.26)	9.2 (0.33)	6.1 (0.31)	7.7 (0.28)
Copper	165		4700	NC	4700		460	RSL - MCL	460	13 (0.3)	4.7 (0.28)	30 (0.36)	34 (0.34)	24 (0.3)
Lead	29.8		800	NC	800		140	RSL - MCL	140	16 (0.062)	3 (0.059)	16 (0.075)	46 (0.071)	20 (0.063)
Mercury			4.07	NC	4.066		1	RSL - MCL	1	U (0.024)	U (0.019)	0.029 J (0.023)	0.044 J (0.024)	0.056 J (0.021)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	13 (0.28)	5.2 (0.26)	22 (0.33)	25 (0.31)	14 (0.28)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	0.57 J (0.43)	U (0.41)	U (0.52)	U (0.49)	0.56 J (0.44)
Silver	0.3		580	NC	580		8.5	MT-Scaled	8.5	0.11 J (0.055)	U (0.052)	0.11 J (0.066)	0.31 (0.062)	0.1 J (0.055)
Vanadium	52.6		580	NC	580					37 (0.23)	8.7 (0.22)	52 (0.27)	37 (0.26)	57 (0.23)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	40 (0.46)	16 (0.43)	93 (0.55)	130 (0.52)	63 (0.46)

TABLE 6
EAST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	EB-03D	EB-04D	EB-04D	EB-04D	EB-05S
Field Sample ID										**CMR-EB03-4.0-4.5-190612-DUP**	**CMR-EB04-0.0-1.0-190613**	**CMR-EB04-4.0-5.0-190613**	**CMR-EB04-8.0-8.5-190613**	**CMR-EB05-11-12-190517**
Lab Sample ID										**UF13022-003**	**UF14018-001**	**UF14018-002**	**UF14018-003**	**UE17007-008**
Collection Depth (ft bgs)										**4 - 4.5**	**0 - 1**	**4 - 5**	**8 - 8.5**	**11 - 12**
Sample Method										**Sonic**	**Sonic**	**Sonic**	**Sonic**	**Direct Push**
Sample Date										**6/12/2019**	**6/13/2019**	**6/13/2019**	**6/13/2019**	**5/17/2019**
Comments										**Field Duplicate**				
VOLATILE ORGANIC COMPOUNDS														
Acetone			67000	NC	67000					0.53 J (0.23)	0.029 J (0.0074)	UJ (1.1)	UJ (0.57)	U (0.24)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	0.58 J (0.11)	U (0.0019)	U (0.57)	1.1 (0.29)	U (0.12)
2-Butanone			19000	NC	19000					U (0.23)	U (0.0037)	U (1.1)	U (0.57)	U (0.24)
Carbon Disulfide			350	NC	350					U (0.11)	U (0.0019)	U (0.57)	U (0.29)	U (0.12)
Cumene			990	NC	990					U (0.11)	U (0.0019)	2.1 (0.57)	2.2 (0.29)	0.38 (0.12)
Cyclohexane			2700	NC	2700					0.78 J (0.11)	U (0.0019)	1.1 J (0.57)	1.1 (0.29)	U (0.12)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.11)	U (0.0019)	3.9 (0.57)	2.7 (0.29)	0.18 J (0.12)
Methyl Acetate			120000	NC	120000					0.12 J (0.11)	U (0.0019)	U (0.57)	U (0.29)	U (0.12)
Methylcyclohexane			2700	NC	2700					1.3 J (0.11)	U (0.0019)	5.3 J (0.57)	8.1 J (0.29)	U (0.12)
Methylene Chloride			320	NC	320		0.013	RSL - MCL	0.013	U (0.11)	U (0.0019)	U (0.57)	U (0.29)	U (0.12)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.11)	0.0045 J (0.0019)	**120 (2.8)**	**120 (2.9)**	5.8 (0.12)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	0.16 J (0.11)	0.0054 (0.0019)	U (0.57)	U (0.29)	U (0.12)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.11)	U (0.0019)	4.9 (0.57)	0.51 J (0.29)	U (0.12)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.11)	U (0.0019)	3.5 (0.57)	0.55 J (0.29)	U (0.12)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.23)	U (0.0037)	8.4 (1.1)	1.1 J (0.57)	U (0.24)
SEMI VOLATILE ORGANIC COMPOUNDS														
Acenaphthene		3800	4500	NC	3800	27	7.26	MT-Scaled	27	U (0.048)	U (0.0086)	16 (0.099)	1.2 (0.02)	0.9 (0.019)
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	0.054 J (0.03)	0.054 (0.0053)	3.4 (0.061)	0.61 (0.012)	0.26 (0.011)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	U (0.034)	U (0.0061)	0.52 (0.071)	0.025 J (0.014)	U (0.013)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	0.05 J (0.038)	0.045 (0.0068)	0.082 J (0.079)	U (0.016)	U (0.015)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	0.051 J (0.029)	0.088 (0.0052)	0.22 J (0.06)	0.02 J (0.012)	U (0.011)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.038)	0.065 (0.0067)	U (0.078)	U (0.015)	U (0.015)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.028)	U (0.005)	U (0.057)	U (0.011)	U (0.011)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	U (0.026)	U (0.0046)	0.23 J (0.054)	0.058 J (0.011)	U (0.01)
Dibenzofuran			100	NC	100					U (0.29)	U (0.052)	8.5 (0.6)	0.95 (0.12)	0.7 (0.11)
2,4-Dimethylphenol			1600	NC	1600		1.2	MT-Scaled	1.2	U (0.29)	U (0.052)	U (0.6)	U (0.12)	U (0.11)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	0.051 J (0.024)	0.053 (0.0043)	0.21 J (0.05)	0.052 J (0.01)	U (0.0094)
Fluorene		2500	3000	NC	2500	35	9.31	MT-Scaled	35	U (0.033)	U (0.0059)	14 (0.068)	2.1 (0.014)	1.3 (0.013)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.058)	U (0.01)	U (0.12)	U (0.024)	U (0.022)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	0.54 J (0.057)	0.29 (0.01)	**650 (3)**	130 (0.59)	68 (0.22)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	0.17 J (0.056)	0.069 (0.01)	**70 (2.9)**	**19 (0.58)**	7.1 (0.022)
Pentachlorophenol			4	C	4		0.014	RSL - MCL	0.014	U (1.4)	U (0.26)	U (3)	U (0.59)	U (0.56)
Phenanthrene			2300	NC	2300					0.2 J (0.042)	0.1 (0.0074)	14 (0.086)	1.8 (0.017)	1.2 (0.016)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	0.26 J (0.029)	0.11 (0.0052)	0.63 (0.06)	0.17 (0.012)	0.077 (0.011)
MDEQ VOLATILE PETROLEUM HYDROCARBON														
C5-C8 Aliphatics		290	220	NC	290	220			220	11 J (0.92)	U (0.89)	49 (9.4)	240 (20)	46 (3.6)
C9-C12 Aliphatics		360			360	11000			11000	1.8 J (0.92)	U (0.89)	**580 (9.4)**	**880 (20)**	150 (3.6)
C9-C10 Aromatics		1000			1000	130			130	1.2 J (0.62)	U (0.59)	370 (6.3)	440 (2.7)	150 (2.4)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	0.29 J (0.042)	U (0.04)	U (0.43)	0.61 J (0.18)	U (0.16)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	0.054 J (0.038)	U (0.037)	1.3 J (0.39)	7.5 (0.16)	4.4 (0.15)
Methyl tert-butyl ether		230	210	C	230	0.078	0.069	MT-Scaled	0.078	U (0.067)	U (0.064)	U (0.68)	U (0.29)	U (0.26)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.16)	0.2 J (0.15)	**41 (1.6)**	**120 (3.4)**	**19 (0.62)**
Petroleum Hydrocarbons (Total)										11 J (1.8)	U (1.8)	960 (18)	1700 (35)	460 (7)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.049)	U (0.047)	U (0.5)	U (0.21)	0.48 J (0.19)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.069)	0.084 J (0.066)	0.74 J (0.7)	U (0.3)	U (0.27)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.035)	U (0.033)	6.6 (0.35)	9 (0.15)	1.6 (0.13)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.069)	0.084 J (0.066)	7.34 (0.7)	23 (1.5)	1.6 (0.27)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON														
C9-C18 Aliphatics		540	44	NC	540	53000			53000	53 (11)	48 (10)	**6500 (120)**	**4100 (58)**	**840 (11)**
C19-C36 Aliphatics		200000			200000					120 (11)	220 (10)	3300 (120)	820 (58)	190 (11)
C11-C22 Aromatics		3900			3900	370			370	120 (11)	140 (10)	**8600 (120)**	3000 (58)	600 (11)
Petroleum Hydrocarbons (Extractable)														
INORGANICS														
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	U (0.2)	U (0.2)	U (0.17)	U (0.18)	0.23 J (0.21)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	11 (0.2)	8.3 (0.2)	9.3 (0.17)	4.5 (0.18)	2 J (0.21)
Barium	429		22000	NC	22000		421	MT-Scaled	421	190 (0.32)	330 (0.31)	170 (0.27)	170 (0.28)	70 (0.32)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	0.87 B (0.035)	0.49 B (0.034)	0.82 B (0.03)	0.51 B (0.03)	1.1 (0.035)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.5 (0.025)	0.51 (0.025)	0.33 (0.022)	0.13 (0.022)	0.17 (0.026)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	23 B (0.56)	12 B (0.55)	14 B (0.48)	11 B (0.49)	15 B (0.57)
Cobalt	10		35	NC	35					9.1 (0.31)	4.1 (0.3)	4.8 (0.26)	4.1 (0.27)	4.2 (0.31)
Copper	165		4700	NC	4700		460	RSL - MCL	460	34 (0.33)	38 (0.32)	32 (0.28)	7.7 (0.29)	81 (0.33)
Lead	29.8		800	NC	800		140	RSL - MCL	140	23 (0.069)	58 (0.067)	43 (0.059)	5.8 (0.061)	15 (0.07)
Mercury			4.07	NC	4.066		1	RSL - MCL	1	0.062 J (0.021)	0.19 (0.02)	0.21 (0.021)	0.024 J (0.024)	0.042 J (0.022)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	21 (0.31)	10 (0.3)	12 (0.26)	9.6 (0.27)	16 (0.31)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.48)	U (0.47)	U (0.41)	U (0.42)	U (0.49)
Silver	0.3		580	NC	580		8.5	MT-Scaled	8.5	0.11 J (0.061)	0.11 J (0.059)	0.14 J (0.052)	0.054 J (0.054)	0.11 J (0.062)
Vanadium	52.6		580	NC	580					57 (0.25)	29 (0.25)	34 (0.22)	21 (0.22)	33 (0.26)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	100 (0.51)	190 (0.49)	73 (0.43)	29 (0.45)	44 (0.51)

TABLE 6
EAST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	EB-05S	EB-06S	EB-06S	EB-07S	EB-07S
Field Sample ID										CMR-EB05-6-7-190517	CMR-EB06-4.5-5.0-190516	CMR-EB06-6.25-6.75-190516	CMR-EB07-0.0-1.0-190516	CMR-EB07-5.25-5.75-190516
Lab Sample ID										UE17007-007	UE17007-001	UE17007-002	UE17007-003	UE17007-004
Collection Depth (ft bgs)										6 - 7	4.5 - 5	6.25 - 6.75	0 - 1	5.25 - 5.75
Sample Method										Direct Push	Direct Push	Direct Push	Direct Push	Direct Push
Sample Date										5/17/2019	5/16/2019	5/16/2019	5/16/2019	5/16/2019
Comments														
VOLATILE ORGANIC COMPOUNDS														
Acetone			67000	NC	67000					U (0.26)	U (0.28)	U (0.23)	U (0.0076)	0.032 (0.0074)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	0.22 J (0.13)	U (0.14)	U (0.11)	U (0.0019)	U (0.0019)
2-Butanone			19000	NC	19000					U (0.26)	U (0.28)	U (0.23)	U (0.0038)	U (0.0037)
Carbon Disulfide			350	NC	350					U (0.13)	U (0.14)	U (0.11)	U (0.0019)	U (0.0019)
Cumene			990	NC	990					0.51 (0.13)	U (0.14)	0.12 J (0.11)	U (0.0019)	0.0033 J (0.0019)
Cyclohexane			2700	NC	2700					0.2 J (0.13)	U (0.14)	U (0.11)	U (0.0019)	U (0.0019)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	1 (0.13)	U (0.14)	U (0.11)	U (0.0019)	U (0.0019)
Methyl Acetate			120000	NC	120000					U (0.13)	U (0.14)	U (0.11)	U (0.0019)	U (0.0019)
Methylcyclohexane			2700	NC	2700					0.74 (0.13)	0.25 J (0.14)	0.33 (0.11)	U (0.0019)	0.0094 (0.0019)
Methylene Chloride			320	NC	320		0.013	RSL - MCL	0.013	U (0.13)	U (0.14)	U (0.11)	U (0.0019)	0.002 J (0.0019)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	**28 (0.53)**	U (0.14)	0.25 J (0.11)	U (0.0019)	U (0.0019)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	0.15 J (0.13)	U (0.14)	0.16 J (0.11)	U (0.0019)	U (0.0019)
meta-xylene			240	NC	240		100	MT-Scaled	100	0.37 (0.13)	U (0.14)	0.37 (0.11)	0.002 J (0.0019)	U (0.0019)
ortho-xylene			280	NC	280		100	MT-Scaled	100	0.2 J (0.13)	U (0.14)	U (0.11)	U (0.0019)	U (0.0019)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	0.57 J (0.26)	U (0.28)	0.44 J (0.23)	U (0.0038)	U (0.0037)
SEMI VOLATILE ORGANIC COMPOUNDS														
Acenaphthene		3800	4500	NC	3800	27	7.26	MT-Scaled	27	1 (0.01)	2.7 (0.049)	U (0.048)	U (0.022)	U (0.024)
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	0.25 (0.0063)	0.85 (0.03)	0.3 (0.03)	0.08 (0.014)	0.31 (0.015)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	U (0.0073)	U (0.035)	U (0.034)	0.046 J (0.016)	U (0.017)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	U (0.0081)	U (0.039)	U (0.038)	U (0.017)	U (0.019)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	U (0.0061)	U (0.029)	U (0.029)	0.088 (0.013)	U (0.015)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.008)	U (0.038)	U (0.038)	U (0.017)	U (0.019)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.0059)	U (0.028)	U (0.028)	0.03 J (0.013)	U (0.014)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	0.022 J (0.0055)	U (0.026)	U (0.026)	0.046 J (0.012)	0.048 J (0.013)
Dibenzofuran			100	NC	100					0.74 (0.061)	1.5 (0.29)	0.4 J (0.29)	U (0.13)	U (0.15)
2,4-Dimethylphenol			1600	NC	1600		1.2	MT-Scaled	1.2	U (0.061)	U (0.29)	U (0.29)	U (0.13)	U (0.15)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	0.029 J (0.0052)	U (0.025)	0.081 J (0.024)	0.086 (0.011)	0.059 J (0.012)
Fluorene		2500	3000	NC	2500	35	9.31	MT-Scaled	35	1.2 (0.007)	2.8 (0.033)	0.47 (0.033)	0.058 J (0.015)	0.28 (0.017)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.012)	U (0.059)	U (0.058)	U (0.026)	U (0.029)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	52 (0.24)	U (0.058)	U (0.057)	0.69 (0.026)	0.28 (0.029)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	6.2 (0.24)	U (0.057)	U (0.056)	0.23 (0.026)	0.15 (0.028)
Pentachlorophenol			4	C	4		0.014	RSL - MCL	0.014	U (0.31)	U (1.5)	U (1.5)	U (0.66)	U (0.73)
Phenanthrene			2300	NC	2300					1.2 (0.0088)	2.2 (0.042)	0.57 (0.042)	0.23 (0.019)	0.89 (0.021)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	0.12 (0.0061)	0.36 (0.029)	0.21 (0.029)	0.13 (0.013)	0.17 (0.015)
MDEQ VOLATILE PETROLEUM HYDROCARBON														
C5-C8 Aliphatics		290	220	NC	290	220			220	22 (3.8)	U (0.94)	200 (1.8)	8.3 (0.77)	6.3 (0.9)
C9-C12 Aliphatics		360			360	11000			11000	210 (3.8)	5 (0.94)	190 (1.8)	38 (0.77)	53 E (0.9)
C9-C10 Aromatics		1000			1000	130			130	160 (2.5)	3.6 (0.62)	190 (0.59)	38 (0.52)	43 (0.6)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	0.19 J (0.17)	0.057 J (0.042)	U (0.04)	0.043 J (0.035)	U (0.041)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	2.2 (0.16)	U (0.039)	10 (0.037)	0.84 (0.032)	0.67 (0.037)
Methyl tert-butyl ether		230	210	C	230	0.078	0.069	MT-Scaled	0.078	U (0.27)	U (0.067)	0.24 J (0.064)	U (0.056)	U (0.064)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	**44 (0.66)**	0.26 J (0.16)	9.8 (0.31)	4 (0.13)	2.1 (0.16)
Petroleum Hydrocarbons (Total)										410 (7)	U (3.5)	750 E (1.8)	100 (1.8)	64 (1.8)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.2)	U (0.05)	U (0.048)	0.11 J (0.041)	U (0.048)
meta-xylene			240	NC	240		100	MT-Scaled	100	0.62 J (0.28)	U (0.07)	U (0.067)	1.6 (0.058)	0.25 J (0.067)
ortho-xylene			280	NC	280		100	MT-Scaled	100	0.66 J (0.14)	U (0.035)	3.6 (0.033)	1 (0.029)	1.1 (0.033)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	1.28 J (0.28)	U (0.14)	6.4 (0.13)	5.18 (0.058)	1.35 (0.067)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON														
C9-C18 Aliphatics		540	44	NC	540	53000			53000	**1100 (11)**	**2200 (12)**	**710 (12)**	150 (11)	280 (12)
C19-C36 Aliphatics		200000			200000					210 (11)	500 (12)	440 (12)	110 (11)	110 (12)
C11-C22 Aromatics		3900			3900	370			370	1300 (11)	1600 (12)	710 (12)	93 (11)	300 (12)
Petroleum Hydrocarbons (Extractable)														
INORGANICS														
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	UJ (0.2)	UJ (0.21)	UJ (0.22)	0.71 J (0.2)	0.23 J (0.18)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	6.2 J (0.2)	20 J (0.21)	2.6 J (0.22)	**40 J (0.2)**	22 J (0.18)
Barium	429		22000	NC	22000		421	MT-Scaled	421	220 (0.3)	350 (0.33)	85 (0.34)	410 (0.31)	430 (0.28)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	0.58 (0.033)	0.94 (0.036)	1.6 (0.038)	0.67 (0.034)	0.66 (0.03)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.13 (0.025)	0.8 (0.026)	0.45 (0.028)	1.6 (0.025)	0.8 (0.022)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	14 B (0.54)	14 B (0.58)	13 B (0.61)	14 B (0.56)	17 B (0.49)
Cobalt	10		35	NC	35					4.9 (0.29)	6.7 (0.32)	6.9 (0.33)	7.1 (0.3)	7.6 (0.27)
Copper	165		4700	NC	4700		460	RSL - MCL	460	14 (0.32)	23 (0.34)	38 (0.36)	240 (0.33)	100 (0.29)
Lead	29.8		800	NC	800		140	RSL - MCL	140	7.7 (0.067)	8 (0.072)	22 (0.075)	95 (0.069)	22 (0.061)
Mercury			4.07	NC	4.066		1	RSL - MCL	1	U (0.021)	U (0.023)	0.79 (0.022)	0.089 (0.02)	0.037 J (0.022)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	11 (0.29)	17 (0.32)	19 (0.33)	14 (0.3)	15 (0.27)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.46)	U (0.5)	U (0.52)	0.59 J (0.48)	0.51 J (0.42)
Silver	0.3		580	NC	580		8.5	MT-Scaled	8.5	0.081 J (0.059)	0.093 J (0.063)	0.2 J (0.066)	0.73 (0.061)	0.26 (0.054)
Vanadium	52.6		580	NC	580					30 (0.25)	39 (0.26)	25 (0.28)	36 (0.25)	37 (0.22)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	36 (0.49)	48 (0.53)	49 (0.55)	270 (0.51)	110 (0.45)

TABLE 6
EAST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	EB-07S	EB-09S	EB-10	EB-10	EB-10	EB-11S	EB-11S
Field Sample ID										CMR-EB07-7.5-8.0-190516	CMR-EB09-6-7-190517	CMR-EB10-0.5-1.0-190606	CMR-EB10-2.5-5.0-190606	CMR-EB10-7.5-8.5-190606	CMR-EB11-2.0-2.5-190520	CMR-EB11-2.5-3.0-190520
Lab Sample ID										UE17007-005	UE17007-009	UF07044-001	UF07044-002	UF07044-003	UE21018-003	UE21018-004
Collection Depth (ft bgs)										7.5 - 8	6 - 7	0.5 - 1	2.5 - 5	7.5 - 8.5	2 - 2.5	2.5 - 3
Sample Method										Direct Push	Direct Push	Sonic	Sonic	Sonic	Direct Push	Direct Push
Sample Date										5/16/2019	5/17/2019	6/6/2019	6/6/2019	6/6/2019	5/20/2019	5/20/2019
Comments																
VOLATILE ORGANIC COMPOUNDS																
Acetone			67000	NC	67000					U (0.23)	0.55 J (0.49)	U (0.35)	U (29)	U (0.8)	0.053 (0.016)	U (5.3)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.12)	0.25 J (0.25)	U (0.17)	U (14)	U (0.4)	U (0.004)	U (2.7)
2-Butanone			19000	NC	19000					U (0.23)	U (0.49)	U (0.35)	U (29)	U (0.8)	U (0.008)	U (5.3)
Carbon Disulfide			350	NC	350					U (0.12)	U (0.25)	U (0.17)	U (14)	U (0.4)	0.0052 J (0.004)	U (2.7)
Cumene			990	NC	990					0.95 (0.12)	2 (0.25)	U (0.17)	U (14)	1.3 (0.4)	U (0.004)	4 J (2.7)
Cyclohexane			2700	NC	2700					0.94 (0.12)	5.3 (0.25)	U (0.17)	110 (14)	7.5 (0.4)	U (0.004)	8.2 (2.7)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	1.2 (0.12)	7 (0.25)	U (0.17)	**83 (14)**	5 (0.4)	U (0.004)	14 (2.7)
Methyl Acetate			120000	NC	120000					U (0.12)	U (0.25)	U (0.17)	U (14)	U (0.4)	U (0.004)	U (2.7)
Methylcyclohexane			2700	NC	2700					5.7 (0.12)	20 (0.25)	0.35 J (0.17)	230 J (14)	21 J (0.4)	U (0.004)	47 (2.7)
Methylene Chloride			320	NC	320		0.013	RSL - MCL	0.013	U (0.12)	U (0.25)	U (0.17)	U (14)	U (0.4)	U (0.004)	U (2.7)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	**21 (0.46)**	3.3 (0.25)	U (0.17)	**43 (14)**	1.1 (0.4)	U (0.004)	11 (2.7)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	0.12 J (0.12)	0.4 J (0.25)	U (0.17)	23 J (14)	U (0.4)	U (0.004)	U (2.7)
meta-xylene			240	NC	240		100	MT-Scaled	100	0.13 J (0.12)	11 (0.25)	0.58 (0.17)	**380 (14)**	6.7 (0.4)	U (0.004)	57 (2.7)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.12)	1.3 (0.25)	0.23 J (0.17)	120 (14)	0.61 J (0.4)	U (0.004)	15 (2.7)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.23)	12 (0.49)	0.81 J (0.35)	**500 (29)**	7.4 (0.8)	U (0.008)	72 (5.3)
SEMI VOLATILE ORGANIC COMPOUNDS																
Acenaphthene		3800	4500	NC	3800	27	7.26	MT-Scaled	27	1.8 (0.047)	U (0.0095)	U (0.02)	0.28 J (0.2)	U (0.0086)	U (0.0052)	U (0.01)
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	0.62 (0.029)	U (0.0058)	0.041 J (0.012)	0.27 J (0.12)	U (0.0053)	0.041 (0.0032)	0.26 (0.0062)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	U (0.033)	U (0.0067)	0.14 (0.014)	U (0.14)	U (0.0061)	0.097 (0.0037)	U (0.0072)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	U (0.037)	U (0.0075)	0.07 (0.016)	U (0.16)	U (0.0068)	0.061 (0.0041)	0.017 J (0.008)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	U (0.028)	U (0.0057)	0.18 (0.012)	U (0.12)	U (0.0052)	0.15 (0.0031)	U (0.0061)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.037)	U (0.0074)	0.072 (0.016)	U (0.16)	U (0.0067)	0.065 (0.0041)	0.021 J (0.0079)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.027)	U (0.0055)	0.047 J (0.012)	U (0.11)	U (0.005)	U (0.003)	U (0.0058)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	U (0.025)	U (0.0051)	0.11 (0.011)	U (0.11)	U (0.0046)	0.076 (0.0028)	U (0.0055)
Dibenzofuran			100	NC	100					1.2 (0.28)	U (0.057)	U (0.12)	U (1.2)	U (0.052)	U (0.031)	0.36 (0.061)
2,4-Dimethylphenol			1600	NC	1600		1.2	MT-Scaled	1.2	U (0.28)	U (0.057)	U (0.12)	U (1.2)	U (0.052)	U (0.031)	U (0.061)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	U (0.024)	U (0.0048)	0.17 (0.01)	U (0.1)	U (0.0043)	0.073 (0.0026)	0.064 (0.0051)
Fluorene		2500	3000	NC	2500	35	9.31	MT-Scaled	35	1.9 (0.032)	0.047 (0.0065)	U (0.014)	U (0.14)	U (0.0059)	0.0091 J (0.0036)	0.66 (0.0069)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.056)	U (0.011)	0.051 J (0.024)	U (0.24)	U (0.01)	0.053 (0.0062)	U (0.012)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	110 (0.56)	0.32 (0.011)	0.52 (0.024)	54 (0.24)	0.17 (0.01)	0.055 (0.0062)	22 (0.12)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	11 (0.055)	0.87 (0.011)	0.27 (0.023)	**32 (0.23)**	0.31 (0.01)	0.047 (0.006)	13 (0.12)
Pentachlorophenol			4	C	4		0.014	RSL - MCL	0.014	U (1.4)	U (0.29)	U (0.6)	U (6)	U (0.26)	U (0.16)	U (0.3)
Phenanthrene			2300	NC	2300					2.3 (0.041)	0.047 (0.0082)	0.2 (0.017)	0.82 (0.17)	U (0.0074)	0.15 (0.0045)	0.71 (0.0088)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	0.42 (0.028)	U (0.0057)	0.21 (0.012)	U (0.12)	U (0.0052)	0.13 (0.0031)	0.1 (0.0061)
MDEQ VOLATILE PETROLEUM HYDROCARBON																
C5-C8 Aliphatics		290	220	NC	290	220			220	160 (3.3)	**770 (8.4)**	42 (1)	**3700 (100)**	230 (3.8)	U (1.4)	**2000 (20)**
C9-C12 Aliphatics		360			360	11000			11000	270 (3.3)	**590 (8.4)**	28 (1)	**2400 (100)**	150 (3.8)	U (1.4)	**2200 (20)**
C9-C10 Aromatics		1000			1000	130			130	240 (2.2)	340 (5.6)	22 (0.68)	**1700 (70)**	76 (2.5)	U (0.91)	**1300 (13)**
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.15)	2.2 (0.15)	0.3 J (0.046)	**31 J (4.7)**	U (0.17)	U (0.062)	3.6 J (0.91)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	6.6 (0.14)	**30 (0.14)**	0.68 (0.042)	**88 (4.3)**	4.4 (0.16)	U (0.057)	**60 (0.83)**
Methyl tert-butyl ether		230	210	C	230	0.078	0.069	MT-Scaled	0.078	U (0.24)	0.47 J (0.24)	U (0.073)	U (7.5)	U (0.27)	U (0.098)	U (1.5)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	**52 H (1.4)**	8.8 (0.58)	0.63 (0.18)	**69 (18)**	1.3 (0.65)	U (0.24)	**35 (3.5)**
Petroleum Hydrocarbons (Total)										250 E (7)	1800 E (7)	84 (1.8)	8000 (180)	430 (8.8)	U (1.8)	5500 (35)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.18)	4.3 (0.18)	0.37 (0.054)	29 J (5.6)	U (0.2)	U (0.073)	9.4 (1.1)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.25)	25 (0.25)	1.6 (0.076)	**280 (7.8)**	2.8 (0.28)	U (0.1)	98 (1.5)
ortho-xylene			280	NC	280		100	MT-Scaled	100	7.9 (0.12)	8.7 (0.13)	0.89 (0.038)	100 (3.9)	5 (0.14)	U (0.051)	48 (0.75)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	14.6 (0.62)	64.2 (0.63)	2.49 (0.076)	**380 (7.8)**	7.8 (0.28)	U (0.1)	146 (1.5)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON																
C9-C18 Aliphatics		540	44	NC	540	53000			53000	**650 (11)**	91 (11)	11 (11)	**1400 (12)**	17 (10)		**1700 (12)**
C19-C36 Aliphatics		200000			200000					250 (11)	13 (11)	U (11)	81 (12)	U (10)		180 (12)
C11-C22 Aromatics		3900			3900	370			370	990 (11)	47 (11)	U (11)	560 (12)	U (10)		710 (12)
Petroleum Hydrocarbons (Extractable)															18 (12)	
INORGANICS																
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	UJ (0.22)	UJ (0.23)	7.1 (0.24)	U (0.19)	U (0.18)	2.6 (0.23)	0.2 J (0.2)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	0.42 J (0.22)	0.56 J (0.23)	**490 (0.24)**	10 (0.19)	2.2 (0.18)	**260 (0.23)**	18 (0.2)
Barium	429		22000	NC	22000		421	MT-Scaled	421	120 (0.35)	59 (0.35)	190 (0.37)	240 (0.29)	57 (0.27)	130 (0.36)	240 (0.32)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	1.7 (0.038)	1.1 (0.039)	0.36 J (0.041)	0.98 J (0.032)	0.64 J (0.03)	0.78 (0.04)	0.77 (0.035)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.32 (0.028)	0.23 (0.029)	4 (0.03)	0.21 (0.023)	U (0.022)	1.5 (0.029)	0.39 (0.026)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	9.9 B (0.62)	13 B (0.63)	10 (0.66)	23 (0.51)	29 (0.48)	7.2 B (0.65)	17 B (0.56)
Cobalt	10		35	NC	35					4.9 (0.34)	3.9 (0.34)	**37 (0.36)**	7.4 (0.28)	3.1 (0.26)	24 (0.35)	5.6 (0.31)
Copper	165		4700	NC	4700		460	RSL - MCL	460	30 (0.36)	20 (0.37)	1200 (1.2)	17 (0.3)	32 (0.28)	1600 (3.8)	42 (0.33)
Lead	29.8		800	NC	800		140	RSL - MCL	140	13 (0.076)	10 (0.078)	57 (0.081)	31 (0.063)	9.7 (0.06)	100 (0.079)	14 (0.069)
Mercury			4.07	NC	4.066		1	RSL - MCL	1	0.18 (0.022)	0.31 (0.021)	0.24 (0.022)	U (0.024)	U (0.02)	0.11 (0.023)	U (0.023)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	16 (0.34)	20 (0.34)	42 (0.36)	17 (0.28)	9.1 (0.26)	29 (0.35)	13 (0.31)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.53)	U (0.54)	1.5 J (0.57)	U (0.44)	U (0.41)	1.2 J (0.55)	0.59 J (0.48)
Silver	0.3		580	NC	580		8.5	MT-Scaled	8.5	0.13 J (0.067)	0.085 J (0.069)	9.7 (0.072)	0.11 J (0.056)	U (0.053)	2.6 (0.07)	0.087 J (0.061)
Vanadium	52.6		580	NC	580					32 (0.28)	22 (0.29)	37 (0.3)	53 (0.23)	60 (0.22)	24 (0.29)	44 (0.26)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	36 (0.56)	44 (0.57)	670 (1.8)	52 (0.46)	39 (0.44)	580 (0.58)	170 (0.51)

TABLE 6
EAST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	EB-14S	EB-14S	EB-15	EB-15	EB-15	EB-15
Field Sample ID										CMR-EB14-0.5-1.5-190520	CMR-EB14-2.0-2.4-190520	CMR-EB15-0.5-1.0-190614	CMR-EB15-15.0-16.0-190614	CMR-EB15-18.0-19.0-190614	CMR-EB15-20.5-21.5-190614
Lab Sample ID										UE21018-001	UE21018-002	UF15015-001	UF15015-002	UF15015-003	UF15015-004
Collection Depth (ft bgs)										0.5 - 1.5	2 - 2.4	0.5 - 1	15 - 16	18 - 19	20 - 21.5
Sample Method										Direct Push	Direct Push	Sonic	Sonic	Sonic	Sonic
Sample Date										5/20/2019	5/20/2019	6/14/2019	6/14/2019	6/14/2019	6/14/2019
Comments															
VOLATILE ORGANIC COMPOUNDS															
Acetone			67000	NC	67000					0.028 (0.0095)	0.01 J (0.0089)	0.011 J (0.0083)	0.04 J (0.0077)	0.048 J (0.0083)	0.072 J (0.0063)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.0024)	U (0.0022)	U (0.0021)	U (0.0019)	U (0.0021)	U (0.0016)
2-Butanone			19000	NC	19000					U (0.0047)	U (0.0045)	U (0.0041)	U (0.0038)	0.011 J (0.0042)	U (0.0031)
Carbon Disulfide			350	NC	350					U (0.0024)	U (0.0022)	U (0.0021)	0.002 J (0.0019)	0.0027 J (0.0021)	U (0.0016)
Cumene			990	NC	990					U (0.0024)	U (0.0022)	UJ (0.0021)	UJ (0.0019)	UJ (0.0021)	UJ (0.0016)
Cyclohexane			2700	NC	2700					U (0.0024)	U (0.0022)	UJ (0.0021)	UJ (0.0019)	UJ (0.0021)	UJ (0.0016)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.0024)	U (0.0022)	U (0.0021)	U (0.0019)	U (0.0021)	U (0.0016)
Methyl Acetate			120000	NC	120000					U (0.0024)	U (0.0022)	U (0.0021)	U (0.0019)	U (0.0021)	U (0.0016)
Methylcyclohexane			2700	NC	2700					U (0.0024)	U (0.0022)	U (0.0021)	U (0.0019)	U (0.0021)	U (0.0016)
Methylene Chloride			320	NC	320		0.013	RSL - MCL	0.013	U (0.0024)	U (0.0022)	U (0.0021)	U (0.0019)	U (0.0021)	U (0.0016)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.0024)	U (0.0022)	0.049 J (0.0021)	0.0062 J (0.0019)	0.0041 J (0.0021)	UJ (0.0016)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.0024)	U (0.0022)	U (0.0021)	U (0.0019)	U (0.0021)	U (0.0016)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.0024)	U (0.0022)	U (0.0021)	U (0.0019)	U (0.0021)	U (0.0016)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.0024)	U (0.0022)	U (0.0021)	U (0.0019)	U (0.0021)	U (0.0016)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.0047)	U (0.0045)	U (0.0041)	U (0.0038)	U (0.0042)	U (0.0031)
SEMI VOLATILE ORGANIC COMPOUNDS															
Acenaphthene		3800	4500	NC	3800	27	7.26	MT-Scaled	27	U (0.0088)	U (0.0047)	U (0.043)	U (0.00097)	U (0.051)	U (0.0046)
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	U (0.0054)	0.0082 J (0.0029)	U (0.027)	0.0027 J (0.0006)	U (0.031)	U (0.0028)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	U (0.0063)	0.032 (0.0033)	U (0.031)	0.0057 (0.00069)	U (0.036)	U (0.0033)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	0.013 J (0.007)	0.016 (0.0037)	U (0.035)	0.0055 (0.00077)	0.042 J (0.041)	U (0.0037)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	U (0.0053)	0.047 (0.0028)	U (0.026)	0.012 (0.00059)	U (0.031)	U (0.0028)
Benzo(g,h,i)perylene			2300	NC	2300					0.013 J (0.0069)	0.021 (0.0037)	U (0.034)	0.0038 (0.00076)	U (0.04)	U (0.0036)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.0051)	0.01 J (0.0027)	U (0.025)	0.0031 J (0.00056)	U (0.03)	U (0.0027)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	U (0.0048)	0.023 (0.0025)	U (0.024)	0.0051 (0.00053)	U (0.028)	U (0.0025)
Dibenzofuran			100	NC	100					U (0.053)	U (0.028)	U (0.26)	U (0.0059)	U (0.31)	U (0.028)
2,4-Dimethylphenol			1600	NC	1600		1.2	MT-Scaled	1.2	U (0.053)	U (0.028)	U (0.26)	U (0.0059)	U (0.31)	U (0.028)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	0.0086 J (0.0045)	0.024 (0.0024)	U (0.022)	0.011 (0.00049)	U (0.026)	U (0.0023)
Fluorene		2500	3000	NC	2500	35	9.31	MT-Scaled	35	U (0.0061)	U (0.0032)	0.051 J (0.03)	0.0016 J (0.00067)	U (0.035)	U (0.0032)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.011)	0.016 (0.0056)	U (0.052)	0.0023 J (0.0012)	U (0.062)	U (0.0056)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	0.013 J (0.011)	0.029 (0.0056)	0.81 (0.052)	0.023 (0.0012)	U (0.061)	U (0.0055)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.01)	0.034 (0.0055)	UJ (0.051)	0.0059 J (0.0011)	UJ (0.06)	UJ (0.0054)
Pentachlorophenol			4	C	4		0.014	RSL - MCL	0.014	U (0.27)	U (0.14)	U (1.3)	0.072 J (0.029)	U (1.5)	U (0.14)
Phenanthrene			2300	NC	2300					0.012 J (0.0077)	0.054 (0.004)	0.07 J (0.038)	0.014 (0.00084)	U (0.044)	U (0.004)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	0.022 J (0.0053)	0.035 (0.0028)	U (0.026)	0.0091 (0.00059)	0.061 J (0.031)	U (0.0028)
MDEQ VOLATILE PETROLEUM HYDROCARBON															
C5-C8 Aliphatics		290	220	NC	290	220			220	U (0.95)	U (1.2)	U (0.96)	U (0.83)	U (1.1)	U (0.78)
C9-C12 Aliphatics		360			360	11000			11000	U (0.95)	U (1.2)	U (0.96)	U (0.83)	U (1.1)	8.5 (0.78)
C9-C10 Aromatics		1000			1000	130			130	U (0.63)	U (0.78)	0.82 J (0.64)	U (0.55)	6.3 (0.73)	12 (0.52)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.043)	U (0.053)	U (0.043)	U (0.038)	U (0.05)	U (0.035)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.039)	U (0.048)	U (0.04)	U (0.034)	U (0.045)	U (0.032)
Methyl tert-butyl ether		230	210	C	230	0.078	0.069	MT-Scaled	0.078	U (0.068)	U (0.084)	U (0.069)	U (0.06)	U (0.079)	U (0.056)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.16)	U (0.2)	0.47 J (0.17)	UJ (0.14)	1.2 J (0.19)	2.5 J (0.14)
Petroleum Hydrocarbons (Total)										U (1.8)	U (1.8)	1.8 J (1.8)	U (1.8)	3.6 J (1.8)	19 (1.8)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.051)	U (0.063)	U (0.051)	U (0.044)	U (0.058)	U (0.042)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.071)	U (0.088)	U (0.071)	U (0.062)	U (0.082)	U (0.058)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.035)	U (0.044)	U (0.036)	U (0.031)	U (0.041)	U (0.029)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.071)	U (0.088)	U (0.071)	U (0.062)	U (0.082)	U (0.058)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON															
C9-C18 Aliphatics		540	44	NC	540	53000			53000	U (10)		22 H (10)	U (11)	**870 (12)**	190 H (11)
C19-C36 Aliphatics		200000			200000					53 (10)		93 H (10)	U (11)	760 (12)	62 H (11)
C11-C22 Aromatics		3900			3900	370			370	54 (10)		59 H (10)	U (11)	530 (12)	33 H (11)
Petroleum Hydrocarbons (Extractable)											16 (12)				
INORGANICS															
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	U (0.18)	1.1 (0.22)	UJ (0.2)	UJ (0.22)	0.46 B (0.18)	UJ (0.18)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	9.1 (0.18)	**100 (0.22)**	13 (0.2)	13 (0.22)	**23 (0.18)**	8.6 (0.18)
Barium	429		22000	NC	22000		421	MT-Scaled	421	230 (0.27)	120 (0.35)	240 (0.31)	380 (0.33)	230 (0.28)	90 (0.27)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	0.67 (0.03)	0.96 (0.038)	0.74 B (0.034)	0.93 B (0.037)	0.86 B (0.031)	0.6 B (0.03)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.65 (0.022)	3.4 (0.028)	0.63 (0.025)	0.61 (0.027)	1.2 (0.023)	0.58 (0.022)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	15 B (0.49)	13 B (0.62)	16 B (0.55)	23 B (0.6)	17 B (0.5)	23 B (0.49)
Cobalt	10		35	NC	35					5.3 (0.26)	11 (0.34)	6.4 (0.3)	7.8 (0.32)	8 (0.27)	15 (0.27)
Copper	165		4700	NC	4700		460	RSL - MCL	460	19 (0.29)	710 (1.5)	46 (0.33)	47 (0.35)	87 (0.3)	68 (0.29)
Lead	29.8		800	NC	800		140	RSL - MCL	140	13 (0.06)	55 (0.076)	48 (0.068)	37 (0.073)	150 (0.062)	8.1 (0.06)
Mercury			4.07	NC	4.066		1	RSL - MCL	1	0.024 J (0.02)	0.13 (0.021)	0.12 (0.021)	0.097 (0.021)	0.15 (0.023)	0.16 (0.02)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	12 (0.26)	17 (0.34)	13 (0.3)	23 (0.32)	16 (0.27)	31 (0.27)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	0.43 J (0.42)	0.97 J (0.53)	U (0.47)	U (0.51)	0.44 J (0.43)	U (0.42)
Silver	0.3		580	NC	580		8.5	MT-Scaled	8.5	0.1 J (0.053)	1.2 (0.067)	0.15 J (0.06)	0.17 J (0.065)	0.44 (0.055)	0.17 J (0.053)
Vanadium	52.6		580	NC	580					34 (0.22)	35 (0.28)	35 (0.25)	49 (0.27)	48 (0.23)	52 (0.22)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	120 (0.44)	920 (2.2)	120 (0.5)	120 (0.54)	230 (0.46)	81 (0.44)

TABLE 6
EAST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Soil Notes:

Table updated in September 2021.

1 All concentrations are presented in mg/kg (ppm).
2 Only compounds with at least one detection each respective area are shown.
3 Inorganic concentrations below the Background Threshold Values for Inorganics in Montana Soils are not identified as exeedances.
4 The USEPA Commercial/Industrial RSLs are based on a Target Risk of $1x10^{-6}$ and a Target Hazard Quotient of 0.1;
C - Carcinogen; NC - Noncarcinogen
5 The Direct Contact Screening Level is selected according to the MTDEQ Surface and Subsurface Soil Screening Flowchart.
6 The MTDEQ Modified EPA Migration to Groundwater Screening Levels are selected according to the MT DEQ Surface and Subsurface Soil Screening Flowchart, a DAF of 10 has been applied to these screening levels;
RSL-MCL - The RSL-MTGW is based on the MCL;
MT-Scaled - The risk-based screening level was scaled to match the MT DEQ HHS groundwater target per the Surface and Subsurface Soil Screening Flowchart.
7 The Leaching to Groundwater Screening Level is selected according to the MTDEQ Surface and Subsurface Soil Screening Flowchart Process.
8 Concentrations that exceed the Direct Contact RBSL are **boldfaced** and gray shaded.
9 Concentrations that exceed the Leaching to Groundwater RBSL are <u>underlined</u> and gray shaded.

Abbeviations:

U -- Not Detected.
J -- Estimated Concentration.
H -- Analysis Conducted Outside Holding Time.
B -- Blank Contamination.
( ) -- Detection Limit.
-- -- Not Analyzed.

TABLE 7
WEST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	WB-01D	WB-01D	WB-01D	WB-01S
Field Sample ID										CMR-WB01-3.0-4.0-190622	CMR-WB01-6.0-6.5-190622	CMR-WB01-6.0-6.5-190622-DUP	CMR-WB01-1.5-2.0-190622
Lab Sample ID										UF25038-002	UF25038-003	UF25038-004	UF25038-001
Collection Depth (ft bgs)										3 - 4	6 - 6.5	6 - 6.5	1.5 - 2
Sample Method										Sonic	Sonic	Sonic	Sonic
Sample Date										6/22/2019	6/22/2019	6/22/2019	6/22/2019
Comments												Field Duplicate	
VOLATILE ORGANIC COMPOUNDS													
Acetone			67000	NC	67000					U (0.0081)	U (1.1)	U (1)	U (0.0098)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.002)	U (0.54)	U (0.51)	U (0.0024)
2-Butanone			19000	NC	19000					U (0.004)	U (1.1)	U (1)	U (0.0049)
Carbon Disulfide			350	NC	350					U (0.002)	U (0.54)	U (0.51)	U (0.0024)
Cumene			990	NC	990					U (0.002)	3.5 (0.54)	5.1 (0.51)	U (0.0024)
Cyclohexane			2700	NC	2700					U (0.002)	3.3 (0.54)	4.4 (0.51)	U (0.0024)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.002)	12 (0.54)	17 (0.51)	U (0.0024)
Methylcyclohexane			2700	NC	2700					U (0.002)	11 (0.54)	14 (0.51)	U (0.0024)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.002)	U (0.54)	U (0.51)	U (0.0024)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.002)	U (0.54)	U (0.51)	U (0.0024)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.002)	U (0.54)	U (0.51)	U (0.0024)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.004)	U (1.1)	U (1)	U (0.0049)
SEMI VOLATILE ORGANIC COMPOUNDS													
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	U (0.015)	U (0.03)	0.13 J (0.028)	0.036 (0.003)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	U (0.017)	U (0.035)	U (0.033)	0.11 (0.0035)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	0.061 J (0.019)	U (0.039)	U (0.037)	0.068 (0.0039)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	U (0.014)	U (0.03)	U (0.028)	0.24 (0.0029)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.019)	U (0.039)	U (0.036)	0.059 (0.0038)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.014)	U (0.029)	U (0.027)	0.066 (0.0028)
bis(2-Ethylhexyl)phthalate			160	C	160		14	RSL - MCL	14	U (0.72)	U (1.5)	U (1.4)	U (0.15)
Carbazole										U (0.14)	U (0.3)	U (0.28)	0.029 J (0.029)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	U (0.013)	U (0.027)	U (0.025)	0.17 (0.0026)
Dibenzofuran			100	NC	100					U (0.14)	U (0.3)	0.39 J (0.28)	0.061 J (0.029)
2,4-Dichlorophenol			250	NC	250		0.05	MT-Scaled	0.05	U (0.14)	U (0.3)	U (0.28)	0.038 J (0.029)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	U (0.012)	U (0.025)	U (0.023)	0.19 (0.0025)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.029)	U (0.059)	U (0.056)	0.051 (0.0058)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	U (0.029)	1.1 (0.059)	1 (0.055)	0.1 (0.0058)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.028)	0.82 (0.058)	0.6 (0.054)	0.09 (0.0057)
Phenanthrene			2300	NC	2300					U (0.021)	U (0.043)	0.17 (0.04)	0.22 (0.0042)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	U (0.014)	U (0.03)	U (0.028)	0.2 (0.0029)
MDEQ VOLATILE PETROLEUM HYDROCARBON													
C5-C8 Aliphatics		290	220	NC	290	220			220	U (0.89)	260 (4.8)	250 (4.6)	U (1.1)
C9-C12 Aliphatics		360			360	11000			11000	31 (0.89)	**730 (4.8)**	**690 (4.6)**	2.3 J (1.1)
C9-C10 Aromatics		1000			1000	130			130	29 (0.6)	520 (3.2)	580 (2.4)	U (0.74)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.041)	U (0.22)	U (0.17)	U (0.05)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.037)	23 (0.2)	**29 (0.15)**	U (0.046)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	1.3 (0.16)	17 (0.83)	**32 (0.63)**	U (0.19)
Petroleum Hydrocarbons (Total)										61 (1.8)	1700 (8.8)	1700 (8.8)	4.8 J (1.8)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.048)	U (0.26)	U (0.19)	U (0.059)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.067)	U (0.36)	U (0.27)	0.13 J (0.083)
ortho-xylene			280	NC	280		100	MT-Scaled	100	0.044 J (0.033)	17 (0.18)	19 (0.14)	0.11 J (0.042)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	0.044 J (0.067)	17 (0.36)	39 (0.34)	0.24 J (0.083)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON													
C9-C18 Aliphatics		540	44	NC	540	53000			53000	**650 (11)**	**6300 (120)**	**4800 (110)**	U (12)
C19-C36 Aliphatics		200000			200000					360 (11)	2500 (120)	2000 (110)	U (12)
C11-C22 Aromatics		3900			3900	370			370	110 (11)	890 (120)	1200 (110)	U (12)
INORGANICS													
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	0.25 J (0.21)	U (0.22)	U (0.22)	3 (0.23)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	14 (0.21)	3.8 (0.22)	3.9 (0.22)	**180 (0.23)**
Barium	429		22000	NC	22000		421	MT-Scaled	421	150 (0.33)	130 (0.35)	130 (0.34)	160 (0.35)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	UJ (0.037)	0.089 J (0.038)	0.1 J (0.038)	UJ (0.039)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.5 (0.027)	0.092 J (0.028)	0.087 J (0.028)	23 (0.029)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	12 (0.59)	8.8 (0.62)	10 (0.61)	13 (0.63)
Cobalt	10		35	NC	35					5.1 (0.32)	3.3 (0.34)	3.6 (0.33)	14 (0.34)
Copper	165		4700	NC	4700		460	RSL - MCL	460	67 (0.35)	5.2 (0.36)	5.5 (0.36)	1300 (1.1)
Lead	29.8		800	NC	800		140	RSL - MCL	140	7.5 (0.073)	5.8 (0.076)	5.7 (0.075)	**1200 (0.23)**
Mercury			4.066	NC	4.066		1	RSL - MCL	1	U (0.023)	U (0.021)	U (0.023)	1.3 (0.022)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	9.6 (0.32)	7.2 (0.34)	7.9 (0.33)	24 (0.34)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.51)	U (0.53)	U (0.52)	0.67 J (0.54)
Silver	0.3		580	NC	580		8.51	MT-Scaled	8.51	0.15 J (0.064)	U (0.067)	U (0.066)	7.7 (0.069)
Vanadium	52.6		580	NC	580					34 (0.27)	19 (0.28)	20 (0.28)	31 (0.29)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	68 (0.54)	25 (0.56)	25 (0.55)	7700 (11)

TABLE 7
WEST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	WB-02D	WB-02D	WB-03D	WB-03D	WB-03S
Field Sample ID										CMR-WB02-10.0-10.75-190622	CMR-WB02-2.0-2.5-190622	CMR-WB03-3.5-4.0-190622	CMR-WB03-5.0-5.5-190622	CMR-WB03-0.5-1.0-190622
Lab Sample ID										UF25046-005	UF25046-004	UF25046-002	UF25046-003	UF25046-001
Collection Depth (ft bgs)										10 - 10.75	2 - 2.5	3.5 - 4	5 - 5.5	0.5 - 1
Sample Method										Sonic	Sonic	Sonic	Sonic	Sonic
Sample Date										6/22/2019	6/22/2019	6/22/2019	6/22/2019	6/22/2019
Comments														
VOLATILE ORGANIC COMPOUNDS														
Acetone			67000	NC	67000					U (0.92)	U (0.0076)	U (0.0082)	U (0.0076)	U (0.011)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	0.56 J (0.46)	U (0.0019)	U (0.002)	U (0.0019)	U (0.0029)
2-Butanone			19000	NC	19000					U (0.92)	U (0.0038)	U (0.0041)	U (0.0038)	U (0.0057)
Carbon Disulfide			350	NC	350					U (0.46)	U (0.0019)	U (0.002)	U (0.0019)	U (0.0029)
Cumene			990	NC	990					2.3 (0.46)	U (0.0019)	U (0.002)	U (0.0019)	U (0.0029)
Cyclohexane			2700	NC	2700					4.1 (0.46)	U (0.0019)	U (0.002)	U (0.0019)	U (0.0029)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	8.4 (0.46)	U (0.0019)	U (0.002)	U (0.0019)	U (0.0029)
Methylcyclohexane			2700	NC	2700					13 (0.46)	U (0.0019)	U (0.002)	U (0.0019)	0.0036 J (0.0029)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.46)	U (0.0019)	U (0.002)	U (0.0019)	U (0.0029)
meta-xylene			240	NC	240		100	MT-Scaled	100	1.4 (0.46)	U (0.0019)	U (0.002)	U (0.0019)	0.0036 J (0.0029)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.46)	U (0.0019)	U (0.002)	U (0.0019)	U (0.0029)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	1.4 J (0.92)	U (0.0038)	U (0.0041)	U (0.0038)	U (0.0057)
SEMI VOLATILE ORGANIC COMPOUNDS														
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	0.038 J (0.015)	U (0.014)	U (0.00059)	U (0.00059)	U (0.055)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	U (0.017)	U (0.017)	0.0021 J (0.00069)	U (0.00068)	0.28 J (0.064)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	U (0.019)	U (0.019)	U (0.00077)	U (0.00077)	0.3 (0.072)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	U (0.014)	U (0.014)	0.0024 J (0.00058)	U (0.00058)	0.54 (0.054)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.019)	U (0.018)	0.0012 J (0.00075)	U (0.00075)	0.18 J (0.071)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.014)	U (0.014)	U (0.00056)	U (0.00056)	U (0.052)
bis(2-Ethylhexyl)phthalate			160	C	160		14	RSL - MCL	14	U (0.71)	U (0.71)	U (0.029)	U (0.029)	U (2.7)
Carbazole										U (0.14)	U (0.14)	U (0.0058)	U (0.0058)	U (0.54)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	U (0.013)	U (0.013)	0.0012 J (0.00052)	U (0.00052)	0.26 J (0.049)
Dibenzofuran			100	NC	100					U (0.14)	U (0.14)	U (0.0058)	U (0.0058)	U (0.54)
2,4-Dichlorophenol			250	NC	250		0.05	MT-Scaled	0.05	U (0.14)	U (0.14)	U (0.0058)	U (0.0058)	U (0.54)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	U (0.012)	U (0.012)	0.0011 J (0.00049)	U (0.00049)	0.28 J (0.046)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.029)	U (0.028)	U (0.0012)	U (0.0012)	U (0.11)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	0.31 (0.028)	U (0.028)	U (0.0011)	U (0.0011)	0.44 (0.11)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	0.14 (0.028)	U (0.027)	U (0.0011)	U (0.0011)	0.2 J (0.11)
Phenanthrene			2300	NC	2300					0.067 J (0.021)	U (0.02)	0.0023 J (0.00084)	U (0.00084)	0.47 (0.078)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	U (0.014)	U (0.014)	0.0017 J (0.00058)	U (0.00058)	0.42 (0.054)
MDEQ VOLATILE PETROLEUM HYDROCARBON														
C5-C8 Aliphatics		290	220	NC	290	220			220	240 (1.8)	1.3 J (0.94)	U (0.95)	U (0.9)	7.9 (1.1)
C9-C12 Aliphatics		360			360	11000			11000	**640 (1.8)**	28 (0.94)	U (0.95)	U (0.9)	16 (1.1)
C9-C10 Aromatics		1000			1000	130			130	380 (1.2)	29 (0.62)	U (0.63)	U (0.6)	15 (0.72)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	0.19 J (0.08)	U (0.042)	U (0.043)	U (0.041)	0.093 J (0.049)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	16 (0.073)	0.23 J (0.039)	U (0.039)	U (0.037)	0.14 J (0.045)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	11 (0.31)	U (0.16)	U (0.16)	U (0.16)	2.2 (0.19)
Petroleum Hydrocarbons (Total)										1300 (3.5)	57 (1.8)	U (1.8)	U (1.8)	48 (1.8)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.094)	0.051 J (0.05)	U (0.051)	U (0.048)	0.73 (0.058)
meta-xylene			240	NC	240		100	MT-Scaled	100	2 (0.13)	0.45 (0.07)	U (0.071)	U (0.067)	1.2 (0.081)
ortho-xylene			280	NC	280		100	MT-Scaled	100	14 (0.066)	0.52 (0.035)	U (0.035)	U (0.034)	0.28 J (0.04)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	16 (0.13)	0.97 (0.07)	U (0.071)	U (0.067)	1.48 (0.081)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON														
C9-C18 Aliphatics		540	44	NC	540	53000			53000	**2800 (11)**	110 (11)	U (11)	U (11)	220 (11)
C19-C36 Aliphatics		200000			200000					850 (11)	47 (11)	U (11)	U (11)	100 (11)
C11-C22 Aromatics		3900			3900	370			370	620 (11)	16 (11)	U (11)	U (11)	62 (11)
INORGANICS														
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	0.41 J (0.22)	0.35 J (0.2)	0.28 J (0.2)	U (0.21)	1.9 (0.22)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	17 (0.22)	21 (0.2)	17 (0.2)	13 (0.21)	**54 (0.22)**
Barium	429		22000	NC	22000		421	MT-Scaled	421	260 (0.35)	340 (0.31)	170 (0.31)	540 (0.33)	61 (0.35)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	0.098 J (0.038)	0.18 (0.034)	0.11 (0.035)	0.11 (0.036)	1.5 (0.038)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.55 (0.028)	46 (0.025)	0.37 (0.025)	0.34 (0.027)	8.7 (0.028)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	20 (0.62)	13 (0.56)	12 (0.56)	16 (0.59)	6.7 (0.62)
Cobalt	10		35	NC	35					11 (0.34)	21 (0.3)	6.2 (0.3)	6.6 (0.32)	4.4 (0.34)
Copper	165		4700	NC	4700		460	RSL - MCL	460	17 (0.36)	350 (0.33)	280 (0.33)	15 (0.35)	430 (0.36)
Lead	29.8		800	NC	800		140	RSL - MCL	140	13 (0.076)	88 (0.069)	8.3 (0.069)	10 (0.072)	**1100 (0.23)**
Mercury			4.066	NC	4.066		1	RSL - MCL	1	0.022 J (0.022)	0.075 J (0.022)	U (0.022)	0.03 J (0.021)	1.2 (0.021)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	20 (0.34)	40 (0.3)	13 (0.3)	16 (0.32)	11 (0.34)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.53)	0.54 J (0.48)	U (0.48)	U (0.5)	1.1 J (0.53)
Silver	0.3		580	NC	580		8.51	MT-Scaled	8.51	0.076 J (0.067)	0.75 (0.061)	0.24 J (0.061)	0.082 J (0.064)	8.1 (0.067)
Vanadium	52.6		580	NC	580					54 (0.28)	26 (0.25)	29 (0.25)	38 (0.27)	27 (0.28)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	78 (0.56)	7400 (51)	77 (0.51)	57 (0.53)	1300 (1.7)

TABLE 7
WEST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	WB-04D	WB-04D	WB-05	WB-06D	WB-06D
Field Sample ID										CMR-WB04-5.0-6.0-190619	CMR-WB04-8.0-9.0-190619	CMR-WB05-7.5-8.5-190619	CMR-WB06-10.0-10.5-190620	CMR-WB06-6.0-6.25-190620
Lab Sample ID										UF21028-003	UF21028-002	UF21028-001	UF21029-001	UF21029-002
Collection Depth (ft bgs)										5 - 6	8 - 9	7.5 - 8.5	10 - 10.5	6 - 6.2
Sample Method										Sonic	Sonic	Sonic	Sonic	Sonic
Sample Date										6/19/2019	6/19/2019	6/19/2019	6/20/2019	6/20/2019
Comments														
VOLATILE ORGANIC COMPOUNDS														
Acetone			67000	NC	67000					0.11 (0.0041)	U (0.25)	0.075 (0.0034)	0.034 (0.0075)	0.14 (0.0068)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.0021)	U (0.12)	U (0.0017)	U (0.0019)	U (0.0017)
2-Butanone			19000	NC	19000					U (0.0041)	U (0.25)	U (0.0034)	U (0.0037)	U (0.0034)
Carbon Disulfide			350	NC	350					U (0.0021)	U (0.12)	0.0025 J (0.0017)	U (0.0019)	U (0.0017)
Cumene			990	NC	990					U (0.0021)	0.29 J (0.12)	U (0.0017)	U (0.0019)	U (0.0017)
Cyclohexane			2700	NC	2700					U (0.0021)	U (0.12)	U (0.0017)	U (0.0019)	U (0.0017)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.0021)	0.28 J (0.12)	U (0.0017)	U (0.0019)	U (0.0017)
Methylcyclohexane			2700	NC	2700					U (0.0021)	U (0.12)	U (0.0017)	U (0.0019)	U (0.0017)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.0021)	U (0.12)	U (0.0017)	U (0.0019)	U (0.0017)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.0021)	U (0.12)	U (0.0017)	U (0.0019)	U (0.0017)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.0021)	U (0.12)	U (0.0017)	U (0.0019)	U (0.0017)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.0041)	U (0.25)	U (0.0034)	U (0.0037)	U (0.0034)
SEMI VOLATILE ORGANIC COMPOUNDS														
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	0.0026 J (0.00058)	U (0.03)	0.0045 (0.00058)	U (0.00059)	U (0.00058)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	0.014 (0.00067)	U (0.034)	0.02 (0.00067)	U (0.00069)	U (0.00067)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	0.011 (0.00075)	U (0.038)	0.013 (0.00075)	U (0.00077)	U (0.00074)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	0.026 (0.00057)	U (0.029)	0.031 (0.00057)	U (0.00058)	U (0.00056)
Benzo(g,h,i)perylene			2300	NC	2300					0.0081 (0.00074)	U (0.038)	0.0092 (0.00074)	U (0.00076)	0.0038 (0.00073)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.00055)	U (0.028)	0.0061 (0.00055)	U (0.00056)	U (0.00054)
bis(2-Ethylhexyl)phthalate			160	C	160		14	RSL - MCL	14	U (0.028)	U (1.5)	U (0.028)	U (0.029)	U (0.028)
Carbazole										U (0.0057)	U (0.29)	U (0.0057)	U (0.0058)	U (0.0056)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	0.0093 (0.00051)	U (0.026)	0.017 (0.00051)	U (0.00052)	U (0.00051)
Dibenzofuran			100	NC	100					U (0.0057)	U (0.29)	0.0086 J (0.0057)	U (0.0058)	U (0.0056)
2,4-Dichlorophenol			250	NC	250		0.05	MT-Scaled	0.05	U (0.0057)	U (0.29)	U (0.0057)	U (0.0058)	U (0.0056)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	0.011 (0.00048)	U (0.024)	0.022 (0.00048)	U (0.00049)	U (0.00047)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	0.0067 (0.0011)	U (0.058)	0.0081 (0.0011)	U (0.0012)	U (0.0011)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	0.0039 (0.0011)	U (0.058)	0.022 (0.0011)	U (0.0012)	U (0.0011)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	0.0045 (0.0011)	U (0.056)	0.015 (0.0011)	U (0.0011)	U (0.0011)
Phenanthrene			2300	NC	2300					0.012 (0.00082)	U (0.042)	0.029 (0.00082)	U (0.00084)	U (0.00081)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	0.017 (0.00057)	U (0.029)	0.041 (0.00057)	0.0026 J (0.00058)	U (0.00056)
MDEQ VOLATILE PETROLEUM HYDROCARBON														
C5-C8 Aliphatics		290	220	NC	290	220			220	2 J (1)	18 (0.99)	U (0.94)	U (0.89)	U (0.76)
C9-C12 Aliphatics		360			360	11000			11000	1.6 J (1)	270 (0.99)	U (0.94)	U (0.89)	U (0.76)
C9-C10 Aromatics		1000			1000	130			130	U (0.67)	180 (3.3)	U (0.62)	U (0.59)	U (0.51)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.046)	U (0.22)	U (0.042)	U (0.04)	U (0.035)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	0.077 J (0.042)	1.6 (0.2)	U (0.039)	U (0.037)	U (0.032)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.18)	6 (0.86)	U (0.16)	U (0.15)	U (0.13)
Petroleum Hydrocarbons (Total)										4.1 J (1.8)	520 (1.8)	U (1.8)	U (1.8)	U (1.8)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	0.34 (0.054)	U (0.26)	U (0.05)	U (0.047)	U (0.041)
meta-xylene			240	NC	240		100	MT-Scaled	100	0.16 J (0.075)	U (0.37)	U (0.07)	U (0.066)	U (0.057)
ortho-xylene			280	NC	280		100	MT-Scaled	100	0.14 J (0.038)	3.4 (0.18)	U (0.035)	U (0.033)	U (0.029)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	1.02 J (0.075)	8.83 (0.37)	U (0.07)	U (0.066)	U (0.057)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON														
C9-C18 Aliphatics		540	44	NC	540	53000			53000	U (11)	**840 (11)**	U (11)	U (12)	U (11)
C19-C36 Aliphatics		200000			200000					U (11)	300 (11)	U (11)	U (12)	U (11)
C11-C22 Aromatics		3900			3900	370			370	U (11)	88 (11)	U (11)	U (12)	U (11)
INORGANICS														
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	0.84 (0.22)	U (0.21)	0.2 J (0.2)	0.43 J (0.23)	U (0.22)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	**56 (0.22)**	6.1 (0.21)	13 (0.2)	17 (0.23)	5.3 (0.22)
Barium	429		22000	NC	22000		421	MT-Scaled	421	150 (0.34)	410 (0.33)	280 (0.32)	640 (0.36)	190 (0.33)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	1.5 (0.038)	0.55 (0.036)	0.83 (0.035)	0.71 (0.04)	0.62 (0.037)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.36 (0.028)	0.11 J (0.026)	2.4 (0.026)	0.32 (0.029)	0.14 (0.027)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	13 (0.61)	12 (0.58)	17 (0.57)	17 (0.64)	13 (0.6)
Cobalt	10		35	NC	35					6.7 (0.33)	3.7 (0.32)	6.7 (0.31)	11 (0.35)	5 (0.32)
Copper	165		4700	NC	4700		460	RSL - MCL	460	340 (0.36)	8.1 (0.34)	77 (0.33)	15 (0.38)	7.6 (0.35)
Lead	29.8		800	NC	800		140	RSL - MCL	140	22 (0.075)	6.9 (0.072)	23 (0.07)	12 (0.079)	7.8 (0.073)
Mercury			4.066	NC	4.066		1	RSL - MCL	1	0.065 J (0.021)	U (0.023)	0.059 J (0.022)	0.024 J (0.022)	0.023 J (0.021)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	12 (0.33)	8.8 (0.32)	12 (0.31)	18 (0.35)	11 (0.32)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.52)	U (0.5)	U (0.48)	U (0.55)	U (0.51)
Silver	0.3		580	NC	580		8.51	MT-Scaled	8.51	0.52 (0.066)	U (0.063)	0.24 J (0.061)	0.1 J (0.07)	U (0.065)
Vanadium	52.6		580	NC	580					33 (0.28)	27 (0.26)	46 (0.26)	70 (0.29)	26 (0.27)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	69 (0.55)	31 (0.53)	330 (0.51)	66 (0.58)	33 (0.54)

TABLE 7
WEST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	WB-07	WB-08	WB-09D	WB-09D	WB-10
Field Sample ID										CMR-WB07-5.0-6.0-190617	CMR-WB08-5.0-6.0-190617	CMR-WB09-2.0-3.0-190617	CMR-WB09-6.0-6.75-190617	CMR-WB10-3.0-4.0-190621
Lab Sample ID										UF18024-004	UF18024-003	UF18024-001	UF18024-002	UF24002-001
Collection Depth (ft bgs)										5 - 6	5 - 6	2 - 3	6 - 6.7	3 - 4
Sample Method										Sonic	Sonic	Sonic	Sonic	Sonic
Sample Date										6/17/2019	6/17/2019	6/17/2019	6/17/2019	6/21/2019
Comments														
VOLATILE ORGANIC COMPOUNDS														
Acetone			67000	NC	67000					0.013 J (0.0095)	UJ (0.24)	0.038 J (0.0072)	UJ (0.22)	U (0.24)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.0024)	U (0.12)	U (0.0018)	U (0.11)	U (0.12)
2-Butanone			19000	NC	19000					U (0.0047)	U (0.24)	U (0.0036)	U (0.22)	U (0.24)
Carbon Disulfide			350	NC	350					U (0.0024)	U (0.12)	U (0.0018)	U (0.11)	U (0.12)
Cumene			990	NC	990					U (0.0024)	U (0.12)	U (0.0018)	0.27 (0.11)	1.3 (0.12)
Cyclohexane			2700	NC	2700					U (0.0024)	U (0.12)	U (0.0018)	U (0.11)	0.38 (0.12)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.0024)	U (0.12)	U (0.0018)	0.91 (0.11)	1.8 (0.12)
Methylcyclohexane			2700	NC	2700					UJ (0.0024)	UJ (0.12)	UJ (0.0018)	0.52 J (0.11)	2.3 (0.12)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.0024)	0.15 J (0.12)	U (0.0018)	U (0.11)	U (0.12)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.0024)	U (0.12)	U (0.0018)	U (0.11)	0.58 (0.12)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.0024)	U (0.12)	U (0.0018)	U (0.11)	U (0.12)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.0047)	U (0.24)	U (0.0036)	U (0.22)	0.58 J (0.24)
SEMI VOLATILE ORGANIC COMPOUNDS														
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	U (0.00061)	0.0042 J (0.003)	U (0.003)	U (0.12)	0.049 J (0.015)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	0.0013 J (0.00071)	U (0.0035)	U (0.0034)	U (0.14)	U (0.018)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	0.0014 J (0.00079)	U (0.0039)	U (0.0038)	U (0.16)	U (0.02)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	0.0036 (0.0006)	0.0082 J (0.0029)	U (0.0029)	U (0.12)	U (0.015)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.00078)	U (0.0038)	U (0.0038)	U (0.16)	U (0.02)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	0.0011 J (0.00057)	U (0.0028)	U (0.0028)	U (0.12)	U (0.014)
bis(2-Ethylhexyl)phthalate			160	C	160		14	RSL - MCL	14	U (0.03)	U (0.15)	U (0.15)	U (6)	U (0.75)
Carbazole										U (0.006)	U (0.029)	U (0.029)	U (1.2)	U (0.15)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	0.0014 J (0.00054)	U (0.0026)	U (0.0026)	U (0.11)	U (0.014)
Dibenzofuran			100	NC	100					U (0.006)	U (0.029)	U (0.029)	U (1.2)	U (0.15)
2,4-Dichlorophenol			250	NC	250		0.05	MT-Scaled	0.05	U (0.006)	U (0.029)	U (0.029)	U (1.2)	U (0.15)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	0.0025 J (0.0005)	0.0074 J (0.0025)	U (0.0024)	U (0.1)	U (0.013)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.0012)	U (0.0058)	U (0.0058)	U (0.24)	U (0.03)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	0.0016 J (0.0012)	U (0.0058)	0.0059 J (0.0058)	0.29 J (0.24)	0.27 (0.03)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	0.0016 J (0.0012)	U (0.0057)	U (0.0056)	U (0.23)	0.21 (0.029)
Phenanthrene			2300	NC	2300					0.0027 J (0.00086)	0.0076 J (0.0042)	U (0.0042)	U (0.17)	0.055 J (0.022)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	0.0023 J (0.0006)	0.011 J (0.0029)	U (0.0029)	U (0.12)	U (0.015)
MDEQ VOLATILE PETROLEUM HYDROCARBON														
C5-C8 Aliphatics		290	220	NC	290	220			220	1.3 J (1.1)	1.3 J (0.84)	U (0.93)	33 (0.86)	170 (1.8)
C9-C12 Aliphatics		360			360	11000			11000	U (1.1)	87 (0.84)	U (0.93)	130 (0.86)	**480 (1.8)**
C9-C10 Aromatics		1000			1000	130			130	U (0.7)	59 (0.56)	U (0.62)	82 (0.57)	320 (1.2)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.048)	U (0.038)	U (0.042)	U (0.039)	0.11 J (0.08)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.044)	0.16 J (0.035)	U (0.039)	2.2 (0.036)	5.9 (0.073)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.18)	1.5 (0.15)	U (0.16)	2.3 (0.15)	9.4 (0.3)
Petroleum Hydrocarbons (Total)										U (1.8)	130 (1.8)	U (1.8)	280 (1.8)	1100 (3.5)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.056)	U (0.045)	U (0.05)	U (0.046)	U (0.094)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.079)	U (0.063)	U (0.07)	U (0.064)	1.5 (0.13)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.039)	0.4 (0.031)	U (0.035)	2.9 (0.032)	U (0.066)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.079)	0.4 (0.063)	U (0.07)	2.9 (0.064)	1.5 (0.13)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON														
C9-C18 Aliphatics		540	44	NC	540	53000			53000	U (12)	420 (11)	U (11)	**1300 (12)**	**1800 (11)**
C19-C36 Aliphatics		200000			200000					U (12)	190 (11)	U (11)	480 (12)	710 (11)
C11-C22 Aromatics		3900			3900	370			370	U (12)	32 (11)	U (11)	170 (12)	360 (11)
INORGANICS														
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	U (0.24)	U (0.21)	U (0.23)	U (0.22)	U (0.23)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	7.8 (0.24)	8.7 (0.21)	13 (0.23)	7.8 (0.22)	18 (0.23)
Barium	429		22000	NC	22000		421	MT-Scaled	421	250 (0.38)	180 (0.33)	230 (0.35)	220 (0.33)	210 (0.36)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	0.48 (0.041)	0.46 (0.036)	0.95 (0.039)	0.6 (0.037)	0.11 J (0.04)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.63 (0.03)	0.33 (0.026)	0.21 (0.028)	0.15 (0.027)	0.12 J (0.029)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	12 B (0.67)	12 B (0.58)	21 B (0.63)	14 B (0.6)	10 (0.65)
Cobalt	10		35	NC	35					4.7 (0.36)	4.4 (0.32)	6.2 (0.34)	4.6 (0.32)	3.7 (0.35)
Copper	165		4700	NC	4700		460	RSL - MCL	460	19 (0.39)	22 (0.34)	15 (0.37)	11 (0.35)	8.4 (0.38)
Lead	29.8		800	NC	800		140	RSL - MCL	140	18 (0.083)	12 (0.071)	10 (0.077)	9.3 (0.073)	5.8 (0.08)
Mercury			4.066	NC	4.066		1	RSL - MCL	1	0.069 J (0.022)	0.034 J (0.021)	0.029 J (0.023)	0.025 J (0.021)	U (0.021)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	10 (0.36)	8.9 (0.32)	16 (0.34)	11 (0.32)	8.2 (0.35)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.57)	U (0.5)	U (0.54)	U (0.51)	U (0.55)
Silver	0.3		580	NC	580		8.51	MT-Scaled	8.51	0.13 J (0.073)	0.096 J (0.063)	0.083 J (0.068)	U (0.065)	U (0.07)
Vanadium	52.6		580	NC	580					27 (0.3)	26 (0.26)	51 (0.28)	32 (0.27)	25 (0.29)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	110 (0.61)	70 (0.53)	53 (0.57)	42 (0.54)	27 (0.59)

TABLE 7
WEST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	WB-10	WB-10	WB-11D	WB-11D	WB-12S
Field Sample ID										CMR-WB10-6.0-7.0-190621	CMR-WB10-9.0-9.5-190621	CMR-WB11-1.0-2.0-190618	CMR-WB11-3.0-3.9-190618	CMR-WB12-0.0-1.0-190618
Lab Sample ID										UF24002-002	UF24002-003	UF19039-005	UF19039-006	UF19039-003
Collection Depth (ft bgs)										6 - 7	9 - 9.5	1 - 2	3 - 3.9	0 - 1
Sample Method										Sonic	Sonic	Sonic	Sonic	Sonic
Sample Date										6/21/2019	6/21/2019	6/18/2019	6/18/2019	6/18/2019
Comments														
VOLATILE ORGANIC COMPOUNDS														
Acetone			67000	NC	67000					0.017 J (0.0036)	0.069 (0.0032)	U (0.23)	U (0.52)	0.015 J (0.0083)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.0018)	U (0.0016)	U (0.11)	U (0.26)	U (0.0021)
2-Butanone			19000	NC	19000					U (0.0036)	U (0.0032)	U (0.23)	U (0.52)	U (0.0041)
Carbon Disulfide			350	NC	350					U (0.0018)	U (0.0016)	U (0.11)	U (0.26)	U (0.0021)
Cumene			990	NC	990					0.0024 J (0.0018)	0.0022 J (0.0016)	U (0.11)	U (0.26)	U (0.0021)
Cyclohexane			2700	NC	2700					U (0.0018)	U (0.0016)	0.29 (0.11)	U (0.26)	U (0.0021)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.0018)	U (0.0016)	U (0.11)	U (0.26)	U (0.0021)
Methylcyclohexane			2700	NC	2700					0.01 (0.0018)	0.011 (0.0016)	1.8 J (0.11)	1.2 J (0.26)	U (0.0021)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.0018)	U (0.0016)	0.14 J (0.11)	0.31 J (0.26)	U (0.0021)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.0018)	U (0.0016)	U (0.11)	U (0.26)	U (0.0021)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.0018)	U (0.0016)	U (0.11)	U (0.26)	U (0.0021)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.0036)	U (0.0032)	U (0.23)	U (0.52)	U (0.0041)
SEMI VOLATILE ORGANIC COMPOUNDS														
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	U (0.00056)	U (0.00054)	U (0.055)	U (0.06)	0.0044 J (0.0029)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	U (0.00064)	U (0.00062)	U (0.064)	U (0.069)	0.021 (0.0033)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	U (0.00072)	U (0.0007)	U (0.072)	U (0.077)	0.028 (0.0037)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	U (0.00054)	U (0.00053)	U (0.054)	U (0.058)	0.078 (0.0028)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.00071)	U (0.00069)	U (0.071)	U (0.076)	0.016 (0.0037)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.00052)	U (0.00051)	U (0.052)	U (0.056)	0.014 J (0.0027)
bis(2-Ethylhexyl)phthalate			160	C	160		14	RSL - MCL	14	U (0.027)	U (0.026)	U (2.7)	U (2.9)	1.7 (0.14)
Carbazole										U (0.0054)	U (0.0053)	U (0.54)	U (0.58)	U (0.028)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	U (0.00049)	U (0.00047)	U (0.049)	U (0.053)	0.04 (0.0025)
Dibenzofuran			100	NC	100					U (0.0054)	U (0.0053)	U (0.54)	U (0.58)	U (0.028)
2,4-Dichlorophenol			250	NC	250		0.05	MT-Scaled	0.05	U (0.0054)	U (0.0053)	U (0.54)	U (0.58)	U (0.028)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	U (0.00046)	U (0.00044)	U (0.046)	U (0.049)	0.048 (0.0024)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.0011)	U (0.0011)	U (0.11)	U (0.12)	0.014 J (0.0057)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	U (0.0011)	0.0022 J (0.001)	U (0.11)	0.83 (0.12)	U (0.0056)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.0011)	U (0.001)	U (0.11)	0.6 (0.11)	U (0.0055)
Phenanthrene			2300	NC	2300					U (0.00078)	U (0.00076)	U (0.078)	0.25 J (0.084)	0.04 (0.0041)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	U (0.00054)	U (0.00053)	U (0.054)	U (0.058)	0.053 (0.0028)
MDEQ VOLATILE PETROLEUM HYDROCARBON														
C5-C8 Aliphatics		290	220	NC	290	220			220	1.5 J (0.8)	U (0.85)	130 (3.6)	210 (4.1)	U (0.97)
C9-C12 Aliphatics		360			360	11000			11000	13 (0.8)	2.5 J (0.85)	340 (3.6)	**500 (4.1)**	U (0.97)
C9-C10 Aromatics		1000			1000	130			130	8.7 (0.53)	0.64 J (0.57)	260 (2.4)	330 (2.7)	U (0.64)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.036)	U (0.038)	U (0.16)	U (0.18)	U (0.044)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	0.14 J (0.033)	U (0.035)	11 (0.15)	16 (0.17)	U (0.04)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	0.66 (0.14)	U (0.15)	8.5 (0.62)	12 (0.7)	U (0.17)
Petroleum Hydrocarbons (Total)										29 (1.8)	4.9 J (1.8)	890 (8.8)	1100 (8.8)	U (1.8)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.043)	U (0.045)	U (0.19)	U (0.22)	U (0.052)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.06)	U (0.063)	0.8 J (0.27)	U (0.3)	U (0.072)
ortho-xylene			280	NC	280		100	MT-Scaled	100	0.28 (0.03)	0.036 J (0.032)	U (0.13)	11 (0.15)	U (0.036)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	0.28 (0.06)	0.036 J (0.063)	0.8 J (0.27)	11 (0.3)	U (0.072)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON														
C9-C18 Aliphatics		540	44	NC	540	53000			53000	12 (10)	15 (10)	**2200 (11)**	**1400 (12)**	U (11)
C19-C36 Aliphatics		200000			200000					U (10)	U (10)	800 (11)	510 (12)	U (11)
C11-C22 Aromatics		3900			3900	370			370	U (10)	U (10)	510 (11)	410 (12)	U (11)
INORGANICS														
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	0.24 J (0.21)	U (0.22)	U (0.21)	U (0.2)	0.3 J (0.22)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	2.4 (0.21)	1.5 (0.22)	14 (0.21)	7.1 (0.2)	**23 (0.22)**
Barium	429		22000	NC	22000		421	MT-Scaled	421	200 (0.33)	1400 (0.34)	150 J (0.32)	220 J (0.31)	480 J (0.35)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	0.14 (0.036)	0.15 (0.037)	0.6 (0.035)	0.91 (0.035)	0.69 (0.038)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.036 J (0.027)	1.3 (0.027)	0.14 (0.026)	0.17 (0.025)	1.2 (0.028)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	**72 (0.59)**	28 (0.6)	13 (0.58)	20 (0.56)	17 (0.62)
Cobalt	10		35	NC	35					5.8 (0.32)	7.9 (0.33)	5.2 (0.31)	6.4 (0.3)	7.6 (0.34)
Copper	165		4700	NC	4700		460	RSL - MCL	460	15 (0.35)	14 (0.35)	8.3 J (0.34)	12 J (0.33)	42 J (0.36)
Lead	29.8		800	NC	800		140	RSL - MCL	140	6.8 (0.073)	6.3 (0.074)	7.3 (0.071)	9 (0.069)	31 (0.076)
Mercury			4.066	NC	4.066		1	RSL - MCL	1	U (0.022)	U (0.02)	0.027 J (0.022)	U (0.024)	0.07 J (0.02)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	18 (0.32)	21 (0.33)	10 (0.31)	15 (0.3)	16 (0.34)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.5)	U (0.51)	U (0.49)	U (0.48)	U (0.53)
Silver	0.3		580	NC	580		8.51	MT-Scaled	8.51	U (0.064)	U (0.065)	U (0.063)	0.071 J (0.061)	0.21 J (0.067)
Vanadium	52.6		580	NC	580					71 (0.27)	76 (0.27)	33 (0.26)	52 (0.25)	47 (0.28)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	48 (0.53)	56 (0.54)	39 (0.52)	50 (0.51)	200 (0.56)

TABLE 7
WEST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	WB-12S	WB-13D	WB-13D	WB-14D
Field Sample ID										CMR-WB12-2.0-2.5-190618	CMR-WB13-3.0-3.5-190618	CMR-WB13-3.0-3.5-190618-DUP	CMR-WB14-20.0-21.0-190625
Lab Sample ID										UF19039-004	UF19039-001	UF19039-002	UF26025-002
Collection Depth (ft bgs)										2 - 2.5	3 - 3.5	3 - 3.5	20 - 21
Sample Method										Sonic	Sonic	Sonic	Sonic
Sample Date										6/18/2019	6/18/2019	6/18/2019	6/25/2019
Comments												Field Duplicate	
VOLATILE ORGANIC COMPOUNDS													
Acetone			67000	NC	67000					U (0.22)	0.022 (0.0076)	0.027 (0.0075)	0.094 J (0.0075)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.11)	U (0.0019)	U (0.0019)	U (0.0019)
2-Butanone			19000	NC	19000					U (0.22)	U (0.0038)	0.0043 J (0.0037)	U (0.0038)
Carbon Disulfide			350	NC	350					U (0.11)	U (0.0019)	U (0.0019)	U (0.0019)
Cumene			990	NC	990					U (0.11)	U (0.0019)	U (0.0019)	U (0.0019)
Cyclohexane			2700	NC	2700					U (0.11)	U (0.0019)	U (0.0019)	U (0.0019)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.11)	U (0.0019)	U (0.0019)	U (0.0019)
Methylcyclohexane			2700	NC	2700					U (0.11)	U (0.0019)	U (0.0019)	U (0.0019)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	0.14 J (0.11)	U (0.0019)	U (0.0019)	U (0.0019)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.11)	U (0.0019)	U (0.0019)	U (0.0019)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.11)	U (0.0019)	U (0.0019)	U (0.0019)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.22)	U (0.0038)	U (0.0037)	U (0.0038)
SEMI VOLATILE ORGANIC COMPOUNDS													
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	U (0.057)	U (0.00057)	U (0.00056)	U (0.00054)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	U (0.065)	U (0.00066)	0.0019 J (0.00065)	U (0.00063)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	U (0.073)	U (0.00073)	U (0.00073)	U (0.0007)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	U (0.055)	U (0.00056)	U (0.00055)	0.0051 (0.00053)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.072)	U (0.00072)	0.0011 J (0.00072)	0.0027 J (0.00069)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.053)	U (0.00053)	U (0.00053)	U (0.00051)
bis(2-Ethylhexyl)phthalate			160	C	160		14	RSL - MCL	14	U (2.8)	U (0.028)	U (0.028)	U (0.027)
Carbazole										U (0.55)	U (0.0056)	U (0.0055)	U (0.0053)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	U (0.05)	U (0.0005)	0.0013 J (0.0005)	U (0.00048)
Dibenzofuran			100	NC	100					U (0.55)	U (0.0056)	U (0.0055)	U (0.0053)
2,4-Dichlorophenol			250	NC	250		0.05	MT-Scaled	0.05	U (0.55)	U (0.0056)	U (0.0055)	U (0.0053)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	U (0.047)	U (0.00047)	0.00082 J (0.00046)	U (0.00045)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.11)	U (0.0011)	U (0.0011)	U (0.0011)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	U (0.11)	U (0.0011)	U (0.0011)	U (0.0011)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.11)	U (0.0011)	U (0.0011)	U (0.001)
Phenanthrene			2300	NC	2300					U (0.08)	0.0014 J (0.0008)	0.0015 J (0.00079)	U (0.00076)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	U (0.055)	0.00078 J (0.00056)	0.0013 J (0.00055)	U (0.00053)
MDEQ VOLATILE PETROLEUM HYDROCARBON													
C5-C8 Aliphatics		290	220	NC	290	220			220	7.5 (0.87)	U (0.82)	U (0.75)	U (0.76)
C9-C12 Aliphatics		360			360	11000			11000	140 (0.87)	U (0.82)	U (0.75)	U (0.76)
C9-C10 Aromatics		1000			1000	130			130	73 (0.58)	U (0.55)	U (0.5)	U (0.51)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.039)	U (0.037)	U (0.034)	U (0.035)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	0.93 (0.036)	U (0.034)	U (0.031)	U (0.031)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	1.7 (0.15)	U (0.14)	U (0.13)	U (0.13)
Petroleum Hydrocarbons (Total)										230 (1.8)	U (1.8)	U (1.8)	U (1.8)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.046)	U (0.044)	U (0.04)	U (0.041)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.065)	U (0.061)	U (0.056)	U (0.057)
ortho-xylene			280	NC	280		100	MT-Scaled	100	1.7 (0.032)	U (0.031)	U (0.028)	U (0.028)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	1.7 (0.065)	U (0.061)	U (0.056)	U (0.057)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON													
C9-C18 Aliphatics		540	44	NC	540	53000			53000	**910 (11)**	U (11)	U (11)	U (11)
C19-C36 Aliphatics		200000			200000					330 (11)	U (11)	U (11)	U (11)
C11-C22 Aromatics		3900			3900	370			370	110 (11)	U (11)	U (11)	U (11)
INORGANICS													
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	U (0.17)	0.24 J (0.23)	U (0.22)	0.34 J (0.19)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	9.1 (0.17)	**23 (0.23)**	**23 (0.22)**	3.4 (0.19)
Barium	429		22000	NC	22000		421	MT-Scaled	421	230 J (0.27)	270 J (0.36)	190 J (0.35)	150 (0.29)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	0.6 (0.029)	0.65 (0.039)	0.62 (0.038)	0.07 J (0.032)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.21 (0.022)	0.19 (0.029)	0.13 J (0.028)	0.56 (0.024)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	13 (0.48)	16 (0.64)	14 (0.62)	27 (0.52)
Cobalt	10		35	NC	35					5.8 (0.26)	6.1 (0.35)	5.7 (0.34)	6.2 (0.28)
Copper	165		4700	NC	4700		460	RSL - MCL	460	8.2 J (0.28)	21 J (0.38)	9 J (0.37)	47 (0.31)
Lead	29.8		800	NC	800		140	RSL - MCL	140	7.7 (0.059)	8.4 (0.079)	7.6 (0.076)	9.7 (0.064)
Mercury			4.066	NC	4.066		1	RSL - MCL	1	0.033 J (0.022)	0.026 J (0.021)	U (0.022)	0.027 J (0.02)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	11 (0.26)	12 (0.35)	11 (0.34)	28 (0.28)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.41)	U (0.55)	U (0.53)	U (0.45)
Silver	0.3		580	NC	580		8.51	MT-Scaled	8.51	0.052 J (0.052)	0.091 J (0.07)	U (0.067)	0.12 J (0.057)
Vanadium	52.6		580	NC	580					35 (0.22)	41 (0.29)	38 (0.28)	59 (0.24)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	40 (0.43)	52 (0.58)	38 (0.56)	74 (0.47)

TABLE 7
WEST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Background Threshold Values for Inorganics in Montana Soils[3]	MDEQ Commercial/ Industrial Direct Contact RBSLs	USEPA RSLs - Commercial/ Industrial[4]		Direct Contact RBSL[5]	MDEQ Leaching to Groundwater < 10 feet to Groundwater RBSL	MDEQ Modified USEPA Migration to Groundwater Screening Levels[6]		Leaching to Groundwater RBSL[7]	WB-14D	WB-14D	WB-15
Field Sample ID										CMR-WB14-5.0-6.0-190625	CMR-WB14-20.0-21.0-190625-DUP	CMR-WB15-4.0-5.0-190625
Lab Sample ID										UF26025-001	UF26025-003	UF26025-004
Collection Depth (ft bgs)										5 - 6	20 - 21	4 - 5
Sample Method										Sonic	Sonic	Sonic
Sample Date										6/25/2019	6/25/2019	6/25/2019
Comments											Field Duplicate	
VOLATILE ORGANIC COMPOUNDS												
Acetone			67000	NC	67000					0.036 J (0.0075)	0.096 J (0.0077)	U (0.25)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.0019)	U (0.0019)	U (0.13)
2-Butanone			19000	NC	19000					U (0.0037)	U (0.0038)	U (0.25)
Carbon Disulfide			350	NC	350					U (0.0019)	U (0.0019)	U (0.13)
Cumene			990	NC	990					U (0.0019)	U (0.0019)	U (0.13)
Cyclohexane			2700	NC	2700					U (0.0019)	U (0.0019)	U (0.13)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.0019)	U (0.0019)	U (0.13)
Methylcyclohexane			2700	NC	2700					U (0.0019)	U (0.0019)	0.18 J (0.13)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.0019)	U (0.0019)	U (0.13)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.0019)	U (0.0019)	U (0.13)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.0019)	U (0.0019)	0.19 J (0.13)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.0037)	U (0.0038)	U (0.25)
SEMI VOLATILE ORGANIC COMPOUNDS												
Anthracene		19000	23000	NC	19000	2600	677	MT-Scaled	2600	U (0.00053)	U (0.00054)	U (0.057)
Benzo(a)anthracene		24	21	C	24	6.8	1.83	MT-Scaled	6.8	U (0.00062)	U (0.00062)	U (0.066)
Benzo(a)pyrene		2.4	2.1	C	2.4	2.3	0.58	MT-Scaled	2.3	U (0.00069)	U (0.00069)	U (0.074)
Benzo(b)fluoranthene		24	21	C	24	23	6	MT-Scaled	23	U (0.00052)	0.0054 (0.00053)	U (0.056)
Benzo(g,h,i)perylene			2300	NC	2300					U (0.00068)	0.0034 (0.00068)	U (0.073)
Benzo(k)fluoranthene		240	210	C	240	230	58	MT-Scaled	230	U (0.0005)	U (0.0005)	U (0.054)
bis(2-Ethylhexyl)phthalate			160	C	160		14	RSL - MCL	14	U (0.026)	U (0.026)	U (2.8)
Carbazole										U (0.0052)	U (0.0053)	U (0.56)
Chrysene		2400	2100	C	2400	690	180	MT-Scaled	690	U (0.00047)	U (0.00047)	U (0.05)
Dibenzofuran			100	NC	100					U (0.0052)	U (0.0053)	U (0.56)
2,4-Dichlorophenol			250	NC	250		0.05	MT-Scaled	0.05	U (0.0052)	U (0.0053)	U (0.56)
Fluoranthene		2500	3000	NC	2500	85	22.25	MT-Scaled	85	U (0.00044)	0.00073 J (0.00044)	U (0.047)
Indeno(1,2,3-cd)pyrene		24	21	C	24	77	19.6	MT-Scaled	77	U (0.001)	U (0.0011)	U (0.11)
2-Methylnaphthalene		250	300	NC	250	6.9			6.9	U (0.001)	U (0.001)	U (0.11)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.001)	0.001 J (0.001)	U (0.11)
Phenanthrene			2300	NC	2300					U (0.00076)	U (0.00076)	U (0.08)
Pyrene		1900	2300	NC	1900	83	21.7	MT-Scaled	83	U (0.00052)	U (0.00053)	U (0.056)
MDEQ VOLATILE PETROLEUM HYDROCARBON												
C5-C8 Aliphatics		290	220	NC	290	220			220	U (0.83)	U (0.81)	34 (0.83)
C9-C12 Aliphatics		360			360	11000			11000	0.83 J (0.83)	U (0.81)	220 (0.83)
C9-C10 Aromatics		1000			1000	130			130	U (0.55)	U (0.54)	140 (0.56)
Benzene		5.7	5.1	C	5.7	0.07	0.026	RSL - MCL	0.07	U (0.038)	U (0.037)	U (0.038)
Ethyl Benzene		28	25	C	28	26	7.8	RSL - MCL	26	U (0.034)	U (0.033)	3 (0.034)
Naphthalene		19	17	C	19	12	3.18	MT-Scaled	12	U (0.14)	U (0.14)	4.2 (0.14)
Petroleum Hydrocarbons (Total)										2.4 J (1.8)	U (1.8)	440 (1.8)
Toluene		5500	4700	NC	5500	21	6.9	RSL - MCL	21	U (0.044)	U (0.043)	U (0.044)
meta-xylene			240	NC	240		100	MT-Scaled	100	U (0.062)	U (0.06)	0.46 (0.062)
ortho-xylene			280	NC	280		100	MT-Scaled	100	U (0.031)	U (0.03)	1.4 (0.031)
Xylenes (total)		310	250	NC	310	320	99	RSL - MCL	320	U (0.062)	U (0.06)	1.86 (0.062)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON												
C9-C18 Aliphatics		540	44	NC	540	53000			53000	U (10)	U (11)	**880 (11)**
C19-C36 Aliphatics		200000			200000					U (10)	U (11)	260 (11)
C11-C22 Aromatics		3900			3900	370			370	U (10)	U (11)	200 (11)
INORGANICS												
Antimony	0.4		47	NC	47		2.7	RSL - MCL	2.7	0.32 J (0.21)	0.3 J (0.21)	0.27 J (0.21)
Arsenic	22.5		3	C	3		2.9	RSL - MCL	2.9	2.3 (0.21)	2.9 (0.21)	3 (0.21)
Barium	429		22000	NC	22000		421	MT-Scaled	421	530 (0.32)	200 (0.32)	130 (0.32)
Beryllium	1.1		230	NC	230		32	RSL - MCL	32	0.095 J (0.035)	0.073 J (0.035)	0.097 J (0.035)
Cadmium	0.7		98	NC	98		3.8	RSL - MCL	3.8	0.11 J (0.026)	0.36 (0.026)	0.12 J (0.026)
Chromium (total)	41.7		6.3	C	6.3		1800000	RSL - MCL	1800000	28 (0.57)	28 (0.58)	35 (0.57)
Cobalt	10		35	NC	35					9.2 (0.31)	5.7 (0.31)	6.2 (0.31)
Copper	165		4700	NC	4700		460	RSL - MCL	460	20 (0.34)	52 (0.34)	16 (0.33)
Lead	29.8		800	NC	800		140	RSL - MCL	140	7.4 (0.07)	9.3 (0.071)	9.5 (0.07)
Mercury			4.066	NC	4.066		1	RSL - MCL	1	U (0.021)	0.044 J (0.019)	U (0.022)
Nickel	31.4		2200	NC	2200		66.7	MT-Scaled	66.7	25 (0.31)	27 (0.31)	21 (0.31)
Selenium	0.7		580	NC	580		2.6	RSL - MCL	2.6	U (0.49)	U (0.49)	U (0.49)
Silver	0.3		580	NC	580		8.51	MT-Scaled	8.51	U (0.062)	0.13 J (0.063)	0.07 J (0.062)
Vanadium	52.6		580	NC	580					60 (0.26)	61 (0.26)	57 (0.26)
Zinc	118		35000	NC	35000		1233	MT-Scaled	1233	71 (0.52)	68 (0.52)	68 (0.51)

TABLE 7
WEST RAIL SOIL ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Soil Notes:

Table updated in September 2021.

1All concentrations are presented in mg/kg (ppm).

2Only compounds with at least one detection each respective area are shown.

3Inorganic concentrations below the Background Threshold Values for Inorganics in Montana Soils are not identified as exeedances.

4The USEPA Commercial/Industrial RSLs are based on a Target Risk of $1x10^{-6}$ and a Target Hazard Quotient of 0.1;

C - Carcinogen; NC - Noncarcinogen

5The Direct Contact Screening Level is selected according to the MTDEQ Surface and Subsurface Soil Screening Flowchart.

6The MTDEQ Modified EPA Migration to Groundwater Screening Levels are selected according to the MT DEQ Surface and Subsurface Soil Screening Flowchart, a DAF of 10 has been applied to these screening levels;

RSL-MCL - The RSL-MTGW is based on the MCL;

MT-Scaled - The risk-based screening level was scaled to match the MT DEQ HHS groundwater target per the Surface and Subsurface Soil Screening Flowchart.

7The Leaching to Groundwater Screening Level is selected according to the MTDEQ Surface and Subsurface Soil Screening Flowchart Process.

8Concentrations that exceed the Direct Contact RBSL are **boldfaced** and gray shaded.

9Concentrations that exceed the Leaching to Groundwater RBSL are <u>underlined</u> and gray shaded.

Abbreviations:

U -- Not Detected.

J -- Estimated Concentration.

H -- Analysis Conducted Outside Holding Time.

B -- Blank Contamination.

( ) -- Detection Limit.

-- -- Not Analyzed.

TABLE 8
EAST RAIL GROUNDWATER ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MDEQ-7 Human Health Standards - Groundwater	MDEQ Tier 1 Groundwater RBSLs	USEPA RSLs Resident Tapwater	EB-04D	EB-05S	EB-06	EB-07	EB-07S	EB-09	EB-10	EB-11S	EB-14D
Field Sample ID				CMR-EB04D-190617-GW	CMR-EB05-190521	CMR-EB06-190516	CMR-EB07-190613-GW	CMR-EB07-190516	CMR-EB09-190607	CMR-EB10-190606	CMR-EB11-190520	CMR-EB14-190613-GW
Lab Sample ID				UF18034-001	UE22029-005	UE22029-001	UF14020-001	UE22029-002	UF08028-005	UF08028-004	UE22029-003	UF14020-002
Sample Method				Sonic	Direct Push	Direct Push	Sonic	Direct Push	Sonic	Sonic	Direct Push	Sonic
Sample Date				6/15/2019	5/21/2019	5/16/2019	6/13/2019	5/16/2019	6/7/2019	6/6/2019	5/20/2019	6/13/2019
Comments												
VOLATILE ORGANIC COMPOUNDS												
Acetone			14000	49 (2)	15 J (10)	U (10)	11 J (2)	53 (10)	4.4 J (2)	U (100)	2.1 J (2)	13 J (2)
Benzene	5	5	0.46	**14 (0.4)**	**49 (2)**	**94 (2)**	**41 (0.4)**	**37 (2)**	**6.7 (0.4)**	**3500 (20)**	0.57 (0.4)	U (0.4)
2-Butanone			5600	15 (2)	U (10)	U (10)	3.3 J (2)	66 (10)	U (2)	U (100)	U (2)	4.8 J (2)
Chlorobenzene	100		78	U (0.4)	U (2)	U (2)	U (0.4)	U (2)	U (0.4)	U (20)	U (0.4)	U (0.4)
Cumene			450	2.5 (0.4)	3.4 (2)	2.9 (2)	1 (0.4)	21 (2)	1.7 (0.4)	58 (20)	1.5 (0.4)	U (0.4)
Cyclohexane			13000	1.4 (0.4)	U (2)	4.9 (2)	2.9 (0.4)	32 (2)	5.9 (0.4)	490 (20)	8.2 (0.4)	U (0.4)
1,2-Dichloroethane	4	4	0.17	U (0.4)	U (2)	U (2)	U (0.4)	U (2)	1.6 (0.4)	**140 (20)**	U (0.4)	**19 (0.4)**
cis-1,2-Dichloroethene	70		36	U (0.4)	U (2)	U (2)	U (0.4)	U (2)	U (0.4)	U (20)	U (0.4)	U (0.4)
Ethyl Benzene	700	700	1.5	4.2 (0.4)	20 (2)	U (2)	1.8 (0.4)	33 (2)	8.8 (0.4)	**740 (20)**	8.6 (0.4)	U (0.4)
2-Hexanone			38	2.3 J (2)	U (10)	U (10)	U (2)	U (10)	U (2)	U (100)	U (2)	U (2)
Methylcyclohexane			13000	1.2 J (0.4)	U (2)	5.7 J (2)	1.9 J (0.4)	65 (2)	6.3 J (0.4)	240 J (20)	13 (0.4)	U (0.4)
Naphthalene	100	100	0.17	**150 (0.4)**	**340 (2)**	8.3 (2)	**160 (0.4)**	**330 (2)**	3.6 (0.4)	**110 (20)**	2.2 (0.4)	U (0.4)
Toluene	1000	1000	1100	0.83 (0.4)	2.1 J (2)	U (2)	0.88 (0.4)	U (2)	0.89 (0.4)	93 (20)	0.53 (0.4)	U (0.4)
meta-xylene	10000		190	3.6 (0.4)	7.2 (2)	2.2 J (2)	1.5 (0.4)	3.1 (2)	9.2 (0.4)	910 (20)	32 (0.4)	U (0.4)
ortho-xylene	10000		190	3.3 (0.4)	4.8 (2)	3.8 (2)	3.3 (0.4)	3 (2)	1.6 (0.4)	83 (20)	9.4 (0.4)	U (0.4)
Xylenes (total)	10000	10000	190	6.9 (0.4)	12 (2)	6 (2)	4.8 (0.4)	6.1 (2)	11 (0.4)	990 (20)	41 (0.4)	U (0.4)
SEMI VOLATILE ORGANIC COMPOUNDS												
Acenaphthene	70	70	530	1.8 (0.4)		6.9 J (0.4)	2.3 (0.04)	6.6 J (0.4)	U (0.04)	U (4)	UJ (0.04)	U (0.04)
Anthracene	2100	2100	1800	U (0.4)		0.92 J (0.4)	U (0.04)	2 J (0.4)	U (0.04)	U (4)	UJ (0.04)	U (0.04)
Carbazole				1.2 J (0.4)		17 J (0.4)	1.1 (0.04)	UJ (0.4)	U (0.04)	U (4)	UJ (0.04)	U (0.04)
Dibenzofuran			7.9	1.9 J (1.6)		3.1 J (1.6)	1.3 (0.16)	5.9 J (1.6)	U (0.16)	U (16)	UJ (0.16)	U (0.16)
2,4-Dimethylphenol	100		360	U (1.5)		UJ (1.5)	U (0.15)	UJ (1.5)	U (0.15)	**570 (15)**	0.51 J (0.15)	U (0.15)
Fluorene	50	50	290	2.1 (0.4)		4.5 J (0.4)	1.9 (0.04)	8.9 J (0.4)	0.056 J (0.04)	U (4)	0.051 J (0.04)	U (0.04)
2-Methylnaphthalene		36	36	190 (0.4)	--	0.77 J (0.4)	100 (0.8)	420 J (2)	1.4 (0.04)	11 J (4)	1.8 J (0.04)	U (0.04)
2-Methylphenol			930	U (2.1)	--	UJ (2.1)	U (0.21)	UJ (2.1)	U (0.21)	86 (21)	UJ (0.21)	0.3 J (0.21)
3&4-Methylphenol				UJ (4.6)	--	UJ (4.6)	U (0.46)	UJ (4.6)	U (0.46)	U (46)	UJ (0.46)	U (0.46)
Naphthalene	100	100	0.17	60 (0.4)	--	4.7 J (0.4)	52 (0.8)	95 J (0.4)	2.1 (0.04)	77 (4)	1.7 J (0.04)	U (0.04)
Phenanthrene			120	0.74 J (0.4)	--	1.3 J (0.4)	U (0.04)	8.5 J (0.4)	0.054 J (0.04)	U (4)	0.09 J (0.04)	U (0.04)
Phenol	4000		5800	UJ (1.9)	--	UJ (1.9)	U (0.19)	UJ (1.9)	U (0.19)	U (19)	UJ (0.19)	U (0.19)
Pyrene	20	20	120	U (0.4)	--	0.58 J (0.4)	U (0.04)	1.5 J (0.4)	U (0.04)	U (4)	0.045 J (0.04)	U (0.04)
MDEQ VOLATILE PETROLEUM HYDROCARBON												
C5-C8 Aliphatics		650	1300	110 (15)	29 J (15)	210 (15)	49 J (15)	2100 (15)	63 J (15)	5600 (300)	330 (15)	17 J (15)
C9-C12 Aliphatics		1400		200 (15)	420 (15)	750 (15)	180 (15)	6800 (15)	63 J (15)	1200 J (300)	250 (15)	U (15)
C9-C10 Aromatics		1100		260 (5)	1900 (25)	550 (5)	220 (5)	5800 (50)	120 (5)	2000 (100)	250 (5)	U (5)
Benzene	5	5	0.46	**12 (0.51)**	**45 (2.6)**	**96 (0.51)**	**38 (0.51)**	**36 J (5.1)**	**6.1 (0.51)**	**3300 (10)**	0.84 J (0.51)	U (0.51)
Ethyl Benzene	700	700	1.5	8 (0.62)	33 (3.1)	5 (0.62)	9.3 (0.62)	140 (6.2)	9.5 (0.62)	**770 (12)**	17 (0.62)	U (0.62)
Naphthalene	100	100	0.17	**140 (0.7)**	**770 (3.5)**	35 (0.7)	**150 (0.7)**	**1100 (7)**	4.4 J (0.7)	**110 (14)**	7.7 (0.7)	U (0.7)
Petroleum Hydrocarbons (Total)				620 (35)	1300 (35)	1500 (35)	530 (35)	15000 (35)	270 (35)	12000 (700)	850 (35)	U (35)
Toluene	1000	1000	1100	U (0.53)	U (2.7)	U (0.53)	1.2 J (0.53)	U (5.3)	0.73 J (0.53)	120 (11)	U (0.53)	U (0.53)
meta-xylene	10000		190	3.9 J (1.2)	15 J (6)	2.6 J (1.2)	U (1.2)	U (12)	9.7 (1.2)	890 (24)	43 (1.2)	U (1.2)
ortho-xylene	10000		190	4.8 J (0.58)	8.9 J (2.9)	7.5 (0.58)	5 (0.58)	140 (5.8)	2.2 J (0.58)	96 J (12)	16 (0.58)	U (0.58)
Xylenes (total)	10000	10000	190	14.9 J (6)	42 (6)	10.1 (1.2)	10.6 (6)	250 (5.8)	11.9 (1.2)	986 (24)	59 (1.2)	U (1.2)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON												
C19-C36 Aliphatics		1000		U (100)	--	5700 (100)	U (100)	4500 (100)	U (100)	U (100)	--	U (100)
C9-C18 Aliphatic Hydrocarbons		1400	100	U (100)	--	13000 (100)	U (100)	9900 (100)	U (100)	U (100)	--	120 (100)
C11-C22 Aromatics		1100		490 (100)	--	12000 (100)	360 (100)	13000 (100)	U (100)	340 (100)	--	U (100)
Petroleum Hydrocarbons (Extractable)				--	--	--	--	--	--	--	580 (200)	--
INORGANICS (dissolved)												
Antimony	6		7.8	0.88 J (0.5)	--	1.3 J (0.5)	U (0.5)	4.7 (0.5)	UJ (0.5)	1 J (0.5)	1.7 J (0.5)	U (0.5)
Arsenic	10		0.052	U (1.3)	--	**150 (1.3)**	U (1.3)	3.4 (1.3)	4.4 (1.3)	**25 (1.3)**	**120 (1.3)**	1.9 J (1.3)
Barium	1000		3800	950 (1.3)	--	**1300 (1.3)**	430 (1.3)	180 (1.3)	120 (1.3)	120 (1.3)	22 (1.3)	34 (1.3)
Beryllium	4		25	U (0.15)	--	UJ (0.15)	U (0.15)	UJ (0.15)	0.2 J (0.15)	U (0.15)	UJ (0.15)	U (0.15)
Cadmium	5		9.2	U (0.13)	--	U (0.13)	U (0.13)	U (0.13)	U (0.13)	U (0.13)	**9.6 (0.13)**	U (0.13)
Chromium (total)	100		0.035	U (1.3)	--	1.5 J (1.3)	U (1.3)	U (1.3)	4.6 J (1.3)	3.2 J (1.3)	U (1.3)	U (1.3)
Cobalt			6	1.3 J (1.3)	--	2.5 J (1.3)	1.3 J (1.3)	U (1.3)	3.1 J (1.3)	2.5 J (1.3)	100 (1.3)	U (1.3)
Copper	1300		800	2.3 J (1.3)	--	3.7 J (1.3)	3.3 J (1.3)	5.5 (1.3)	6.2 (1.3)	3.6 J (1.3)	45 (1.3)	5.5 (1.3)
Lead	15		15	U (0.25)	--	0.83 J (0.25)	U (0.25)	U (0.25)	1.3 (0.25)	0.46 J (0.25)	1.4 (0.25)	U (0.25)
Nickel	100		390	13 (1.3)	--	11 (1.3)	9.8 (1.3)	7 (1.3)	9.9 (1.3)	24 (1.3)	67 (1.3)	6.5 (1.3)
Selenium	50		100	U (1.3)	--	U (1.3)	U (1.3)	U (1.3)	2.5 J (1.3)	5.2 (1.3)	U (1.3)	2 J (1.3)
Silver	100		94	U (0.25)	--	U (0.25)	U (0.25)	U (0.25)	U (0.25)	U (0.25)	0.57 J (0.25)	U (0.25)
Vanadium			86	U (2.5)	--	4.2 J (2.5)	U (2.5)	5.9 (2.5)	9.3 (2.5)	5.9 (2.5)	U (2.5)	5.9 (2.5)
Zinc	2000		6000	5.6 J (2.5)	--	12 (2.5)	U (2.5)	5.5 J (2.5)	27 B (2.5)	15 B (2.5)	1300 (2.5)	U (2.5)

TABLE 8
EAST RAIL GROUNDWATER ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MDEQ-7 Human Health Standards - Groundwater	MDEQ Tier 1 Groundwater RBSLs	USEPA RSLs Resident Tapwater	EB-14S	MW-079D	MW-079S	MW-081D	MW-081S	MW-099	MW-100
Field Sample ID				CMR-EB14-190520	CMR-MW79D-190625	CMR-MW79S-190625	CMR-MW81D-190617-GW	CMR-MW81S-190617-GW	CMR-MW99-190625	CMR-MW100-190626
Lab Sample ID				UE22029-004	UF26019-001	UF26019-002	UF18034-003	UF18034-002	UF26019-003	UF28032-001
Sample Method				Direct Push	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date				5/20/2019	6/25/2019	6/25/2019	6/17/2019	6/17/2019	6/25/2019	6/27/2019
Comments										
VOLATILE ORGANIC COMPOUNDS										
Acetone			14000	U (2)	U (20)	U (100)	7 J (2)	7.1 J (2)	U (2)	U (2)
Benzene	5	5	0.46	U (0.4)	**1000 (4)**	**3500 (20)**	**5.3 (0.4)**	**48 (0.4)**	U (0.4)	**170 (0.4)**
2-Butanone			5600	U (2)	U (20)	380 J (100)	2.1 J (2)	2.2 J (2)	U (2)	2.6 J (2)
Chlorobenzene	100		78	U (0.4)	U (4)	U (20)	U (0.4)	0.64 (0.4)	U (0.4)	U (0.4)
Cumene			450	U (0.4)	U (4)	52 (20)	0.48 J (0.4)	19 (0.4)	U (0.4)	4.7 (0.4)
Cyclohexane			13000	U (0.4)	98 (4)	340 (20)	0.5 (0.4)	38 (0.4)	U (0.4)	4.6 (0.4)
1,2-Dichloroethane	4	4	0.17	U (0.4)	**16 (4)**	**26 (20)**	U (0.4)	U (0.4)	U (0.4)	3.7 (0.4)
cis-1,2-Dichloroethene	70		36	U (0.4)	U (4)	U (20)	U (0.4)	U (0.4)	U (0.4)	0.53 (0.4)
Ethyl Benzene	700	700	1.5	U (0.4)	4.5 J (4)	**990 (20)**	U (0.4)	4.6 (0.4)	U (0.4)	31 (0.4)
2-Hexanone			38	U (2)	U (20)	U (100)	U (2)	U (2)	U (2)	U (2)
Methylcyclohexane			13000	1.2 J (0.4)	30 J (4)	160 J (20)	0.62 J (0.4)	23 (0.4)	U (0.4)	4.1 J (0.4)
Naphthalene	100	100	0.17	U (0.4)	U (4)	**350 (20)**	3.7 (0.4)	**130 (0.4)**	U (0.4)	**590 J (2)**
Toluene	1000	1000	1100	U (0.4)	12 (4)	960 (20)	U (0.4)	1 (0.4)	U (0.4)	2.5 (0.4)
meta-xylene	10000		190	U (0.4)	36 (4)	4300 (20)	0.73 (0.4)	3.4 (0.4)	U (0.4)	19 (0.4)
ortho-xylene	10000		190	U (0.4)	14 (4)	1100 (20)	1 (0.4)	5.5 (0.4)	U (0.4)	9.1 (0.4)
Xylenes (total)	10000	10000	190	U (0.4)	50 (4)	5300 (20)	1.8 (0.4)	8.9 (0.4)	U (0.4)	28 (0.4)
SEMI VOLATILE ORGANIC COMPOUNDS										
Acenaphthene	70	70	530	UJ (0.04)	U (1)	U (2)	U (0.4)	1.6 (0.4)	U (0.2)	5.6 (1)
Anthracene	2100	2100	1800	UJ (0.04)	U (1)	U (2)	U (0.4)	U (0.4)	U (0.2)	U (1)
Carbazole				UJ (0.04)	U (1)	U (2)	U (0.4)	1.1 J (0.4)	U (0.2)	U (1)
Dibenzofuran			7.9	UJ (0.16)	U (4)	U (8)	U (1.6)	1.9 J (1.6)	U (0.8)	4.5 J (4)
2,4-Dimethylphenol	100		360	UJ (0.15)	U (3.8)	**1000 (38)**	U (1.5)	U (1.5)	U (0.75)	U (3.8)
Fluorene	50	50	290	UJ (0.04)	U (1)	U (2)	U (0.4)	2.7 (0.4)	U (0.2)	5.5 (1)
2-Methylnaphthalene		36	36	UJ (0.04)	1.4 J (1)	83 (2)	2.3 (0.4)	41 (0.4)	0.26 J (0.2)	570 (5)
2-Methylphenol			930	UJ (0.21)	U (5.3)	610 (11)	U (2.1)	U (2.1)	U (1.1)	U (5.3)
3&4-Methylphenol				UJ (0.46)	U (12)	23 J (23)	UJ (4.6)	UJ (4.6)	U (2.3)	U (12)
Naphthalene	100	100	0.17	UJ (0.04)	U (1)	**220 (2)**	1.3 J (0.4)	20 (0.4)	0.22 J (0.2)	**350 (1)**
Phenanthrene			120	UJ (0.04)	U (1)	U (2)	U (0.4)	1.2 J (0.4)	U (0.2)	2.7 J (1)
Phenol	4000		5800	UJ (0.19)	51 J (4.8)	24 J (9.5)	UJ (1.9)	1.9 J (1.9)	UJ (0.95)	UJ (4.8)
Pyrene	20	20	120	UJ (0.04)	U (1)	U (2)	U (0.4)	U (0.4)	U (0.2)	U (1)
MDEQ VOLATILE PETROLEUM HYDROCARBON										
C5-C8 Aliphatics		650	1300	48 J (15)	1000 (75)	4000 (750)	U (15)	310 (15)	U (15)	U (75)
C9-C12 Aliphatics		1400		220 (15)	280 J (75)	1600 J (750)	33 J (15)	310 (15)	U (15)	330 J (75)
C9-C10 Aromatics		1100		150 (5)	180 (25)	3500 (250)	82 (5)	360 (5)	8 J (5)	570 (25)
Benzene	5	5	0.46	U (0.51)	**930 (2.6)**	**3100 (26)**	4.8 J (0.51)	**45 (0.51)**	U (0.51)	**140 (2.6)**
Ethyl Benzene	700	700	1.5	1.2 J (0.62)	U (3.1)	**920 (31)**	1.4 J (0.62)	7.6 (0.62)	U (0.62)	32 (3.1)
Naphthalene	100	100	0.17	6.6 (0.7)	U (3.5)	**350 (35)**	6.3 (0.7)	**160 (0.7)**	U (0.7)	**580 (3.5)**
Petroleum Hydrocarbons (Total)				410 (35)	2500 (180)	22000 (1800)	140 J (35)	1100 (35)	U (35)	1700 (180)
Toluene	1000	1000	1100	U (0.53)	30 (2.7)	870 (27)	U (0.53)	1.1 J (0.53)	U (0.53)	U (2.7)
meta-xylene	10000		190	U (1.2)	53 (6)	4000 (60)	U (1.2)	3.6 J (1.2)	U (1.2)	20 J (6)
ortho-xylene	10000		190	1.1 J (0.58)	21 J (2.9)	990 (29)	2.3 J (0.58)	8.2 (0.58)	U (0.58)	10 J (2.9)
Xylenes (total)	10000	10000	190	1.1 J (1.2)	74 (6)	4990 (60)	2.3 J (1.2)	11.8 (6)	U (1.2)	30 J (6)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON										
C19-C36 Aliphatics		1000		--	U (100)	U (100)	U (100)	U (100)	U (100)	U (100)
C9-C18 Aliphatic Hydrocarbons		1400	100	--	U (100)	U (100)	U (100)	U (100)	U (100)	U (100)
C11-C22 Aromatics		1100		--	140 (100)	790 (100)	U (100)	300 (100)	U (100)	2300 (100)
Petroleum Hydrocarbons (Extractable)				330 (200)	--	--	--	--	--	--
INORGANICS (dissolved)										
Antimony	6		7.8	1.4 J (0.5)	U (0.5)	1.5 J (0.5)	0.76 J (0.5)	U (0.5)	U (0.5)	U (0.5)
Arsenic	10		0.052	4.6 (1.3)	**15 (1.3)**	**280 (1.3)**	1.4 J (1.3)	**49 (1.3)**	**90 (1.3)**	**48 (1.3)**
Barium	1000		3800	19 (1.3)	73 (1.3)	**1300 (1.3)**	200 (1.3)	**5000 (1.3)**	120 (1.3)	**3300 (1.3)**
Beryllium	4		25	UJ (0.15)	U (0.15)	U (0.15)	U (0.15)	U (0.15)	U (0.15)	U (0.15)
Cadmium	5		9.2	**9.8 (0.13)**	U (0.13)	U (0.13)	U (0.13)	U (0.13)	U (0.13)	U (0.13)
Chromium (total)	100		0.035	U (1.3)	U (1.3)	1.6 J (1.3)	U (1.3)	U (1.3)	U (1.3)	U (1.3)
Cobalt			6	2.5 J (1.3)	14 (1.3)	4.1 J (1.3)	1.8 J (1.3)	1.4 J (1.3)	U (1.3)	2.6 J (1.3)
Copper	1300		800	20 (1.3)	5.9 (1.3)	1.7 J (1.3)	4.5 J (1.3)	1.3 J (1.3)	U (1.3)	1.4 J (1.3)
Lead	15		15	U (0.25)	0.43 J (0.25)	9.1 (0.25)	0.26 J (0.25)	U (0.25)	U (0.25)	0.44 J (0.25)
Nickel	100		390	15 (1.3)	32 (1.3)	13 (1.3)	11 (1.3)	6 (1.3)	7.5 (1.3)	7.4 (1.3)
Selenium	50		100	U (1.3)	5.9 (1.3)	3.8 J (1.3)	U (1.3)	U (1.3)	U (1.3)	U (1.3)
Silver	100		94	U (0.25)	U (0.25)	U (0.25)	U (0.25)	U (0.25)	U (0.25)	U (0.25)
Vanadium			86	U (2.5)	U (2.5)	8.7 (2.5)	U (2.5)	U (2.5)	U (2.5)	U (2.5)
Zinc	2000		6000	1700 (2.5)	15 (2.5)	8.1 J (2.5)	16 (2.5)	12 (2.5)	8.5 J (2.5)	U (2.5)

TABLE 8
EAST RAIL GROUNDWATER ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Groundwater Notes:

*Table updated in September 2021**.***

1 All concentrations are presented in ug/L (ppb).
2 Only compounds with at least one detection are shown.
3 Concentrations that exceed the MDEQ-7 Human Health Standards - Groundwater are **boldfaced.**
4 Concentrations that exceed the MDEQ Tier 1 Groundwater RBSLs are gray shaded.
5 Concentrations that exceed the USEPA Regional Screening Levels - Resident Tapwater are underlined.

Abbreviations:

U -- Not Detected.
J -- Estimated Concentration.
H -- Analysis Conducted Outside Holding Time.
B -- Blank Contamination.
( ) -- Detection Limit.
-- -- Not Analyzed.

TABLE 9
WEST RAIL GROUNDWATER ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MDEQ-7 Human Health Standards - Groundwater	MDEQ Tier 1 Groundwater RBSLs	USEPA RSLs - Resident Tapwater	WB-01S	WB-02S	WB-03D	WB-03S	WB-04S	WB-05S
Field Sample ID				CMR-WB01S-190624	CMR-WB02S-190622	CMR-WB03D-190624	CMR-WB03S-190622	CMR-WB104S-190620	CMR-WB05S-190620
Lab Sample ID				UF25040-001	UF25037-002	UF25040-002	UF25037-001	UF21103-003	UF21103-002
Sample Method				Sonic	Sonic	Sonic	Sonic	Sonic	Sonic
Sample Date				6/24/2019	6/22/2019	6/24/2019	6/22/2019	6/20/2019	6/20/2019
Comments									
VOLATILE ORGANIC COMPOUNDS									
Acetone			14000	U (10)	U (10)	U (2)	U (2)	8.9 J (2)	15 J (2)
Benzene	5	5	0.46	**130 (2)**	**330 (2)**	U (0.4)	U (0.4)	**10 (0.4)**	U (0.4)
2-Butanone			5600	U (10)	U (10)	U (2)	U (2)	2.8 J (2)	2.9 J (2)
Chloromethane	600		190	U (2)	U (2)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Cumene			450	29 (2)	26 (2)	U (0.4)	U (0.4)	22 (0.4)	U (0.4)
Cyclohexane			13000	33 (2)	42 (2)	U (0.4)	U (0.4)	2.5 (0.4)	U (0.4)
1,2-Dichloroethane	4	4	0.17	U (2)	U (2)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Ethyl Benzene	700	700	1.5	310 (2)	330 (2)	U (0.4)	U (0.4)	98 (0.4)	U (0.4)
Methyl Acetate			20000	U (2)	U (2)	U (0.4)	U (0.4)	UJ (0.4)	UJ (0.4)
Methyl tert-butyl ether	30	30	14	U (2)	6.3 (2)	U (0.4)	U (0.4)	6.7 (0.4)	U (0.4)
Methylcyclohexane			13000	26 (2)	29 (2)	U (0.4)	U (0.4)	5.4 (0.4)	U (0.4)
Naphthalene	100	100	0.17	7.5 (2)	11 (2)	U (0.4)	U (0.4)	2.1 (0.4)	U (0.4)
Toluene	1000	1000	1100	U (2)	2.5 (2)	U (0.4)	U (0.4)	1 (0.4)	U (0.4)
meta-xylene	10000		190	14 (2)	92 (2)	U (0.4)	U (0.4)	3.3 (0.4)	U (0.4)
ortho-xylene	10000		190	U (2)	6.5 (2)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Xylenes (total)	10000	10000	190	14 (2)	98 (2)	U (0.4)	U (0.4)	3.6 (0.4)	U (0.4)
SEMI VOLATILE ORGANIC COMPOUNDS									
bis(2-Ethylhexyl)phthalate	6		5.6	U (0.38)	U (3.8)	U (1.9)	U (1.9)	U (1.9)	U (0.38)
Fluorene	50	50	290	U (0.04)	U (0.4)	0.33 J (0.2)	U (0.2)	U (0.2)	U (0.04)
2-Methylnaphthalene		36	36	U (0.04)	3.4 (0.4)	2.6 (0.2)	U (0.2)	1.5 (0.2)	0.041 J (0.04)
3&4-Methylphenol				U (0.46)	UJ (4.6)	U (2.3)	UJ (2.3)	U (2.3)	U (0.46)
Naphthalene	100	100	0.17	U (0.04)	6 (0.4)	4.1 (0.2)	U (0.2)	2 (0.2)	U (0.04)
Pentachlorophenol	1		0.041	**2.1 J (1.3)**	U (13)	U (6.7)	U (6.7)	U (6.7)	U (1.3)
Phenol	4000		5800	UJ (0.19)	UJ (1.9)	UJ (0.95)	UJ (0.95)	U (0.95)	U (0.19)
MDEQ VOLATILE PETROLEUM HYDROCARBON									
C5-C8 Aliphatics		650	1300	140 J (75)	190 J (75)	U (15)	U (15)	180 (15)	U (15)
C9-C12 Aliphatics		1400		560 (75)	530 (75)	U (15)	15 J (15)	770 (15)	U (15)
C9-C10 Aromatics		1100		770 (25)	890 (25)	U (5)	16 J (5)	920 (5)	U (5)
Benzene	5	5	0.46	**120 (2.6)**	**310 (2.6)**	U (0.51)	U (0.51)	**12 (0.51)**	U (0.51)
Ethyl Benzene	700	700	1.5	270 (3.1)	300 (3.1)	U (0.62)	U (0.62)	110 (0.62)	U (0.62)
Methyl tert-butyl ether	30	30	14	U (6)	U (6)	U (1.2)	U (1.2)	5.6 (1.2)	U (1.2)
Naphthalene	100	100	0.17	14 J (3.5)	17 J (3.5)	U (0.7)	U (0.7)	33 (0.7)	U (0.7)
Petroleum Hydrocarbons (Total)				2000 (180)	2600 (180)	U (35)	U (35)	2000 (35)	U (35)
Toluene	1000	1000	1100	U (2.7)	U (2.7)	U (0.53)	U (0.53)	1.1 J (0.53)	U (0.53)
meta-xylene	10000		190	13 J (6)	87 (6)	U (1.2)	U (1.2)	4.8 J (1.2)	U (1.2)
ortho-xylene	10000		190	U (2.9)	7 J (2.9)	U (0.58)	U (0.58)	10 (0.58)	U (0.58)
Xylenes (total)	10000	10000	190	13 J (6)	94 (6)	U (1.2)	U (1.2)	14.8 (1.2)	U (1.2)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON									
C9-C18 Aliphatics		1400	100	U (100)	270 (100)	510 (100)	U (100)	1500 (100)	U (100)
C19-C36 Aliphatics		1000		U (100)	U (100)	140 (100)	U (100)	700 (100)	U (100)
C11-C22 Aromatics		1100		U (100)	180 (100)	100 (100)	U (100)	310 (100)	U (100)
INORGANICS (dissolved)									
Antimony	6		7.8	U (0.5)	U (0.5)	U (0.5)	U (0.5)	1.6 J (0.5)	1.3 J (0.5)
Arsenic	10		0.052	U (1.3)	**65 (1.3)**	**24 (1.3)**	3.4 (1.3)	**36 (1.3)**	1.6 J (1.3)
Barium	1000		3800	35 (1.3)	900 (1.3)	**1100 (1.3)**	120 (1.3)	650 (1.3)	87 (1.3)
Beryllium	4		25	U (0.15)	U (0.15)	U (0.15)	U (0.15)	U (0.15)	U (0.15)
Cadmium	5		9.2	0.27 J (0.13)	U (0.13)	U (0.13)	U (0.13)	0.55 (0.13)	2.2 (0.13)
Chromium (total)	100		0.035	1.5 J (1.3)	U (1.3)	U (1.3)	U (1.3)	U (1.3)	U (1.3)
Cobalt			6	4.4 J (1.3)	2.2 J (1.3)	3.1 J (1.3)	U (1.3)	16 (1.3)	7 (1.3)
Copper	1300		800	7.7 (1.3)	U (1.3)	U (1.3)	5.8 (1.3)	6.3 (1.3)	9.7 (1.3)
Lead	15		15	0.26 J (0.25)	U (0.25)	U (0.25)	U (0.25)	6.1 (0.25)	0.51 J (0.25)
Mercury	2		0.63	U (0.091)	U (0.091)	U (0.091)	0.16 J (0.091)	U (0.091)	U (0.091)
Nickel	100		390	13 (1.3)	6 (1.3)	5.2 (1.3)	8.5 (1.3)	12 (1.3)	10 (1.3)
Selenium	50		100	U (1.3)	U (1.3)	U (1.3)	U (1.3)	U (1.3)	4.4 J (1.3)
Vanadium			86	3.7 J (2.5)	U (2.5)	U (2.5)	U (2.5)	U (2.5)	U (2.5)
Zinc	2000		6000	17 (2.5)	69 (2.5)	24 (2.5)	9.9 J (2.5)	330 B (2.5)	520 B (2.5)

TABLE 9
WEST RAIL GROUNDWATER ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MDEQ-7 Human Health Standards - Groundwater	MDEQ Tier 1 Groundwater RBSLs	USEPA RSLs Resident Tapwater	WB-06S	WB-07	WB-08	WB-09S	WB-10	WB-11D
Field Sample ID				CMR-WB06S-190620	CMR-WB07-190618-GW	CMR-WB08-190618-GW	CMR-WB09S-190618-GW	CMR-WB10-190621	CMR-WB11D-190619
Lab Sample ID				UF21029-004	UF19040-001	UF19040-002	UF19040-003	UF22026-002	UF21102-003
Sample Method				Sonic	Sonic	Sonic	Sonic	Sonic	Sonic
Sample Date				6/20/2019	6/18/2019	6/18/2019	6/18/2019	6/21/2019	6/19/2019
Comments									
VOLATILE ORGANIC COMPOUNDS									
Acetone			14000	6.1 J (2)	2.1 J (2)	4.4 J (2)	6.8 J (2)	U (2)	7.1 J (2)
Benzene	5	5	0.46	U (0.4)	U (0.4)	**6.5 (0.4)**	**46 (0.4)**	**67 (0.4)**	U (0.4)
2-Butanone			5600	U (2)	U (2)	U (2)	21 (2)	14 (2)	U (2)
Chloromethane	600		190	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Cumene			450	U (0.4)	U (0.4)	U (0.4)	3.6 (0.4)	18 (0.4)	U (0.4)
Cyclohexane			13000	U (0.4)	U (0.4)	U (0.4)	1.5 (0.4)	8.6 (0.4)	U (0.4)
1,2-Dichloroethane	4	4	0.17	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Ethyl Benzene	700	700	1.5	U (0.4)	U (0.4)	U (0.4)	40 (0.4)	82 (0.4)	U (0.4)
Methyl Acetate			20000	UJ (0.4)	UJ (0.4)	UJ (0.4)	UJ (0.4)	0.5 J (0.4)	UJ (0.4)
Methyl tert-butyl ether	30	30	14	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Methylcyclohexane			13000	U (0.4)	U (0.4)	U (0.4)	3.2 J (0.4)	14 (0.4)	U (0.4)
Naphthalene	100	100	0.17	U (0.4)	U (0.4)	U (0.4)	0.41 J (0.4)	3.4 (0.4)	U (0.4)
Toluene	1000	1000	1100	U (0.4)	U (0.4)	1 (0.4)	U (0.4)	U (0.4)	1.8 (0.4)
meta-xylene	10000		190	U (0.4)	U (0.4)	U (0.4)	2.5 (0.4)	41 (0.4)	U (0.4)
ortho-xylene	10000		190	U (0.4)	U (0.4)	U (0.4)	U (0.4)	1.5 (0.4)	U (0.4)
Xylenes (total)	10000	10000	190	U (0.4)	U (0.4)	U (0.4)	2.5 (0.4)	42 (0.4)	U (0.4)
SEMI VOLATILE ORGANIC COMPOUNDS									
bis(2-Ethylhexyl)phthalate	6		5.6	2.9 BJ (0.38)	0.48 J (0.38)	0.38 J (0.38)	U (1.9)	U (1.9)	U (0.38)
Fluorene	50	50	290	U (0.04)	U (0.04)	U (0.04)	U (0.2)	U (0.2)	U (0.04)
2-Methylnaphthalene		36	36	U (0.04)	U (0.04)	U (0.04)	U (0.2)	1.2 (0.2)	U (0.04)
3&4-Methylphenol				U (0.46)	U (0.46)	U (0.46)	U (2.3)	6.3 J (2.3)	U (0.46)
Naphthalene	100	100	0.17	U (0.04)	U (0.04)	U (0.04)	U (0.2)	2 (0.2)	U (0.04)
Pentachlorophenol	1		0.041	U (1.3)	U (1.3)	U (1.3)	U (6.7)	U (6.7)	U (1.3)
Phenol	4000		5800	U (0.19)	U (0.19)	U (0.19)	U (0.95)	2 J (0.95)	U (0.19)
MDEQ VOLATILE PETROLEUM HYDROCARBON									
C5-C8 Aliphatics		650	1300	U (15)	U (15)	U (15)	75 (15)	230 (15)	U (15)
C9-C12 Aliphatics		1400		U (15)	U (15)	79 (15)	480 (15)	860 (15)	U (15)
C9-C10 Aromatics		1100		U (5)	U (5)	13 J (5)	390 (5)	960 (5)	U (5)
Benzene	5	5	0.46	U (0.51)	U (0.51)	**7.1 (0.51)**	**47 (0.51)**	**67 (0.51)**	U (0.51)
Ethyl Benzene	700	700	1.5	U (0.62)	U (0.62)	U (0.62)	43 (0.62)	88 (0.62)	U (0.62)
Methyl tert-butyl ether	30	30	14	U (1.2)	U (1.2)	U (1.2)	U (1.2)	U (1.2)	U (1.2)
Naphthalene	100	100	0.17	U (0.7)	U (0.7)	U (0.7)	8.5 (0.7)	26 (0.7)	U (0.7)
Petroleum Hydrocarbons (Total)				U (35)	U (35)	92 J (35)	950 (35)	2400 (35)	U (35)
Toluene	1000	1000	1100	U (0.53)	U (0.53)	1.1 J (0.53)	U (0.53)	U (0.53)	1.1 J (0.53)
meta-xylene	10000		190	U (1.2)	U (1.2)	U (1.2)	3.6 J (1.2)	42 (1.2)	U (1.2)
ortho-xylene	10000		190	U (0.58)	U (0.58)	U (0.58)	1.4 J (0.58)	3.6 J (0.58)	U (0.58)
Xylenes (total)	10000	10000	190	U (1.2)	U (1.2)	U (1.2)	5 J (1.2)	114.6 (1.2)	U (1.2)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON									
C9-C18 Aliphatics		1400	100	U (100)	U (100)	300 (100)	130 (100)	5800 (100)	U (100)
C19-C36 Aliphatics		1000		U (100)	U (100)	150 (100)	U (100)	2700 (100)	U (100)
C11-C22 Aromatics		1100		U (100)	U (100)	U (100)	130 (100)	820 (100)	U (100)
INORGANICS (dissolved)									
Antimony	6		7.8	U (0.5)	U (0.5)	0.57 J (0.5)	U (0.5)	1.2 J (0.5)	U (0.5)
Arsenic	10		0.052	2.9 (1.3)	3.3 (1.3)	**10 (1.3)**	**31 (1.3)**	**390 (1.3)**	U (1.3)
Barium	1000		3800	180 (1.3)	33 (1.3)	75 (1.3)	520 (1.3)	**2100 (1.3)**	32 (1.3)
Beryllium	4		25	0.33 J (0.15)	U (0.15)	U (0.15)	U (0.15)	U (0.15)	U (0.15)
Cadmium	5		9.2	0.29 J (0.13)	U (0.13)	U (0.13)	U (0.13)	U (0.13)	U (0.13)
Chromium (total)	100		0.035	11 (1.3)	U (1.3)	1.7 BJ (1.3)	U (1.3)	U (1.3)	U (1.3)
Cobalt			6	16 (1.3)	U (1.3)	12 (1.3)	8.7 (1.3)	3.1 J (1.3)	1.5 J (1.3)
Copper	1300		800	20 (1.3)	4.3 J (1.3)	3.1 J (1.3)	U (1.3)	1.6 J (1.3)	4.6 J (1.3)
Lead	15		15	3.5 (0.25)	U (0.25)	U (0.25)	0.27 J (0.25)	0.48 J (0.25)	U (0.25)
Mercury	2		0.63	U (0.091)	U (0.091)	U (0.091)	U (0.091)	U (0.091)	U (0.091)
Nickel	100		390	39 (1.3)	7.1 (1.3)	19 (1.3)	14 (1.3)	5.3 (1.3)	23 (1.3)
Selenium	50		100	U (1.3)	1.3 J (1.3)	U (1.3)	U (1.3)	U (1.3)	4.9 J (1.3)
Vanadium			86	22 (2.5)	2.7 J (2.5)	U (2.5)	3 J (2.5)	U (2.5)	3.2 J (2.5)
Zinc	2000		6000	35 B (2.5)	12 (2.5)	11 (2.5)	13 (2.5)	45 B (2.5)	U (2.5)

TABLE 9
WEST RAIL GROUNDWATER ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MDEQ-7 Human Health Standards - Groundwater	MDEQ Tier 1 Groundwater RBSLs	USEPA RSLs - Resident Tapwater	WB-11S	WB-12S	WB-13D	WB-13S	WB-14D
Field Sample ID				CMR-WB11S-190621	CMR-WB12-190619	CMR-WB13D-190619	CMR-WB13S-190620	CMR-WB14D-190625
Lab Sample ID				UF22026-001	UF21102-002	UF21102-001	UF21103-001	UF26052-001
Sample Method				Sonic	Sonic	Sonic	Sonic	Sonic
Sample Date				6/21/2019	6/19/2019	6/19/2019	6/20/2019	6/25/2019
Comments								
VOLATILE ORGANIC COMPOUNDS								
Acetone			14000	U (2)	11 (2)	3.7 J (2)	13 J (2)	U (2)
Benzene	5	5	0.46	**39 (0.4)**	U (0.4)	U (0.4)	U (0.4)	U (0.4)
2-Butanone			5600	20 (2)	4.5 J (2)	U (2)	2.8 J (2)	U (2)
Chloromethane	600		190	U (0.4)	0.45 J (0.4)	U (0.4)	U (0.4)	U (0.4)
Cumene			450	25 (0.4)	2.3 (0.4)	U (0.4)	U (0.4)	U (0.4)
Cyclohexane			13000	26 (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
1,2-Dichloroethane	4	4	0.17	U (0.4)	U (0.4)	U (0.4)	U (0.4)	0.93 (0.4)
Ethyl Benzene	700	700	1.5	190 (0.4)	1.7 (0.4)	U (0.4)	U (0.4)	U (0.4)
Methyl Acetate			20000	UJ (0.4)	UJ (0.4)	UJ (0.4)	UJ (0.4)	U (0.4)
Methyl tert-butyl ether	30	30	14	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Methylcyclohexane			13000	28 (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Naphthalene	100	100	0.17	2 (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Toluene	1000	1000	1100	1.1 (0.4)	U (0.4)	0.62 (0.4)	U (0.4)	U (0.4)
meta-xylene	10000		190	14 (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
ortho-xylene	10000		190	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Xylenes (total)	10000	10000	190	14 (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
SEMI VOLATILE ORGANIC COMPOUNDS								
bis(2-Ethylhexyl)phthalate	6		5.6	U (1.9)	U (0.38)	U (0.38)	U (0.38)	U (0.38)
Fluorene	50	50	290	U (0.2)	U (0.04)	U (0.04)	U (0.04)	U (0.04)
2-Methylnaphthalene		36	36	0.87 (0.2)	U (0.04)	U (0.04)	U (0.04)	U (0.04)
3&4-Methylphenol				4 J (2.3)	U (0.46)	U (0.46)	U (0.46)	U (0.46)
Naphthalene	100	100	0.17	1.5 (0.2)	U (0.04)	U (0.04)	U (0.04)	U (0.04)
Pentachlorophenol	1		0.041	U (6.7)	U (1.3)	U (1.3)	U (1.3)	U (1.3)
Phenol	4000		5800	U (0.95)	U (0.19)	U (0.19)	U (0.19)	UJ (0.19)
MDEQ VOLATILE PETROLEUM HYDROCARBON								
C5-C8 Aliphatics		650	1300	280 J (75)	27 J (15)	U (15)	140 (15)	U (15)
C9-C12 Aliphatics		1400		1500 (75)	220 (15)	U (15)	U (15)	U (15)
C9-C10 Aromatics		1100		1100 (25)	200 (5)	U (5)	U (5)	U (5)
Benzene	5	5	0.46	**38 (0.51)**	U (0.51)	U (0.51)	U (0.51)	U (0.51)
Ethyl Benzene	700	700	1.5	170 (3.1)	2 J (0.62)	U (0.62)	U (0.62)	U (0.62)
Methyl tert-butyl ether	30	30	14	U (1.2)	U (1.2)	U (1.2)	U (1.2)	U (1.2)
Naphthalene	100	100	0.17	83 (0.7)	12 (0.7)	U (0.7)	U (0.7)	U (0.7)
Petroleum Hydrocarbons (Total)				3100 (180)	450 (35)	U (35)	110 J (35)	U (35)
Toluene	1000	1000	1100	2.1 J (0.53)	U (0.53)	0.71 J (0.53)	U (0.53)	U (0.53)
meta-xylene	10000		190	24 (1.2)	U (1.2)	U (1.2)	U (1.2)	U (1.2)
ortho-xylene	10000		190	86 (0.58)	0.66 J (0.58)	U (0.58)	U (0.58)	U (0.58)
Xylenes (total)	10000	10000	190	140 (6)	0.66 J (1.2)	U (1.2)	U (1.2)	U (1.2)
MDEQ EXTRACTABLE PETROLEUM HYDROCARBON								
C9-C18 Aliphatics		1400	100	990 (100)	250 (100)	U (100)	U (100)	U (100)
C19-C36 Aliphatics		1000		410 (100)	110 (100)	U (100)	U (100)	U (100)
C11-C22 Aromatics		1100		230 (100)	340 (100)	U (100)	U (100)	U (100)
INORGANICS (dissolved)								
Antimony	6		7.8	0.5 J (0.5)	0.68 J (0.5)	U (0.5)	1 J (0.5)	U (0.5)
Arsenic	10		0.052	**150 (1.3)**	**27 (1.3)**	U (1.3)	6.2 (1.3)	U (1.3)
Barium	1000		3800	**1700 (1.3)**	140 (1.3)	91 (1.3)	85 (1.3)	17 (1.3)
Beryllium	4		25	0.2 J (0.15)	0.22 J (0.15)	U (0.15)	U (0.15)	U (0.15)
Cadmium	5		9.2	U (0.13)	U (0.13)	U (0.13)	0.16 J (0.13)	U (0.13)
Chromium (total)	100		0.035	2.3 J (1.3)	2.2 J (1.3)	2 J (1.3)	U (1.3)	U (1.3)
Cobalt			6	3 J (1.3)	12 (1.3)	1.4 J (1.3)	3.7 J (1.3)	2.5 J (1.3)
Copper	1300		800	3.3 J (1.3)	4.4 J (1.3)	6.6 (1.3)	10 (1.3)	4 J (1.3)
Lead	15		15	2.2 (0.25)	2 (0.25)	0.51 J (0.25)	0.74 J (0.25)	U (0.25)
Mercury	2		0.63	U (0.091)	U (0.091)	U (0.091)	U (0.091)	U (0.091)
Nickel	100		390	8.2 (1.3)	15 (1.3)	26 (1.3)	10 (1.3)	26 (1.3)
Selenium	50		100	U (1.3)	U (1.3)	U (1.3)	U (1.3)	U (1.3)
Vanadium			86	6.8 (2.5)	5.5 (2.5)	5.5 (2.5)	3.3 J (2.5)	U (2.5)
Zinc	2000		6000	21 B (2.5)	18 B (2.5)	U (2.5)	21 B (2.5)	U (2.5)

TABLE 9
WEST RAIL GROUNDWATER ANALYTICAL RESULTS
Calumet Montana Refining, LLC - Great Falls, Montana

Groundwater Notes:

Table updated in September 2021.

1 All concentrations are presented in ug/L (ppb).
2 Only compounds with at least one detection are shown.
3 Concentrations that exceed the MDEQ-7 Human Health Standards - Groundwater are **boldfaced.**
4 Concentrations that exceed the MDEQ Tier 1 Groundwater RBSLs are gray shaded.
5 Concentrations that exceed the USEPA Regional Screening Levels - Resident Tapwater are underlined.

Abbreviations:

U -- Not Detected.
J -- Estimated Concentration.
H -- Analysis Conducted Outside Holding Time.
B -- Blank Contamination.
( ) -- Detection Limit.
-- -- Not Analyzed.

APPENDIX A
Updated Conceptual Site Model – June 2021

UPDATED CONCEPTUAL SITE MODEL

CALUMET MONTANA REFINING, LLC
GREAT FALLS, MONTANA

June 2021

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FIGURES

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LIST OF ACRONYMS

ACM	Anaconda Company Mining
amsl	Above Mean Sea Level
AOC	Area of Concern
bgs	Below Ground Surface
CMR	Calumet Montana Refining, LLC
CSM	Conceptual Site Model
East Rail	East Rail Loading Area
gpm	gallons per minute
GWIC	Ground Water Information Center
MBMG	Montana Bureau of Mines and Geology
PID	Photoionization Detector
Ramboll	Ramboll US Consulting, Inc.
Site	CMR facility
USGS	US Geological Survey
West Rail	West Rail Loading Area

1. INTRODUCTION

Ramboll US Consulting, Inc. (Ramboll), on behalf of Calumet Montana Refining, LLC (CMR), has prepared this Updated Conceptual Site Model (CSM) Report for the Calumet Great Falls Montana Refining facility located at 1900 10th Street NE, Great Falls, Montana (Site) (Figure 1). This report presents the findings from an investigation of geologic outcrops along the northern bank of the Missouri River. Along with a literature review, the findings from the geologic outcrop investigation were integrated with previous field investigations, including a review of the boring logs and well construction information and historic groundwater elevations, down-gradient of the Area of Concern (AOC)-16 Area along North River Road, West Rail Loading Area (West Rail), East Rail Loading Area (East Rail), and along the Missouri River. Based on the above, this report presents an updated CSM of the geology and hydrogeology associated with the Site. Locations of the exposed outcrops and associated geologic units mapped and compiled by the Montana Bureau of Mines and Geology (MBMG) and US Geological Survey (USGS) are shown in Figure 2 (MBMG 2002). A series of cross-sections were generated, as shown in Figure 3, to illustrate the geologic units with depth in the AOC-16 Area (Figure 4), East Rail (Figure 5), and along the Missouri River (Figure 6). In addition, locations of the exposed outcrops near the monitoring wells down-gradient of AOC-16 along North River Road, are shown in Figure 4. A representative stratigraphic column based on the updated CSM is shown in Figure 7. Boring logs for select monitoring wells (i.e., MW-41S/D, MW-71, MW-72, MW-61S/D, MW-62, MW-79D, MW-81D, MW-97, MW-98, MW-99, MW-105, and WB-14D) discussed in this report and/or used to generate the cross-sections in Figures 4-6 which support the revisions to the CSM, are included as Appendix A and shown in Figure 3.

2. GEOLOGIC BACKGROUND

2.1 REGIONAL GEOLOGY

The North American Cordilleran Orogeny led to the development of the Cordilleran Foreland Basin System and associated sedimentary deposits. These sedimentary deposits have been the focus CMR geologic investigations. The archetypal collision of the North American Cordilleran fold and thrust belt lies to the west of present day Great Falls, Montana, and represents the collision of oceanic and continental lithosphere as the North American Continental Plate overrode the oceanic Kula-Farallon Plate during the Late Jurassic into the Early Cretaceous Period (beginning approximately 150 million years ago) (Reid 2015).

A non-marine, foreland basin system developed to the east of the topographic load of the North American Cordilleran Orogenic Belt, the associated foredeep of the foreland basin system infilled with fluvial and estuarine-dominated sediment deposits during the Early Cretaceous that thinned eastward, away from the collision boundary, meanwhile a forebulge emerged to the east of where the city of Great Falls, Montana, is located today (Reid 2015).

The fluvial and estuarine deposits of the foreland basin system are dominated by silts and sands of the Kootenai Formation which represents the lithology that underlies the city of Great Falls and the CMR facility. The Kootenai Formation has informally been differentiated into fifth member (Kk5 – shallowest and youngest), an upper and lower fourth (Kk4 – older and underlying the Kk5), which is underlain by a member known as the Sunburst Sandstone (Reid 2015).

The fifth member of the Kootenai Formation is distinguished by red-weathered mudstone that contains lenses and beds of brownish-gray and greenish-gray, cross-bedded, micaceous sandstone and light gray nodular limestone concretions. The lower part contains a dark-gray shale and lignite bed with a significant pre-angiosperm flora. Thickness of the fifth member is estimated to be approximately 230 feet (Reid 2015).

The upper strata of the fourth member of the Kootenai Formation, which directly underlies the fifth member, has been identified as brownish-gray limestone and interbedded shale. The limestone contains ostracods and brackish water dinoflagellates (Burden 1984). The lower portion of the fourth member of the Kootenai Formation has been identified as sandstones interbedded with very dark reddish-brown mudstones that contain brackish water dinoflagellates (Burden 1984). The sandstones of the lower portion range from dusky-red to pale reddish-brown, fine-to medium-grained, platy, thin- to medium-bedded. Large channels cut through the lower portion of the fourth member unit and channel fill has been observed to be mudstone, interbedded sandstone and mudstone, or sandstone deposits (Hopkins 1985). The approximate thickness of the fourth member of the Kootenai Formation has been estimated to be as much as 200 feet.

The Sunburst Member (Kks) is one of the lowest (oldest) units of the Kootenai Formation that outcrops near present day Great Falls, Montana, and is typically a light, yellowish-brown, well sorted, well cemented, resistant quartz sandstone with interspersed limonite specks. Sedimentary structures include cross bedding and ripple lamination (Reid 2015). A

modified stratigraphic section of the Great Falls area and CMR hydrostratigraphic units are presented in Table 1.

2.2 GEOLOGIC INTERPRATIONS OF PREVIOUS FIELD INVESTIGATIONS

In 2019 and 2020, Ramboll geologists logged and characterized the varied shallow lithological units underlying CMR. The boring logs and monitoring well construction information, including soil and groundwater analytical data, have been presented in the following reports:

- Rail Investigation Area Interim Measures (CMR 2019a);
- 3rd Quarter 2019 Groundwater Sampling Summary Report (CMR 2019b);
- AOC-16 Pilot Study Evaluation Report (CMR 2020a);
- 2019 Annual Groundwater Sampling Summary Report (CMR 2020b);
- 3rd Quarter 2020 Groundwater Sampling Summary Report (CMR 2020c);
- AOC-16 Interim Measures Final (100%) Design Report (CMR 2020d); and
- 4th Quarter 2020 Groundwater Sampling Summary Report (CMR, 2021).

Previous subsurface investigations at the Site have utilized a variety of drilling methods including direct push, hollow stem auger, air rotary and sonic. All drilling methods with the exception for air rotary and sonic drilling resulted in borehole refusal at a hard dusky-red unit. The sonic drilling method was selected by Ramboll because this method offered more advanced drilling capabilities including, improved sample recovery that resulted in a better representation and correlation of grain size descriptions with depth. Grain size descriptions obtained during previous drilling operations were compared to and correlated with the geologic outcrops that were observed along the Missouri River. An updated CSM and a representative stratigraphic column at CMR are discussed in more detail in Section 4.1.

A brief synopsis of the geologic findings from different investigated areas are presented in the sections below. This report provides an updated geological context, formation descriptions, and hydrogeological unit descriptions and presents an updated CSM.

2.2.1 AOC-16 Area

The lithology of the AOC-16 Area has been presented in multiple reports (CMR 2020a, CMR 2020c, CMR 2020d). Approximately the top 5 feet of material is composed of fill and/or reworked material consisting of gravels with varying amounts of fine sand and silt. Beneath the fill material is a fine sand that extends down to a thinly bedded sandstone unit and/or moderately laminated hard gray silt. The silt had various amounts of fine sand and featured yellow mottling. Beneath the sandstone and hard gray silt is the first appearance of the weathered and mottled dusky-red siltstone unit. Hydrocarbon odor and staining, including overall sand content, decreased with depth. Along North River Road, a thin bed of strongly cemented sandstone and weakly laminated dusky-red siltstone/mudstone were encountered, which did not exhibit signs of groundwater (i.e., moisture content or mottling). The deepest boring (MW-41D), advanced to 35 feet, identified a gray to dark gray siltstone/shale beneath dry upper aquitard unit (i.e., dusky-red siltstone with interbedded sandstone).

Table 2 presents the lithological units present along North River Road (CMR 2020d). The distinct lithological units presented in Table 1 appear to be laterally continuous (west to east), but the strongly cemented sandstone unit 4 appears to pinch out to the south, which is shown in Figure 4.

2.2.2 West Rail

As presented in the Rail Investigation Area Interim Measures (RIAIM) (CMR 2019a), heterogeneous geologic conditions were encountered at the West Rail associated with approximately the top 10 feet of material (shallow horizon) were encountered. These were composed of fill and/or reworked material consisting of gravels with varying amounts of sands, silts and clays. This material is heterogeneous and non-continuous; but overall grain size fines with depth from some gravels and sands to silts and clays. In the West Rail, the first foot consists of ballast stone underlain by gravelly sands that fined with depth to silty sands and sandy clays. Logging the fill material in the first 10 feet was difficult due to poor recovery of the sands and gravels that tended to fall out of the drill stem during the drilling process. In borings advanced within the ditch along the West Rail or within the property boundary of the wastewater treatment plant (southern borings) only the first 1-5 feet are composed of fill material.

The shallow horizon was underlain by a weakly to well laminated dusky red unit that extended to depths of approximately 15-20 feet below ground surface (bgs). In the southern borings, the shallow horizon is underlain by a weakly laminated, dusky red unit that extended to depths of 16-28 feet bgs. This dusky-red unit is interpreted as the weathered siltstone or mudstone that represents the top of bedrock. The dusky red unit is underlain by hard or well laminated siltstones and/or mudstones (to depths ranging from 25-33 feet bgs). The well laminated unit and harder, typically more massive units were occasionally interbedded. Strongly cemented sandstone was encountered near the terminal depth of the borings.

The deepest boring (WB-14D), advanced to 40 feet bgs with a bottom elevation of approximately 3,281 ft above mean sea level (amsl), within the wastewater treatment plant, identified laminated siltstones beneath the sandstone.

2.2.3 East Rail

Approximately the top 10 feet of material at the East Rail is composed of fill and/or reworked material consisting of gravels with varying amounts of sands, silts and clays (CMR 2019a). This material is heterogeneous and non-continuous; but overall grain size fines with depth from some gravels and sands to silts and clays. Within this shallow horizon (first 10 feet of material) there is typically staining within the first 5 feet of material and strong hydrocarbon odors observed within the upper 10 feet.

The shallow horizon is directly underlain by a dry dusky red unit composed primarily of silts and clays that extend to depths ranging from 15-20 feet bgs (hydrocarbon odors and elevated photoionization detector (PID) readings were present to 20 feet in some locations). This unit was often weakly laminated to moderately laminated, any moisture in the dusky

red unit was typically associated with mottled coloration on the more clay-rich portions. As mentioned in Section 2.2.1, this unit is interpreted as a weathered siltstone and/or mudstone. This dusky red unit was observed throughout the East Rail with the exception boring EB-15 (converted to MW-99) located offsite adjacent to the river walk. Fill was present in EB-15 to a depth of almost 20 feet bgs as illustrated by the presence of an asphalt cobble identified at 19.5 feet bgs. Based on relative depths of the dusky-red siltstone unit, the absence is likely due to the removal of this unit due to the construction of the 10th Street NE bridge and/or erosional processes.

Immediately below the dusky red unit are alternating layers of hard, massive and well laminated siltstones and mudstones. The massive siltstones/mudstones were observed to have moisture associated with the mottled red and gray coloration portions. Within the laminated siltstones/mudstones there are often fine to very fine sandstone lenses or layers. Laminated sands and silts were identified near the terminal depth of several borings and likely represent very dense to well-cemented sandstones in some cases.

Two geologic cross-sections from the southern portion of the East Rail, extending to the bank of the Missouri River, are shown in Figure 5.

2.2.4 Along the Missouri River

Based on the combined field observations in the areas noted above, a cross section was developed along the Missouri River, as shown in Figure 6. The geology was simplified into three main units: fill and/or native sandy material, dusky-red siltstone with various amounts of fine sand, and a gray siltstone/shale. Sandstone layers and/or lenses are observed within both the dusky-red siltstone and gray siltstone units. In addition, the geology beneath the intersection between 10th Street NE and North River Road was inferred based on lithology observed at (west to east) MW-11, MW-99 and MW-61S/D. These monitoring wells have a notable absence of the dusky-red unit typically observed along the Missouri River. Thick sequences of fill and/or sandy material was encountered. The notable absence of the dusky-red unit likely represents removal of the dusky-red unit through construction and/or erosional processes. Alternatively, the thick sequence of sandy material observed at MW-61S/D could be related to a steep and narrow channel in-fill.

3. FIELD METHODS

On September 2, 2020, Ramboll geologists conducted a geologic survey of exposed outcrops along the northern bank of the Missouri River in Great Falls, Montana. The location of the investigation area associated with AOC-16 (rock outcrops 1-8) was approximately 500 feet southeast from the Truck Loading Rack Area of CMR operations (see Figure 2). Additional rock outcrops further east of the CMR facility were observed as part of this investigation (rock outcrops 9-15 as shown on Figure 2). The locations of the investigation are denoted on Figure 2, the general geologic description of each rock outcrop is described in Table 3 and photos of the outcrops are shown in the photolog included as Appendix B.

The survey was initiated at the nearest rock outcropping relative to the deep monitoring well (MW-41D) installed during the AOC-16 Interim Measures Design field activities. The field team moved from west to east, following rock outcrops 1-8, to verify the lateral continuity of geological units identified in Table 2. The survey involved identification of geological characteristics (i.e., identification of grain size, color and depositional features) of the exposed outcrops along the Missouri River.

3.1 SOUTHEAST OF AOC-16

The investigation area immediately southeast of AOC-16 (rock outcrops 1-8), shown in Figure 2, are at a similar elevation as the subsurface deposits identified in the AOC-16 Interim Measures Design field activities (see Table 2). The outcrops observed at these rock outcrops were geographically the closest rock outcrops to the deep monitoring well (MW-41D) installed along North River Road. Rock outcrops were observed to be in-situ[1] (rock outcrops 1-4 and 6), float material[2] overlying local deposits (rock outcrops 7 and 8) or beneath the soil horizon and not definitively identifiable as in-situ (rock outcrop 5).

Rock outcrops 1-3 shared similar geologic characteristics and all appeared to be in place. The depositional units were predominately weathered siltstone or mudstone, dusky-red in color, thinly laminated, with varying amounts of fine sand. Mottling was observed at rock outcrops 1 and 3.

Rock outcrops 4-6 outcropped in relatively close proximity to one another and stratigraphically lower than rock outcrops 1-3. Rock outcrops 4-6 were identified as weathered gray to dark gray siltstones and mudstones. Rock outcrops 4 and 6 were both thinly laminated and appeared to be in-situ and rock outcrop 6 presented with yellow mottling. The strata at rock outcrop 4 was visibly saturated and wet (see Appendix B). The observed saturation at this location may be daylighting of groundwater from the upper bedrock semi-confined hydrostratigraphic unit.

Rock outcrop 7 was identified as a strongly lithified, thinly bedded, gray sandstone. This unit was not in-situ, but float material that rested on top of in-situ dusky-red siltstone deposits

[1] In-situ is a large outcrop that has not been disturbed from its original stratigraphic location by faulting or erosional processes.

[2] Float is a piece of rock that has been removed and transported from its original geologic outcrop.

(rock outcrops 1-3). Rock outcrop 8 was a piece of float material that exhibited distinct thin laminations of a dusky-red siltstone and/or mudstone.

3.2 EAST OF AOC-16

Additional rock outcrops were identified further east from the AOC-16 investigation area that were discussed above. These additional outcrops were investigated to gain better understanding regarding the variability of geologic units along the northern bank of the Missouri River (i.e., fifth member of the Kootenai Formation). Descriptions of the rock outcrops and geology are as follows (west to east):

Rock Outcrop 9

Exposed outcrops were observed beneath the 15th Street Bridge. Despite the slight disturbance of the beds that was likely attributed to the construction of the bridge, the units appeared to be relatively in-place and demonstrated contacts between different lithologic units. Contacts of the sedimentary units were observed, as follows (top to bottom):

- A very competent and thinly bedded sandstone overlaid a dusky red and weakly laminated siltstone.
- The contact between the dusky-red siltstone was observed to be a very fine and strongly cemented sandstone.
- The strongly cemented sandstone overlaid a dusky-red siltstone with variable amounts of sand and weak laminations.
- The base of the exposed outcrop section was a gray, mottled siltstone/mudstone.

Rock Outcrop 15

A well exposed outcrop along North River Road was located approximately a quarter mile east of rock outcrop 9 and at slightly higher elevation than the 15th Street Bridge outcrops. Here, a thinly bedded, maroon siltstone which exhibited mottling was observed.

Rock Outcrops 13 and 14

Both outcrops were exposed in close vicinity to each other along the walking trail. Rock outcrop 13 was stratigraphically higher than rock outcrop 14. A thinly bedded maroon siltstone was observed at rock outcrop 13, which was similar to the outcrop observed at rock outcrop 15. The maroon siltstone was immediately above a gray, thinly bedded sandstone at rock outcrop 14.

Rock Outcrop 10

An exposed outcrop of gray, strongly lithified and cross-bedded sandstone was observed on top of Smelter Hill close to Black Eagle Dam. Based on elevation, rock outcrop 10 is the highest (youngest) in-situ stratigraphic unit observed during this investigation.

Rock Outcrop 11

A thinly bedded maroon siltstone with varying amounts of sand is located stratigraphically lower than rock outcrop 10.

Rock Outcrop 12

The small island associated with Black Eagle Dam was predominately composed of rubble and overgrowth; however, near the riverbank, exposed sections of gray, coarsely crystalline outcrop was observed that exhibited orthogonal joint set. This unit appears to be an in-situ crystalline limestone (fourth member of the Kootenai Formation Kk4). This unit was the lowest (oldest) stratigraphic deposit observed during this investigation based on relative outcrop elevations.

4. SUMMARY AND CONCLUSIONS

This geologic investigation focused on observing outcrops along the Missouri River to verify the presence and interpret lateral continuity of lithologic units observed during previous drilling activities. The riverbank deposits provided an opportunity to observe in-situ lithology. As outlined in Table 2, the deposits that underly the AOC-16 Area of the CMR facility were observed to be composed of dusky-red siltstone and interbedded with gray, micaceous sandstones overlying a gray mottled siltstone/shale unit. Rock outcrops southeast of the AOC-16 Area (rock outcrops 1-8) were at relatively similar elevations as the depositional units observed during drilling activities along North River Road. Observations during the outcrop investigation generally correlated to the lithologic units identified in deep boring MW-41D.

Based on the undisturbed nature and similar elevation of the deposits along the northern bank of the Missouri River (rock outcrops 1-8), the units represent laterally continuous sedimentary strata that closely correspond to the fifth member (Kk5) of the Kootenai Formation. Figure 4 shows an interpreted cross-section extended towards the Missouri River. In addition, rock outcrops 9-15 (excluding rock outcrop 12) identified alternating layers of sandstone, siltstone and mudstone (Kk5) that were underlain by a gray, orthogonally jointed crystalline limestone (Kk4) located to the east of Black Eagle Dam (rock outcrop 12).

Rock outcrop 12 likely represents the contact between the fifth (Kk5) and fourth (Kk4) members of the Kootenai Formation. These observations further support that AOC-16 deposits exist entirely within the fifth member (Kk5) of the Kootenai Formation and the geologic contact with the fourth member (Kk4) rests stratigraphically lower than the units observed during field investigations at CMR at an estimated elevation of 3,262 ft amsl. The closest domestic well to CMR is located approximately 1,500 feet northeast of the AOC-16 and is presumably screened in the Sunburst Member of the Kootenai Formation at elevations from 3210 to 3240 ft amsl. Presuming Kootenai Formation is horizontal without any dip[3], Table 4 below summarizes the depth from ground surface at various portions of the CMR site to the projected upper contact of the fourth (Kk4) member and the upper contact of the Sunburst Member (Kks) of the Kootenai Formation.

[3] The Northwest – Southeast trending Sweetgrass Arch, a fracture anticline, is located approximately 1.5 miles Northeast of the AOC-16. The Kootenai Formation maybe inferred to have a Southwesterly dip such that the depth to the upper contact of the Sunburst Member (Kks) of the Kootenai Formation maybe at a deeper depth than indicated in Table 4.

Area	Ground Surface Elevation	Depth to the Projected Upper Contact to the Kk4 (3264 ft amsl)	Depth to the Projected Upper Contact to the Kks (3240 ft amsl)
Active Refinery	3,320 ft to 3,368 ft	58 ft to 106 ft	80 ft to 128 ft
West Rail	3,324 ft to 3,334 ft	62 ft to 72 ft	84 ft to 94 ft
East Rail	3,320 ft to 3,344 ft	58 ft to 82 ft	80 ft to 104 ft
AOC-16	3,337 ft to 3,371 ft	75 ft to 109 ft	97 ft to 131 ft

Table 4: Projected Depths to the Top of the Fourth and Sunburst Members of the Kootenai Formation

The lowest stratigraphic elevation reached during soil borings and/or monitoring wells in the West Rail, East Rail, and AOC-16 areas are WB-14D (3,281 ft), MW-99 (3,302 ft), and MW-41D (3,307 ft), respectively. At the bottom, a gray siltstone/shale was observed at WB-14D and MW-41D, while a well-cemented sandstone unit was observed at MW-99.

4.1 UPDATED CONCEPTUAL SITE MODEL

Based on previous field investigations discussed in Section 2.2, including this geologic outcrop investigation, the updated CSM is discussed below and presented in Figure 7.

4.1.1 Geology

The upper horizon at CMR is composed of fill and/or reworked material consisting of gravels with varying amounts of sands, silts and clays. The reworked material also consists of glaciolacustrine deposits composed of varying amounts of unconsolidated silts and sands that range from loose to hard or dense along with discontinuous lenses and/or beds of sandstone (Figure 7).

Beneath the surface deposits is the fifth member (Kk5) of the lower Cretaceous Kootenai Formation. The fifth member (Kk5) consists of siliciclastic muddy fluvial and fluviolacustrine deposits composed predominantly of interbedded mudstones, siltstone and thin lenses and beds of well cemented very fine to fine cross-bedded sandstone. The uppermost part that is laterally continuous beneath CMR is a dusky-red weathered and weakly laminated siltstone/mudstone deposits. In some cases, sand content is greater in the upper portions of this stratigraphic unit. The lower part of the fifth member of the Kootenai Formation consists of a dark-gray shale.

During this geologic outcrop investigation, an orthogonal jointed limestone was encountered at the lowest stratigraphic location (i.e., rock outcrop 12). This unit likely represents the fourth member (Kk4) of the Kootenai Formation. However, it is unknown whether this upper limestone unit is present beneath the CMR facility. This unit was not mentioned in the

geologic description for the fourth member (Kk4) outlined in the DRAFT OU2 Groundwater Conceptual Site Model for the nearby Anaconda Copper Mining (ACM) Company Smelter and Refinery NPL Site approximately 1 mile east of the CMR facility (Woodard & Curran 2020). The lower portion of the fourth member (Kk4) is a dusky-red sandstone interbedded with very dark reddish-brown mudstone (Burden 1984). Therefore, the distinction between the fifth and fourth members may be difficult if the limestone unit is not present beneath the CMR facility. The limestone observed during this investigation should be distinguished from the underlying much older Paleozoic limestone of the Madison Group which is host to the principal regional aquifer.[4]

4.1.2 Hydrogeology

There are four distinct hydrostratigraphic units that extend across the Site and overlie the regional aquifer (CMR 2020b). The current understanding of the Site's hydro-stratigraphy is as follows:

- The *Perched Unconfined Saturated Zone* is a low yield hydrostratigraphic unit present within fill, glaciolacustrine deposits and/or poorly lithified mudstone/siltstone that contain various amounts of fine sand. The top of competent bedrock is encountered and appears laterally continuous across the site as a dusky-red siltstone. The weathered portion of the dusky-red siltstone is moist and constitutes the base of the Perched Unconfined Saturated Zone. Due to heterogenous nature of re-worked surficial deposits, perched groundwater was observed to be discontinuous. Groundwater elevations in the perched hydrostratigraphic unit shows a rapid response to infiltration of surface water from rain and/or snowmelt.
- The *Upper Aquitard* which hydraulically separates the overlying Perched Unconfined Saturated Zone and the underlying Upper Bedrock Semi-Confined Saturated Zone is comprised of the dry dusky-red siltstone. This unit is composed of a well lithified siltstone/mudstone interbedded with moderately to well cemented sandstone. The Upper Aquitard is continuous across the site except for a few locations where it has been either removed by excavation or erosional processes.[5] The low permeable strata of the aquitard impedes the hydraulic communication between the overlying Perched Unconfined Saturated Zone and the underlying Upper Bedrock Semi-Confined Saturated Zone.
- The *Upper Bedrock Semi-Confined Saturated Zone* is a low yield hydrostratigraphic unit underlying the Upper Aquitard and is composed of alternating layers of hard massive siltstone and/or shales[6] with fine to very fine sandstone lenses and/or beds.

[4] The famous Giant Spring located along the south bank of the Missouri River a few miles east of the site is the location where the underlying (~400 feet bgs) confined Madison Aquifer day lights to the surface under flowing artesian conditions at a remarkable discharge rate of approximately 100,000 gallons per minute (gpm).

[5] The first stratigraphic unit associated with the fifth member (Kk5) of the Kootenai (i.e., dusky-red siltstone) was not observed at three monitoring wells (MW-11, MW-62 and MW-99) likely due to excavation related to the construction of 15th Street Bridge and/or erosional processes. The absence of this unit could provide a more readily available migration pathway for perched unconfined groundwater to the upper bedrock semi-confined saturated zone.

[6] The top of the Upper Bedrock Semi-Confined Saturated Zone is typically observed as a gray siltstone and/or shale.

The heterogenous nature of the Upper Bedrock Semi-Confined Saturated Zone lithology results in discontinuous layers of permeability and limits groundwater movement through more permeable lenses/layers or bedding planes.

- The *Sunburst Sandstone Semi-Confined Aquifer* is the shallowest potable aquifer present in the Great Falls area. The Sunburst Member (Kks) of the Kootenai Formation is unit is a well cemented and well sorted quartz sandstone that features cross bedding and ripple laminations. This is the main hydrostratigraphic unit that is associated with a local water supply and, to a limited extent, is used for domestic purposes in the Great Falls area (Wilke 1983). Two nearby domestic wells to the CMR facility were installed in a gray sandstone unit (see Appendix C). Based on the total well depth, screen interval, and lithologic unit, these wells appear to be installed in the Sunburst Sandstone member. Where present, this aquifer produces 25 gpm (Wilke 1983).
- The *Confined Madison Aquifer* is the principal regional aquifer in Cascade County. Paleozoic limestone associated with the Madison Group is host of the Madison Aquifer that is recharged by precipitation and snowmelt from the Little Belt Mountains. This aquifer is overlain by the Lower Cretaceous Kootenai Formation and Jurassic Morrison and Swift Formations. Based on local well information, the Madison Aquifer is approximately 400 feet below CMR (Appendix C).[7]

Groundwater flow in the perched and upper bedrock hydrostratigraphic units is south towards the Missouri River, located directly down-gradient of the site. Perched groundwater does not have an apparent connection to the adjacent Missouri River as the base of the perched saturated zone daylights to the riverbank above the level of the river. Upper bedrock groundwater may also daylight along the riverbank above the river level and/or may discharge into riverbank sediments below the level of the river.

[7] Upon review of an irrigation well located less than one mile east of CMR (Groundwater Information Center [GWIC] ID is 302544), the Madison Aquifer is approximately 366 to 414 feet below the active refinery assuming horizonal stratigraphic of the Madison Group Limestone. However, due to the Sweetgrass Arch anticline, the estimated depths would likely be greater beneath CMR.

5. REFERENCES

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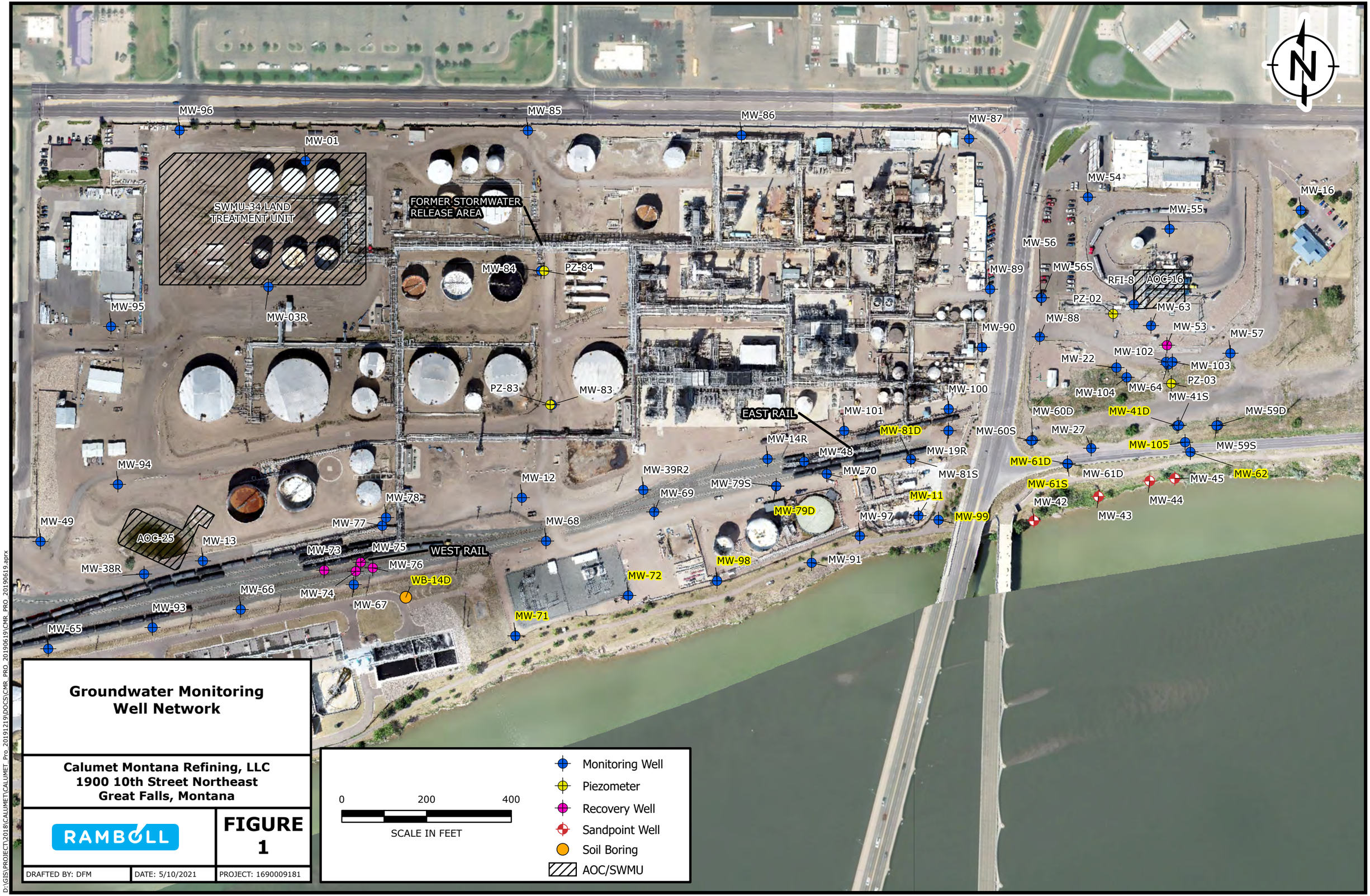
FIGURES


MW-96
MW-85
MW-86
MW-87
MW-01
SWMU-34 LAND TREATMENT UNIT
FORMER STORMWATER RELEASE AREA
MW-84
PZ-84
MW-89
MW-03R
MW-95
MW-90
PZ-83
MW-83
EAST RAIL
MW-101
MW-100
MW-81D
MW-14R
MW-48
MW-19R
MW-60S
MW-94
MW-12
MW-39R2
MW-79S
MW-70
MW-81S
MW-78
MW-69
MW-11
MW-49
MW-77
MW-68
MW-79D
MW-97
MW-99
AOC-25
MW-13
MW-73
MW-75
WEST RAIL
MW-38R
MW-76
MW-98
MW-91
WB-14D
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AOC-16
PZ-02
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MW-57
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PZ-03
MW-41S
MW-60D
MW-41D
MW-59D
MW-27
MW-105
MW-59S
MW-61D
MW-61D
MW-45
MW-62
MW-61S
MW-42
MW-44
MW-43
N
Groundwater Monitoring Well Network
Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana
RAMBOLL
FIGURE 1
DRAFTED BY: DFM
DATE: 5/10/2021
PROJECT: 1690009181
0
200
400
SCALE IN FEET
Monitoring Well
Piezometer
Recovery Well
Sandpoint Well
Soil Boring
AOC/SWMU
D:\GIS\PROJECT\2018\CALUMET\CALUMET_Pro_20191219\DOCS\CMR_PRO_20190619\CMR_PRO_20190619.aprx

DRAFT

OLD HAVRE HWY

15TH STREET

MISSOURI RIVER

RIVER DRIVE

RAILROAD TRACKS

9 15 11 14 13 10 12

7 2 1 8 5 4 6 3

0 60
SCALE IN FEET

LEGEND

- ROCK OUTCROP
- PROPERTY BOUNDARY (APPROXIMATE)
- SWEETGRASS ARCH
- FILL
- GLACIAL LAKE DEPOSIT AND REWORKED GLACIAL LAKE DEPOSITS (HOLOCENE AND PLEISTOCENE)
- FIFTH MEMBER OF THE KOOTENAI FORMATION (LOWER CRETACEOUS)
- FOURTH MEMBER OF THE KOOTENAI FORMATION (LOWER CRETACEOUS)

NOTES:

1. ROCK OUTCROP LOCATIONS ARE APPROXIMATE.
2. STRATIGRAPHIC UNITS OBTAINED FROM THE GEOLOGIC MAP OF THE GREAT FALLS NORTH 30' X 60' QUADRANGLE, CENTRAL MONTANA (2002).

N

0 900
SCALE IN FEET

FILE LOCATION:
L:\Loop Project
Files\1690019871_Calumet_2021_RCRA_2021-03\02_Outcrop Locations.dwg

DESIGNED BY: AS/PL

DRAFTED BY: CKL

DATE: 3/11/2021

APPROVED BY: KC

RAMBOLL

UPDATED CONCEPTUAL SITE MODEL (CSM) REPORT

ROCK OUTCROP LOCATIONS

PROJECT# 1690019871-002

FIGURE
2

DRAFT

SMELTER AVENUE

10TH STREET NE

GRASS

GRAVEL

VEGETATION

MISSOURI RIVER

A

A'

B

B'

C

C'

D

D'

MW-41S
MW-41D
MW-105
MW-62
MW-61S
MW-61D
MW-81D
MW-79D
MW-11
MW-99
MW-97
MW-91
MW-98
MW-72
MW-71
WB-14D
PZ-01
PZ-02
PZ-03
MW-53
SVE-1
AS-1
SVE-2A
AS-2A
SVE-2B
AS-2B

0 150
SCALE IN FEET

FILE LOCATION:
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Files\1690019871_Calumet_2021_RCRA\-002\03_Geologic Cross-Section Locations.dwg

DESIGNED BY: KC
DRAFTED BY: CKL
APPROVED BY: KC
DATE: 5/6/2021

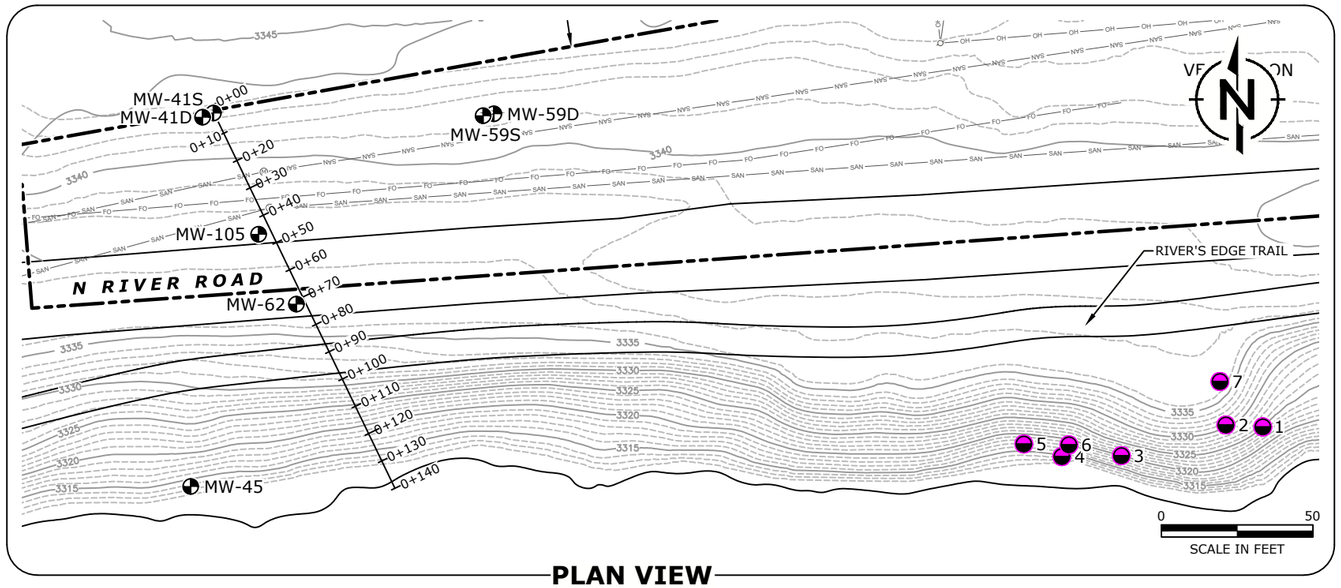
RAMBOLL

UPDATED CONCEPTUAL SITE MODEL (CSM) REPORT

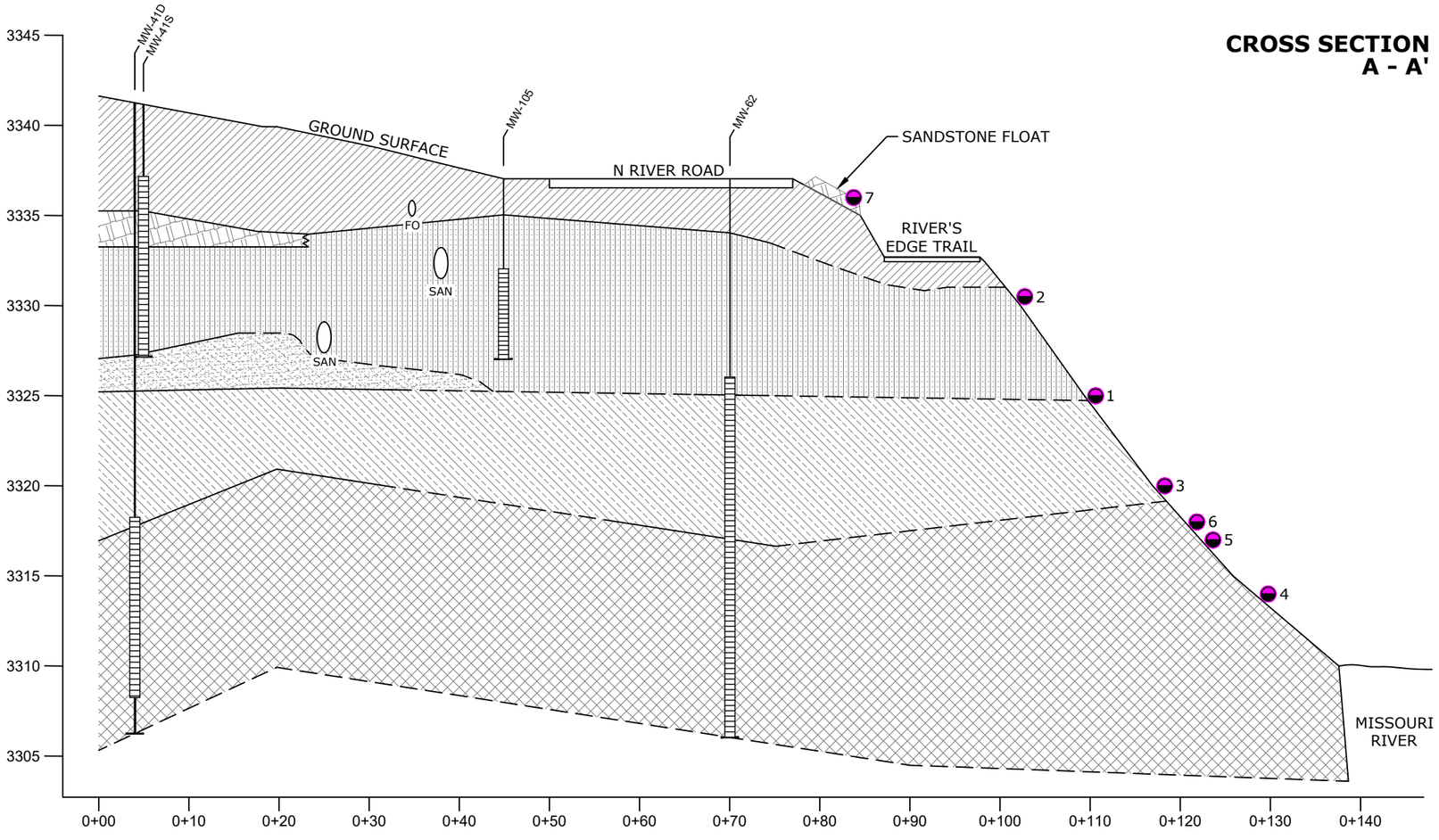
GEOLOGIC CROSS-SECTION C-C' LOCATION

1690019871-002

FIGURE
3



PLAN VIEW



CROSS SECTION A - A'

LEGEND

- SAMPLE LOCATION
- END OF BORING
- LITHOLOGY CONTACT
- INFERRED LITHOLOGY UNIT BOUNDARY
- MONITORING WELL SCREEN INTERVAL
- SANITARY SEWER (SAN)
- FIBER OPTIC (FO)
- UNIT 1: SILTY SAND (VADOZE ZONE)
- UNIT 2: SANDSTONE (PERCHED UNCONFINED)
- UNIT 3: SILTSTONE WITH VERY FINE SAND (PERCHED UNCONFINED)
- UNIT 4: MODERATELY TO STRONGLY CEMENTED VERY FINE SAND (UPPER AQUITARD)
- UNIT 5: DUSKY-RED SILTSTONE/MUDSTONE (UPPER AQUITARD)
- UNIT 6: GRAY SILTSTONE/MUDSTONE (UPPER BEDROCK SEMI-CONFINED)

NOTE:

- FIELD POINTS ARE APPROXIMATE.

UNIT 3: PERCHED UNCONFINED AQUIFER
FIELD POINT 2: SILTSTONE/MUDSTONE WITH FINE SAND (IN-SITU), DUSKY-RED, MOTTLED, THINLY-LAMINATED

UNIT 5: UPPER AQUITARD
FIELD POINT 3: SILTSTONE/MUDSTONE WITH VARIOUS AMOUNTS OF FINE SAND (IN-SITU), DUSKY-RED, MOTTLED, THINLY-LAMINATED

UNIT 6: UPPER BEDROCK SEMI-CONFINED AQUIFER
FIELD POINT 6: SILTSTONE/MUDSTONE (IN-SITU), GRAY TO DARK GRAY, WET

DRAFT

DATE
SIGNATURE

FILE LOCATION:
L:\Loop Project
Files\1690019871_Calumet_2021_RCRA\-002\04_Geologic Cross-Section - AOC-16 Area.dwg

DESIGNED BY: CKL
DRAFTED BY: CKL
APPROVED BY: CKL
DATE: 5/6/2021

RAMBOLL

UPDATED CONCEPTUAL SITE MODEL (CSM) REPORT

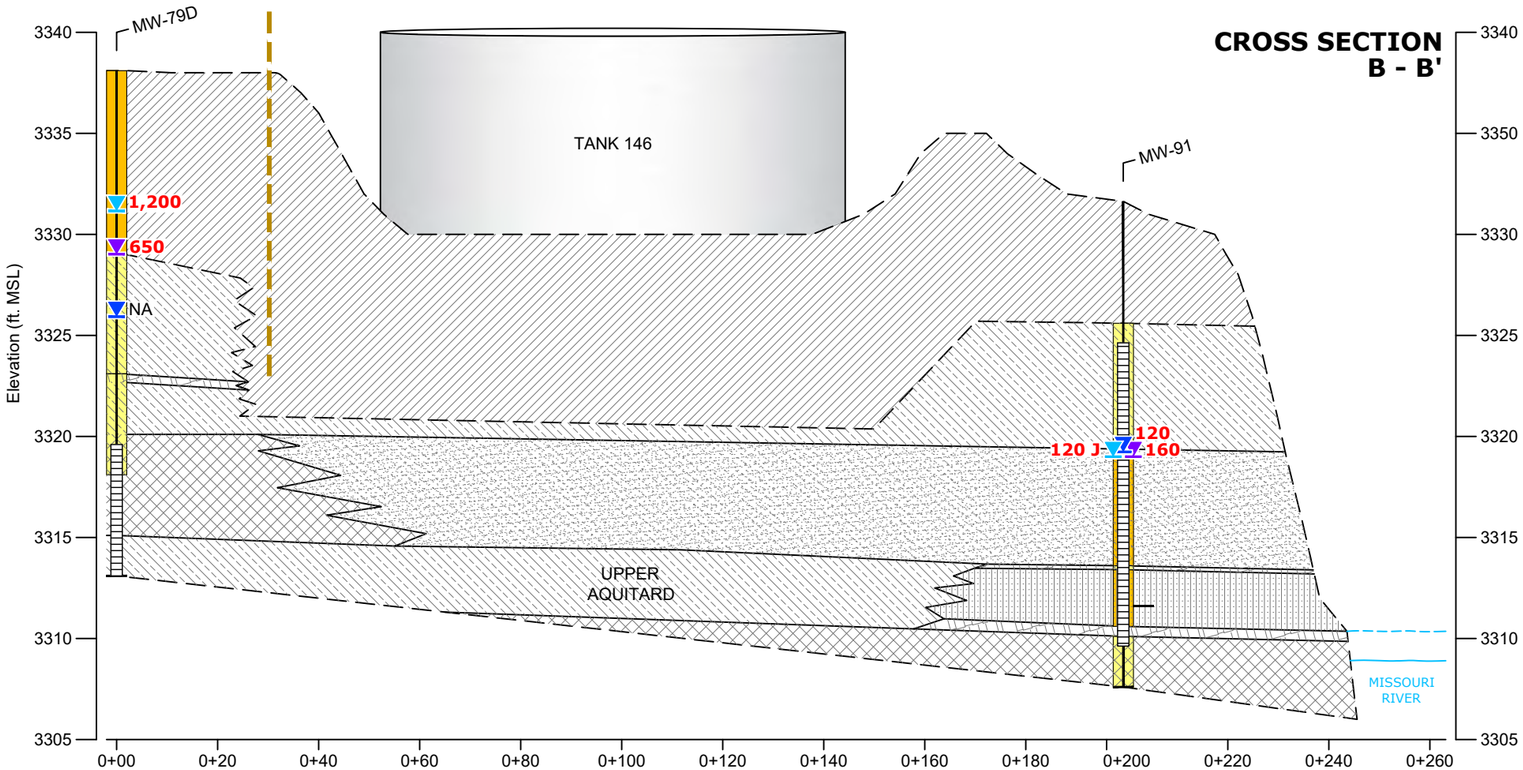
GEOLOGIC CROSS-SECTION A-A' - AOC-16 AREA

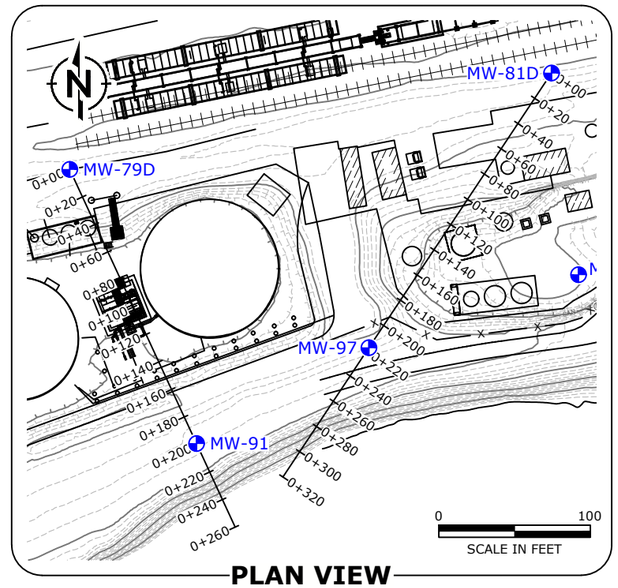
1690019871-002.

FIGURE
4

DRAFT

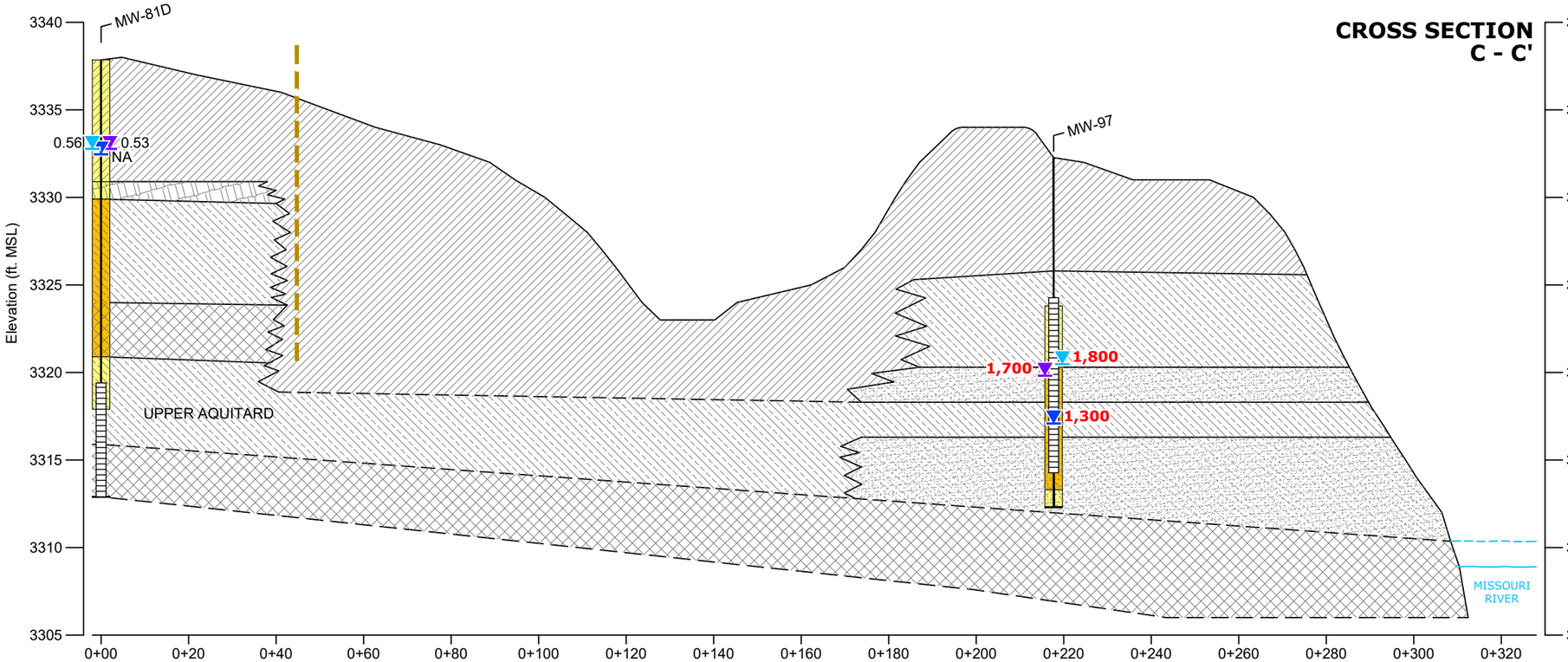
CROSS SECTION B - B'





PLAN VIEW

CROSS SECTION C - C'



LEGEND

- SAMPLE LOCATION END OF BORING
- LITHOLOGY CONTACT
- INFERRED LITHOLOGY UNIT BOUNDARY
- MONITORING WELL SCREEN INTERVAL
- FILL
- SANDSTONE
- BROWN SAND/ SANDSTONE
- DUSKY-RED SILTSTONE
- DUSKY-RED SILTSTONE WITH FINE SAND
- GRAY SILTSTONE
- WATER LEVEL (3Q20)
- WATER LEVEL (4Q20)
- WATER LEVEL (1Q21)
- 1,200 BENZENE RESULT (µg/L)
- 1,200 BENZENE RESULT EXCEEDS MDEQ-7 HUMAN HEALTH STANDARD SCREENING LEVEL OF 5 µg/L
- CORRUGATED SHEET PILE WALL
- SIGNS OF HC CONTAMINATION (STAINING/SHEEN/ODOR)
- SIGNS OF HC CONTAMINATION (ODOR)

Notes:
µg/L = microgram per liter
NA = not analyzed
J = datum estimated

FILE LOCATION:
L:\Loop Project
Files - Current\1690019871_Calumet_2021_RCRA\-002\05-06_Geologic Cross-Section BCD.dwg

DESIGNED BY: KC
DRAFTED BY: CKL
APPROVED BY: KC
DATE: 5/6/2021
DATE
SIGNATURE

RAMBOLL

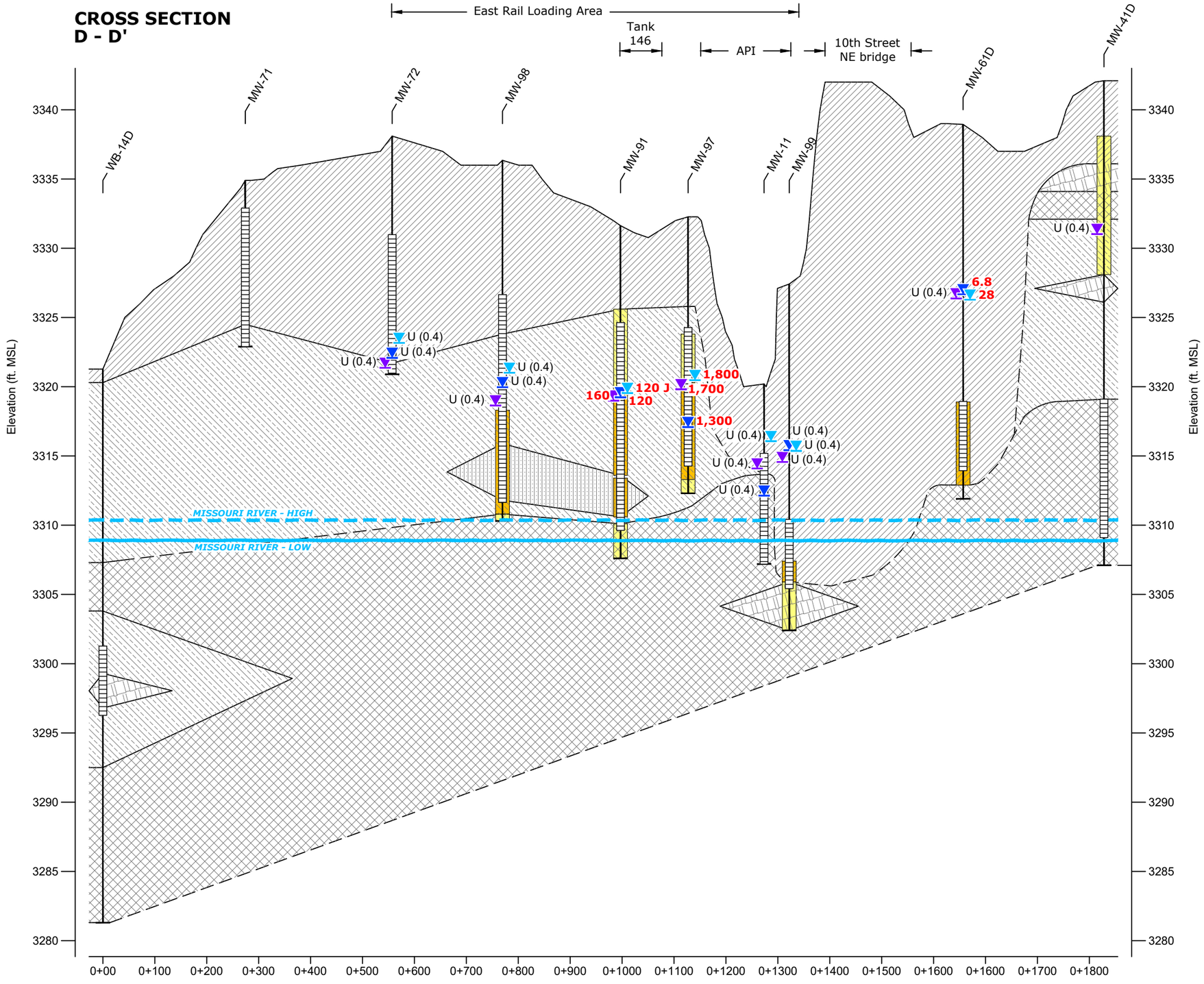
UPDATED CONCEPTUAL SITE MODEL (CSM) REPORT

GEOLOGIC CROSS-SECTION B-B' AND C-C' - EAST RAIL LOADING AREA

1690019871-002

FIGURE
5

CROSS SECTION
D - D'



LEGEND

- SAMPLE LOCATION END OF BORING
- LITHOLOGY CONTACT
- INFERRED LITHOLOGY UNIT BOUNDARY
- MONITORING WELL SCREEN INTERVAL
- FILL AND/OR NATIVE SANDY LITHOLOGY
- SANDSTONE
- BROWN SAND/SANDSTONE
- DUSKY-RED SILTSTONE WITH VARIOUS AMOUNTS OF FINE SAND
- GRAY SILTSTONE
- WATER LEVEL (3Q20)
- WATER LEVEL (4Q20)
- WATER LEVEL (1Q21)
- 1,200 BENZENE RESULT (µg/L)
- **1,200** BENZENE RESULT EXCEEDS MDEQ-7 HUMAN HEALTH STANDARD SCREENING LEVEL OF 5 µg/L
- SIGNS OF HC CONTAMINATION (STAINING/SHEEN/ODOR)
- SIGNS OF HC CONTAMINATION (ODOR)

Notes:

µg/L = microgram per liter

NA = not analyzed

J = datum estimated

U (0.4) = non-detect and associated reporting limit

API = Calumet Montana Refinery's American Petroleum Institute.

The water level of the Missouri River is based on fluctuation of water level at sand point well MW-43 in 2020 and 2021.

DRAFT

DATE

SIGNATURE

FILE LOCATION: L:\Loop Project Files\1690019871_Calumet_2021_RCRA\-002\05-06_Geologic Cross-Section BCD.dwg

DRAFTED BY: CKL

DESIGNED BY: KC

APPROVED BY: KC

DATE: 5/6/2021

RAMBOLL

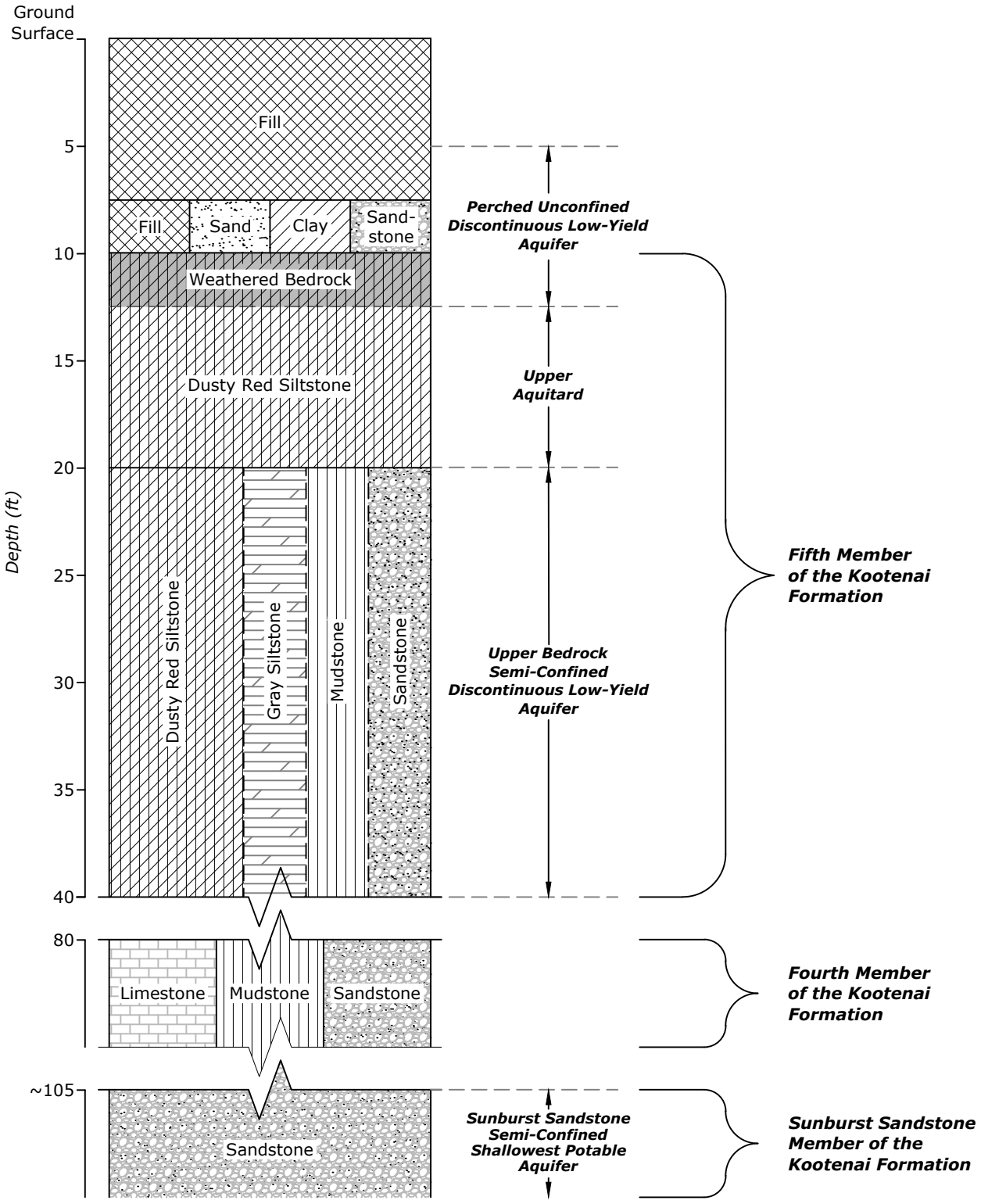
UPDATED CONCEPTUAL SITE MODEL (CSM) REPORT

GEOLOGIC CROSS-SECTION D-D' - ALONG THE MISSOURI RIVER

1690019871-002

FIGURE

6



Note:

i. The depths associated with each stratigraphic unit are approximate and intended to be illustrative of the geology encountered beneath the Calumet Montana Refinery.

RAMBOLL

CMR Lithology - Typical Stratigraphic Column Schematic

FIGURE **7**

DRAFTED BY: APR/CKL | DATE: 5/6/2021 | 1690019871

L:\Loop Project Files_CAD\1690019871_Calumet_2021_RCRA\-002\07_CMR Lith-Typ Stratigraphic Column Schematic.dwg

TABLES

Table 1
Stratigraphic Section for the Great Falls Area and CMR Hydrostratigraphy
Calumet Montana Refinery, LLC - Great Falls, Montana

Age		Lithology	Hydro-stratigrahpic unit[1]	Map Unit	Geologic Unit	Subunit	Description
N/A		Silt, Sand, Clay	Vadose Zone	N/A	Fill	---	Fill and/or reworked material at the CMR facility consists of gravels with varying amounts of sands, silts and clays. The material is hetergeneous and non-continuous, but overall grain size fines with depth from some gravels and sands to silts and clays.
Cenozoic	Pleistocene / Holocene	Silt, Sand, Clay	Perched Unconfined	Qgl	Glacial Lake Great Falls Deposits	---	Glacial lake deposits and reworked glacial lake deposits. Grayish-brown, yellowish-brown, and pale orange silt interbedded with very fine-grained sand and clay. Lake deposits are horizontally bedded and may be laminated. Unit also contains grayish-orange, yellowish-brown, and pale orange silt and very fine-grained sand of younger alluvial and colluvial deposits reworked from glacial lake deposits.
Mesozoic	Cretaceous	Mudstone Siltstone	Upper Aquitard / Upper Bedrock Semi-Confined	Kk5	Kootenai Formation	Fifth member	Red weathered mudstone and siltstone that contains lenses and beds of brownish-gray and greenish-gray, cross-bedded, micaceous sandstone, and light gray nodular limestone concretions. Lower part contains a dark-gray shale and lignite beds. Thickness approximately 230 ft.
		Limestone Sandstone Mudstone		Kk4		Fourth member	Upper: Brownish-gray limestone and interbedded shale. Lower: Dusky red to pale reddish-brown-weathering, fine to medium-grained, platy, thin- to medium-bedded sandstone interbedded with very dark reddish-brown mudstone that contains brackish water dinoflagellates. Thickness up to 200 ft.
		Sandstone	Sunburst Sandstone Semi-Confined	Kks		Sunburst Sandstone	Light yellowish-brown, well sorted, well cemented, resistant quartz sandstone with interspersed limonite specks. Sedimentary structures include cross bedding and ripple laminations. Thickness 50 ft.
		Mudstone				Second member[2]	Dark gray mudstone that grades downward into red mudustone. Exposed at Ryan Dam.
		Sandstone				Cutbank Sandstone	Moderately well sorted, coarse- to fine-grained sandstone with interspersed black, dark- and light-gray chert clasts. Incompletely exposed near Ryan and Moroney Dam.
	Jurassic	Mudstone	Lower Aquitard	Jm	Morrison Formation	---	Non-marine, varicolored, greenish-gray interbedded shale and siltstone with minor limestone and sandstone beds
		Sandstone		Jsw	Swift Formation	---	Interbedded light gray to light brown, calcareous quartz sandstone ("ribbon sands") and dark gray marine shale
Paleozoic	Mississipian	Limestone	Confined Madison	Mm	Madison Group	Charles Formation / Mission Canyon Fm / Lodgepole Formation	Light to medium gray, medium to thick bedded, cherty marine limestone

Notes: Not all geologic units shown have been encountered beneath Calumet Montana Refinery (CMR). In addition, some units from the Cenozoic have been excluded for a simplified stratigraphic column and are not indicated to be present at CMR.

1 Section 4.1.2 in the Updated Conceptual Site Model Report discusses the hydrostratigraphic units in more detail.

2 Walker (1974) interpreted the dark gray mudstone at Ryan Dam as the Morrison Formation, but Schwartz (2002) determinted that it is part of the Second member of the Kootenai Formation as mapped in adjacent quads (Vuke, 2000; Vuke and others, 2002).

= Unconformity

Sources: Below is a select list of sources referenced in the Geologic Map of the Great Falls North 30' x 60' Quadrangle, Central Montana (2002):

Burden, E.T., 1984, Terrestrial palynomorph biostratigraphy of the lower part of the Mannville Group (Lower Cretaceous), Alberta and Montana, in Stott, D.F., and Glass, D.J., eds., The Mesozoic of Middle North America: Canadian Society of Petroleum Geologists, Memoir 9, p. 249–270. [includes Kootenai Fm. in the Great Falls North quadrangle]

Lemke, R .W ., and E.K. M aughan, 1977. Engineering Geology of the City of Great Falls and Vicinity, Montana. USGS Miscellaneous Investigation Series Map I-1025.

Schwartz, R.K., 2002, Department of Geology, Allegheny College, Meadville, PA, personal communication.

Suttner, L .J ., 1969. S tratigraphic and Petrographic Analy sis of Upper Jurassic-Lower Cretaceous M orrison and Kootenai Formations, Southwest Montana. AAPG Bulletin v. 53, No. 7, p. 1391-1410. J uly 1969.

Vuke, S.M., 2000, Geologic map of the Great Falls South 30’ x 60’ quadrangle: Montana Bureau of Mines and Geology Open File Report MBMG 407, scale 1:100,000.

Vuke, S.M., Berg, R.B., Colton, R.B., and O’Brien, H.E., 2002, Geologic map of the Belt 30’ x 60’ quadrangle, central Montana: Montana Bureau of Mines and Geology Open File Report MBMG 450, scale 1:100,000.

Walker, T.F., 1974, Stratigraphy and depositional environments of the Morrison and Kootenai Formations of the Great Falls area, central Montana: Missoula, University of Montana, Ph.D. dissertation, 195 p.

Wilke, K.R . , 1983. Appraisal of Water in Bedrock Aquifers, Northern Cascade County , Montana. Montana Bureau of M ines and Geology M emoir 54. 22p. Plate.

Table 2
North River Road Area Lithology
Calumet Montana Refining, LLC -Great Falls, Montana

Unit #	Unit	Description	Indication of Hydrocarbons	Moisture	Start Depth (ft bgs)	Unit Thickness (ft)	Hydrostratigraphic Unit
1	Silty Sand	Mottling; roots; medium dense	Odor	Moist	Surface	3.5 - 6	Vadose Zone
2	Sandstone	Thinly bedded	Odor	---	3.5 - 6	2.5 - 3	Perched Unconfined
3	Weakly Laminated Siltstone with Sand	Mottling and/or weakly laminated; dense to very dense; gray color then transitions to dusky-red	Odor/Staining Dissipates with depth	Slightly moist	6 – 8	5 – 6	
4	Strongly Cemented Sandstone	Hard	None	Dry	12 – 14	2 – 4	Upper Aquitard
5	Mudstone/Siltstone	Varies in sand content; varies in color (dusky-red to gray); weakly laminated	None	Dry to slightly moist	16 – 19	1 - 3	
6	Siltstone/Shale	Mottling; medium dense to dense	None	Dry to slightly moist	18 – 23	> 2	Upper Bedrock Semi-Confined

Notes:
ft = feet
bgs = below ground surface

Table 3
Summary of Rock Outcrop Descriptions
Calumet Montana Refinery, LLC - Great Falls, Montana

Location	Geologic Unit	Subunit	Hydrostratigraphic Unit[1]	In-situ / Float	Lithology	Description
1	Kootenai Formation	Fifth member	Perched	In-situ	Siltstone/mudstone	Dusky-red, mottled, thinly-laminated, with various amounts of sand
2		Fifth member	Perched	In-situ	Siltstone/mudstone	Dusky-red, thinly-laminated, with various amounts of sand
3		Fifth member	Upper Aquitard	In-situ	Siltstone/mudstone	Dusky-red, mottled, thinly-laminated, with various amounts of sand
4		Fifth member	Upper Bedrock	In-situ	Siltstone/mudstone	Gray to dark gray, thinly-laminated, wet
5		Fifth member	Upper Bedrock	Unknown	Siltstone/mudstone	Gray to dark gray, beneath soil horizon, moist
6		Fifth member	Upper Bedrock	In-situ	Siltstone/mudstone	Gray to dark gray, yellow mottling, thinly-laminated
7		Fifth member	--	Float	Sandstone	Gray, strongly-lithified, thinly-bedded
8		Fifth member	--	Float	Siltstone/mudstone	Red, thinly-laminated
9*		Fifth member	--	In-situ	Cross-section of various units of siltstone, mudstone, and sandstone	
10		Fifth member	--	In-situ	Sandstone	Gray, strongly-lithified, cross-bedded
11		Fifth member	--	In-situ	Siltstone	Maroon, thinly-bedded, various amounts of fine sand
12		Fourth member	--	In-situ	Crystalline limestone	Gray, coarse-grain, crystalline, jointing
13		Fifth member	--	In-situ	Siltstone	Maroon, thinly-bedded, various amounts of fine sand
14		Fifth member	--	In-situ	Sandstone	Gray, thinly-bedded
15		Fifth member	--	In-situ	Siltstone	Maroon, thinly-laminated, mottled various amounts of fine sand

Notes:

* Rock outcrop exposed beneath 15th Street Bridge had multiple geologic units present.

1 Monitoring well screen intervals are identified as the following: "perched" unconfined wells, "upper bedrock" semi-confined wells, or cross-connected wells. The perched and upper bedrock units are seperated by an shallow aquitard (i.e. a dry dusky-red unit composed primarly of silts and clays). Some monitoring wells and/or piezometers have unknown screen intervals and, therefore, the hydrostratigrahpic unit was listed as unknown.

APPENDIX A
Boring Logs

- MW-11 – screened in both the Perched and Upper Bedrock Saturated Zones
- MW-41D – screened in the Upper Bedrock Semi-Confined Saturated Zone
- MW-61S – screened in the Perched Saturated Zone
- MW-61D – screened in the Perched Saturated Zone
- MW-62 – screened in both the Perched and Upper Bedrock Saturated Zones
- MW-71 – screened in the Perched Saturated Zone
- MW-72 – screened in the Perched Saturated Zone
- MW-7D – screened in the Perched Saturated Zone
- MW-81D – screen in the Upper Bedrock Semi-Confined Saturated Zone
- MW-98 – screened in both the Perched and Upper Bedrock Saturated Zones
- MW-99 – screened in the Perched Unconfined Saturated Zone
- MW-105 – screened in the Perched Saturated Zone
- WB-14D – screened in the Upper Bedrock Semi-Confined Saturated Zone

MONTANA REFINING COMPANY
GROUNDWATER WELL INSTALLATION REPORT

DWG No. 66-A-267 MRC Well No. MW #11 State Well No. _____
Project RFI Location API (SWME #4)
Project No. _____ Installed By R. HAHN Date 6/1/2000 Time 14:30
Easting -28.40 Northing -764.99 Zone 12 Elevation 3300.19
SECTION 1 TOWNSHIP 20 N RANGE 3 E
Method of Installation HOLLOW STEM AUGER
MOBILE B-59

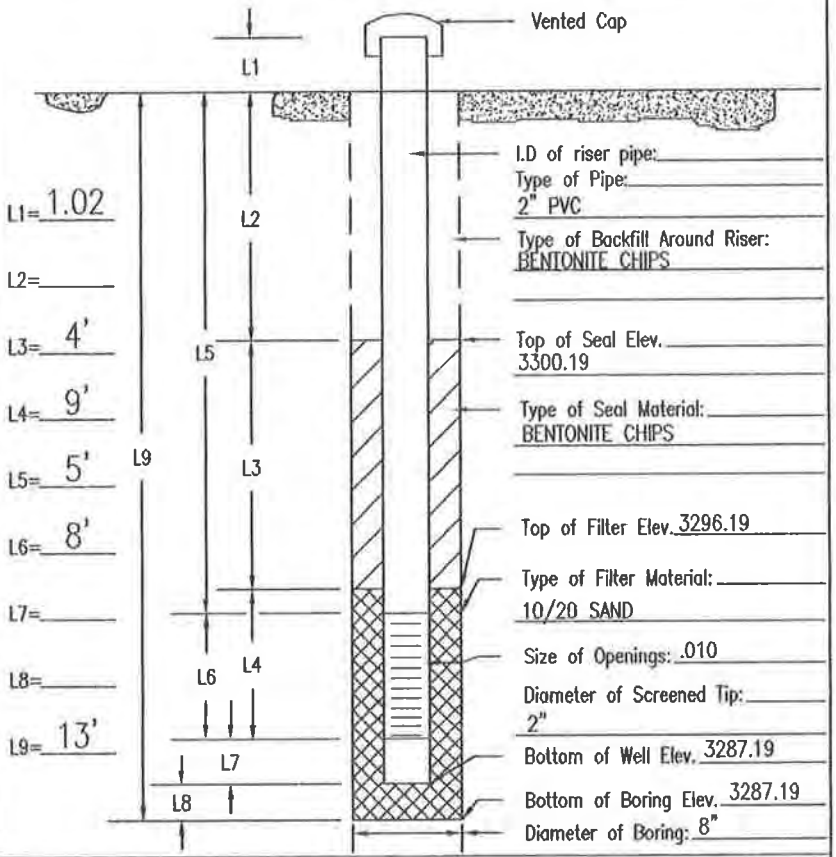
LOG OF BORING AND WELL

BORING

Depth in ft.	Graphic Log	Description	H-Nu Reading
2.5'		CL, LEAN CLAY, SOFT, MOIST, REDDISH GRAY BROWN	
5'			
7.5'			
10'		SHALE, DRY HARD, GLEY1 6/10GY @ 10.75' GREEN	
12.5'		COMP BEDROCK @ 12'	

OBSERVATION WELL INFORMATION

Type of Well: MONITORING WELL 2" PVC
Ground Elev. 3300.19 Top of Riser Elev. 3301.50



Remarks:

Prepared By: R. HAHN
Logged By: DAVE FISHBAUGH
DRILLER: #042
Drilling Company: BOLAND DRILLING

C:\DWG\RFI\WELLS\66-A-267.dwg Thu Apr 12 10:11:02 2001

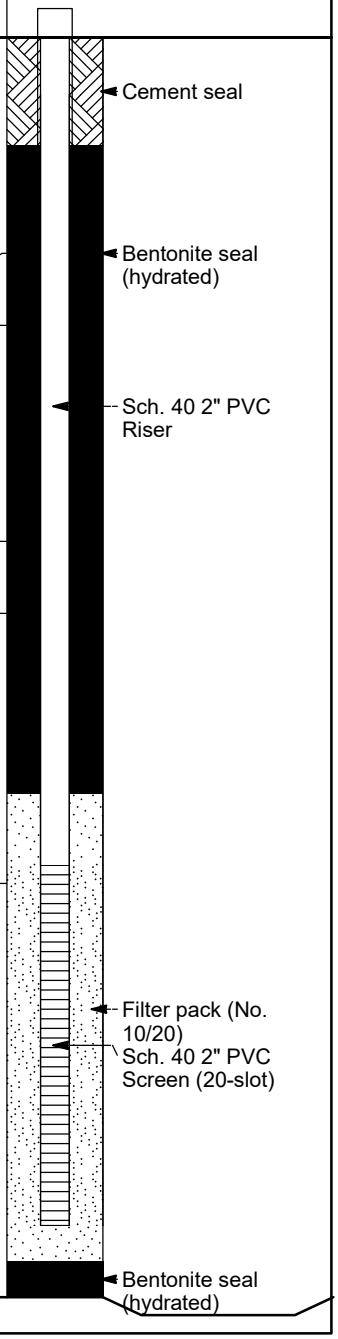
Ramboll
1560 Broadway Suite 1905
Denver, CO 80202
Telephone: 303-382-5460

WELL ID: **MW-41D**
BORING NUMBER: **MW-41D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME MW Install; AOC-16 Interim Measures Design
PROJECT NUMBER 1690017652; 1690014124-003
PROJECT LOCATION Great Falls, MT
DATE STARTED 6/18/20 **COMPLETED** 6/18/20
LOGGED BY Brooks Bailey **CHECKED BY** Kit Carson
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear LS250 MiniSonic
NORTHING Not Measured **EASTING** Not Measured
DRILLER Aaron Bradley
TOTAL BORING DEPTH 35 ft bgs **BOREHOLE SIZE** 4.5 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 33 ft bgs **SCREEN INTERVAL** 23-33 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION
0						
		14.1				(SM) **SILTY FINE SAND (FILL)**, dusky red (10R 3/3) with grayish brown mottling, some clay, moist, medium dense, low plasticity, rootlets throughout.
5		82.8				(SP) **FINE TO VERY FINE SAND (FILL)**, pale brown (10YR 6/3), trace fines, soft, moist, loose, hydrocarbon odor increasing in strength with depth toward uderlying sandstone.
		390				6.0 **LITHIFIED SAND**, gray (10YR 5/1), competent, thinly bedded.
		118.7				8.0 (SM) **FINE TO VERY FINE SAND AND SILT**, gray (10YR 5/1), brownish yellow mottling, hard to firm, slightly moist, weakly laminated, hydrocarbon odor.
10		322				(SP) **VERY FINE SAND**, little silt, dusky red (10R 3/3), medium dense to dense, dry to slightly moist, hydrocarbon odor dissipating in strength with depth.
		106				
		23				
		1.6				14.0 (SP) **VERY FINE SAND**, gray (10YR 6/1), very hard, dry, dense, strongly cemented, no hydrocarbon odor.
15		1.7				
		1.7				16.0 (SM) **VERY FINE SAND AND SILT**, dusky red (10R 3/3), dense, dry, weakly laminated.
		0.5				
20		0.6				(ML) **SILT**, dusky red (10R 3/3), trace very fine sand, firm to hard, dry, weakly laminated.
		0.9				(ML) **SAME AS ABOVE**, intermixed with gray (10YR 6/1), dry to slightly moist.
						23.5 (ML) **SILT**, gray (10YR 6/1), trace orangish brown mottling, firm, medium dense.
25		0.6				
		0.5				
30		0.6				
		0.5				
		0.3				
35						

Bottom of borehole at 35.0 feet.



Lithology Log Sheet 1 of 3

LOCATION ID: MW-61

Project Name: AOC 16 Groundwater Investigation	Project Number: 477-018-002	Site ID: Calumet Refinery, Great Falls, MT	
Drilling Company: Boland Environmental Drilling	Driller:	Ground Elevation:	Total Drilled Depth: 27 feet-bgs
Drilling Equipment: CME Truck Mount Rotary Rig	Drilling Method: Hollow Stem Augers	Borehole Diameter: 10"	Date/Time Drilling Started: 6-Apr-17
			Date/Time Total Depth Reached: 6-Apr-17
Type of Sampling Device: Split-Spoon		Water Level (bgs): First 3 feet-bgs	Final
Sample Hammer: Type Safety Hammer; 140 lbs; Driving Weight; Drop = 30"		Geologist: W. Coles	Checked by/Date
Location Description (include sketch in field logbook)			

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	ASTM Code	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
0				Concrete Pavement							
0.5											
1				Brown and black, silty clayey, gravelly, fine to coarse grained SAND, damp to wet, no odor.							
2											
3											
4											
5				Gray, fine grained sandy, silty CLAY, damp, hard, no staining, no odor.							
6				Gray, fine grained SAND, some silt and gravel, damp to moist, no staining, no odor.							
7				Gray, clayey, gravelly, fine to coarse grained SAND, moist, no staining, no odor.							
8											
9											
10											

Trihydro CORPORATION

Lithology Log (continued) Sheet 2 of 3

LOCATION ID: MW-61

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	ASTM Code	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
10				Same as above.							
11				Brown SANDSTONE, friable, no staining, no odor.							
12											
13											
14											
15											Wet @ 15' bgs
16											Void encountered at 16' bgs. Void filled using washed pea gravel and sand and some bentonite chips.
17											
18											
19											
20				Brown SANDSTONE, fractured, friable, black staining, hydrocarbon odor.							
21											
22											
23											

Trihydro CORPORATION

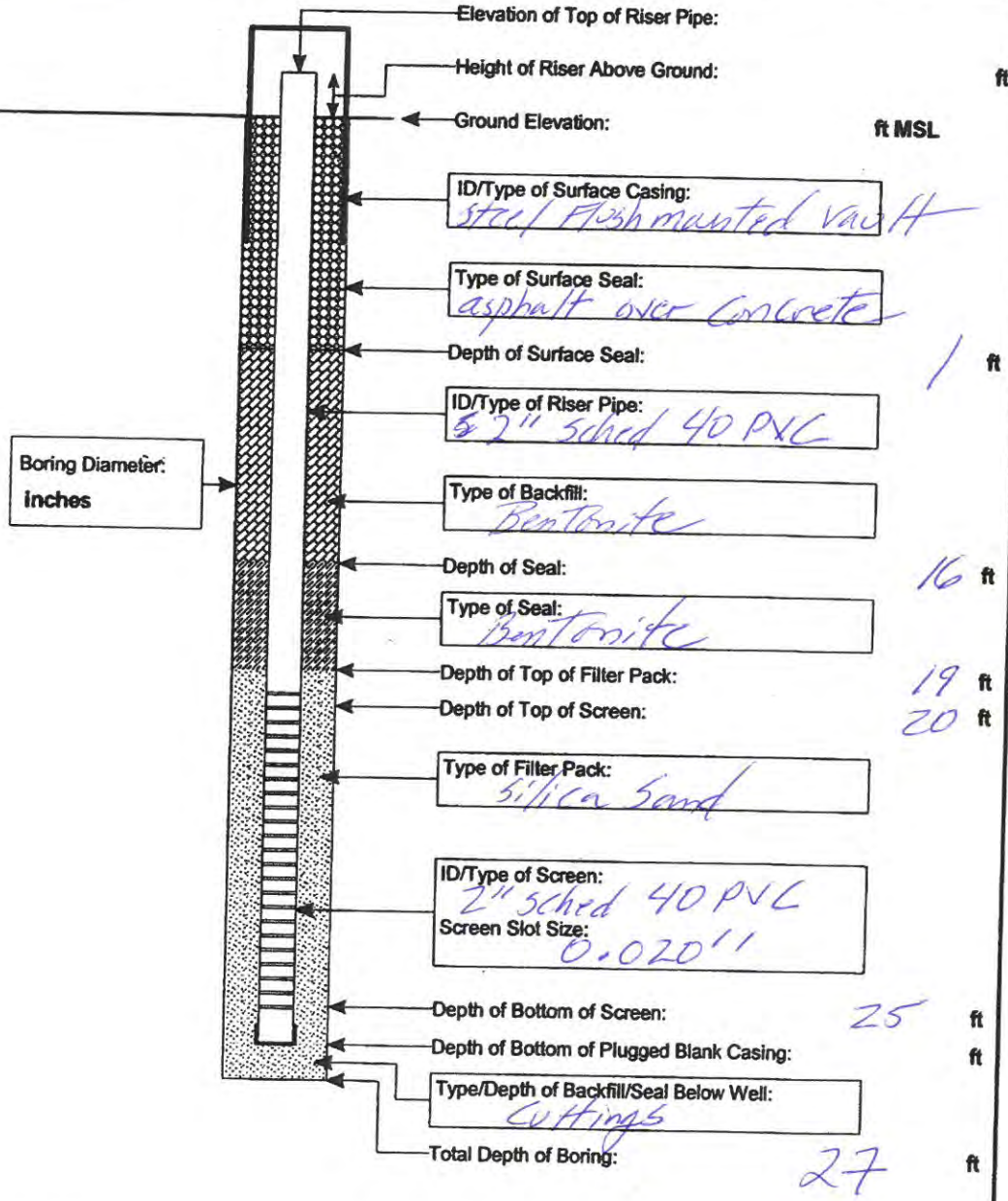
Lithology Log (continued) Sheet 3 of 3

LOCATION ID: MW-61

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	ASTM Code	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
23				Same as above.							
24											
25											
26				Gray Mudstone, laminated bedding, no staining, no odor.							
27				TD @ 27' bgs. Deep Well installed @ 25' bgs Shallow Well installed @ 15.5' bgs							
28											
29											
30											
31											
32											
33											
34											
35											
36											

Project: AOC 16, Interim Measures Project Location: Great Falls, MT Project Number: 477-018-002	**MONITORING WELL CONSTRUCTION LOG FOR MW-61D**

Well Location MW-61		Date(s) Installed 4-6-17	Time
Installed By Boland Drilling	Observed By W. Coles	Total Depth 27'	
Method of Installation Hollow Stem Auger			
Screened Interval 20'-25'	Completion Zone		
Remarks Nested Pair - Deep Well			



NOTE: DIAGRAM IS NOT TO SCALE

Trihydro CORPORATION

Report: ENV_WELL_CONSTR_ABOVE_GROUND; File: DUMMY.GPJ; 11/2/2001 1

Lithology Log Sheet 1 of 3

LOCATION ID: MW-62

Project Name: AOC 16 Groundwater Investigation	Project Number: 477-018-002	Site ID: Calumet Refinery, Great Falls, MT	
Drilling Company: Boland Environmental Drilling	Driller:	Ground Elevation:	Total Drilled Depth: 31 feet-bgs
Drilling Equipment: CME Truck Mount Rotary Rig	Drilling Method: Hollow Stem/Air Rotary	Borehole Diameter: 10" / 8"	Date/Time Drilling Started: 6-Apr-17
			Date/Time Total Depth Reached: 6-Apr-17
Type of Sampling Device: Split-Spoon, observed cuttings		Water Level (bgs): First feet-bgs	Final
Sample Hammer: Type Safety Hammer; 140 lbs; Driving Weight; Drop = 30"		Geologist: W. Coles	Checked by/Date
Location Description (include sketch in field logbook)			

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	ASTM Code	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
0											
0.3				Asphalt Pavement							
				Sub-base/road-base							Dry borehole, no groundwater encountered during drilling.
1											
1.5											
2				Brown fine to medium grained SAND, moist, no staining, no odor.							
3				Red SHALE, weathered, dry, no odor							Air rotary drilling used after 5' bgs
4											
5				Red SHALE, competent, dry, no odor							
6											
7				Red SHALE, competent, dry, slight hydrocarbon odor							
8											
9											
10											

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Lithology Log (continued) Sheet 2 of 3

LOCATION ID: MW-62

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	ASTM Code	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
10				Same as above.							
11											
12				Red SHALE, competent, dry, no odor							
13											
14											
15											
16											
17											
18											
19											
20				Gray, grading to black SANDSTONE, dry, no staining, no odor.							
21											
22											
23											

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Lithology Log (continued) Sheet 3 of 3

LOCATION ID: MW-62

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	ASTM Code	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
23				Same as above.							
24											
25											
26											
27											
28											
29											
30											
31				TD @ 31' bgs. Deep Well installed @ 31' bgs No Shallow Well was installed							
32											
33											
34											
35											
36											

Lithology Log Sheet 1 of 2

LOCATION ID
MW-71

Project Name	Project Number	Site ID
West Rail Remediation	477-019-001	Calumet Refinery, Great Falls, MT

Drilling Company	Driller	Ground Elevation	Total Drilled Depth
Boland Environmental Drilling			12 feet-bgs

Drilling Equipment	Drilling Method	Borehole Diameter	Date/Time Drilling Started	Date/Time Total Depth Reached
CME-45 Track Mounted HAS	Hollow Stem Auger	10"	21-Jun-17	21-Jun-17

Type of Sampling Device	Water Level (bgs)
Cuttings	First Dry feet-below TOC Final

Sample Hammer		Geologist	Checked by/Date
Type	140 lbs Driving Weight Drop =	P. Hildebrandt	

Location Description (include sketch in field logbook)

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	ASTM Code	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
0				Top Soil							
1				Clay - trace silt; plastic; moist; dark brown							No hydrocarbon odor
2											
3											
4											
5											
6											
7											
8											
9				Sand, f-grained; trace m-sand; minor silt; damp; medium brown							No hydrocarbon odor
10											

Lithology Log (continued) Sheet 2 of 2

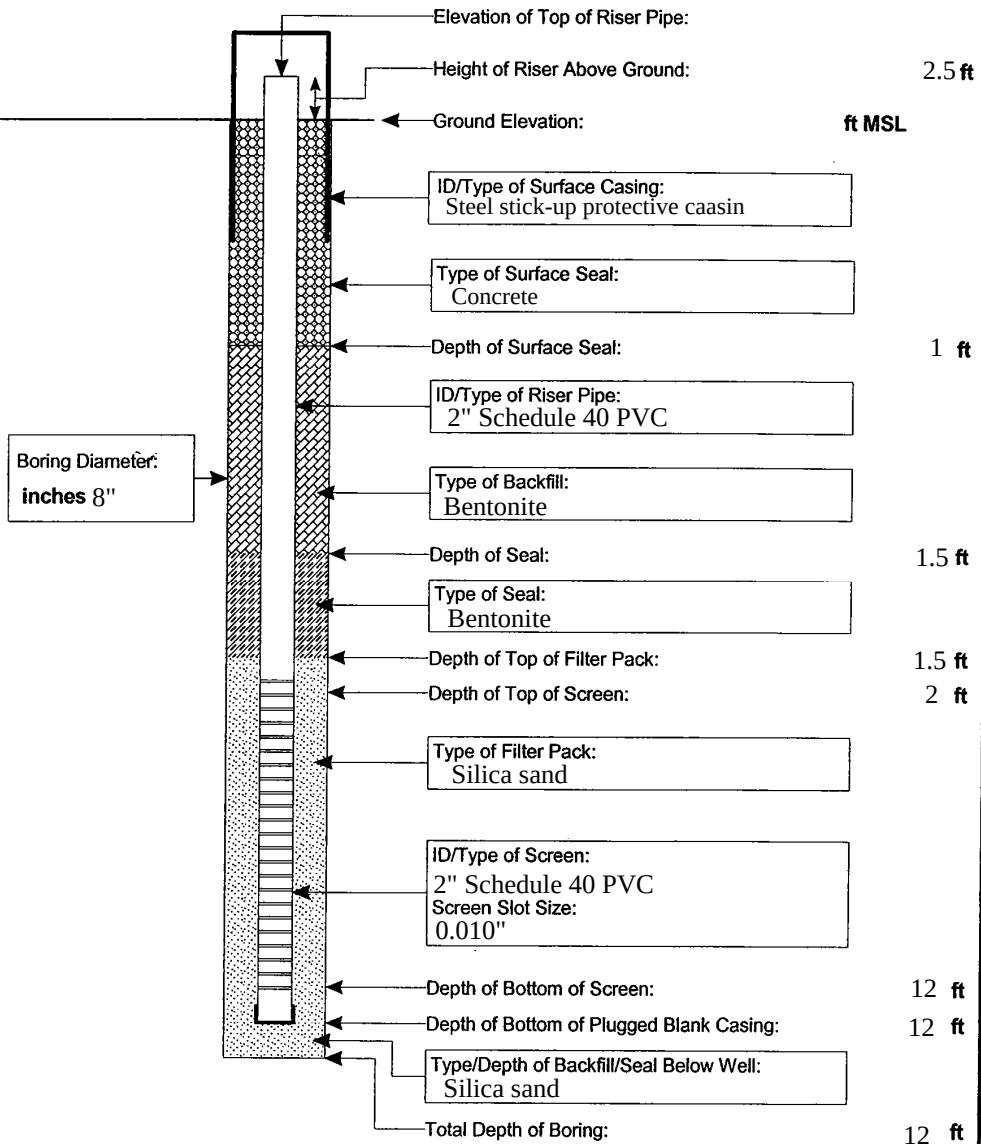
LOCATION ID: MW-71

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	ASTM Code	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
10				As above							No hydrocarbon odor
11				Shale; weathered; dry; red							No hydrocarbon odor
12				Refusal at bedrock (12' bgs) TD @ 12' bgs Well installed @ 12' bgs							
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											

Project: West Rail Remediation
Project Location: CMR - Great Falls, Montana
Project Number: 477-019-001

MONITORING WELL CONSTRUCTION LOG FOR

Well Location MW-71	Date(s) Installed 6/21/2017	Time 1100
Installed By Borland Drilling	Observed By Paul Hildebrandt	Total Depth 12-ft
Method of Installation Hollow Stem Auger - CME-45 Track mounted		
Screened Interval 2 - 12-feet bgs	Completion Zone	
Remarks		



NOTE: DIAGRAM IS NOT TO SCALE

Report: ENV_WELL_CONSTR_ABOVE_GROUND; File: DUMMY.GPJ; 11/2/2001 1

Trihydro CORPORATION

Lithology Log Sheet 1 of 2

LOCATION ID
MW-72

Project Name	Project Number	Site ID
West Rail Remediation	477-019-001	Calumet Refinery, Great Falls, MT

Drilling Company	Driller	Ground Elevation	Total Drilled Depth
Boland Environmental Drilling			17.25 feet-bgs

Drilling Equipment	Drilling Method	Borehole Diameter	Date/Time Drilling Started	Date/Time Total Depth Reached
CME-45 Track Mounted HAS	Hollow Stem Auger	8"	22-Jun-17	22-Jun-17

Type of Sampling Device	Water Level (bgs)	
Split spoon	First Dry feet-below TOC	Final

Sample Hammer		Geologist	Checked by/Date
Type	140 lbs Driving Weight Drop =	Grant Price	

Location Description (include sketch in field logbook)

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	ASTM Code	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
0				Pot-holed with hydro-knife; no description							
1											
2											
3											
4											
5											
6											
7											
8				Gravel - f-m w/sand and clay; saturated; medium brown							No hydrocarbon odor
9				Sand, f-grained; silty; moist to wet; medium to dark brown							No hydrocarbon odor
10											

Lithology Log (continued) Sheet 2 of 2

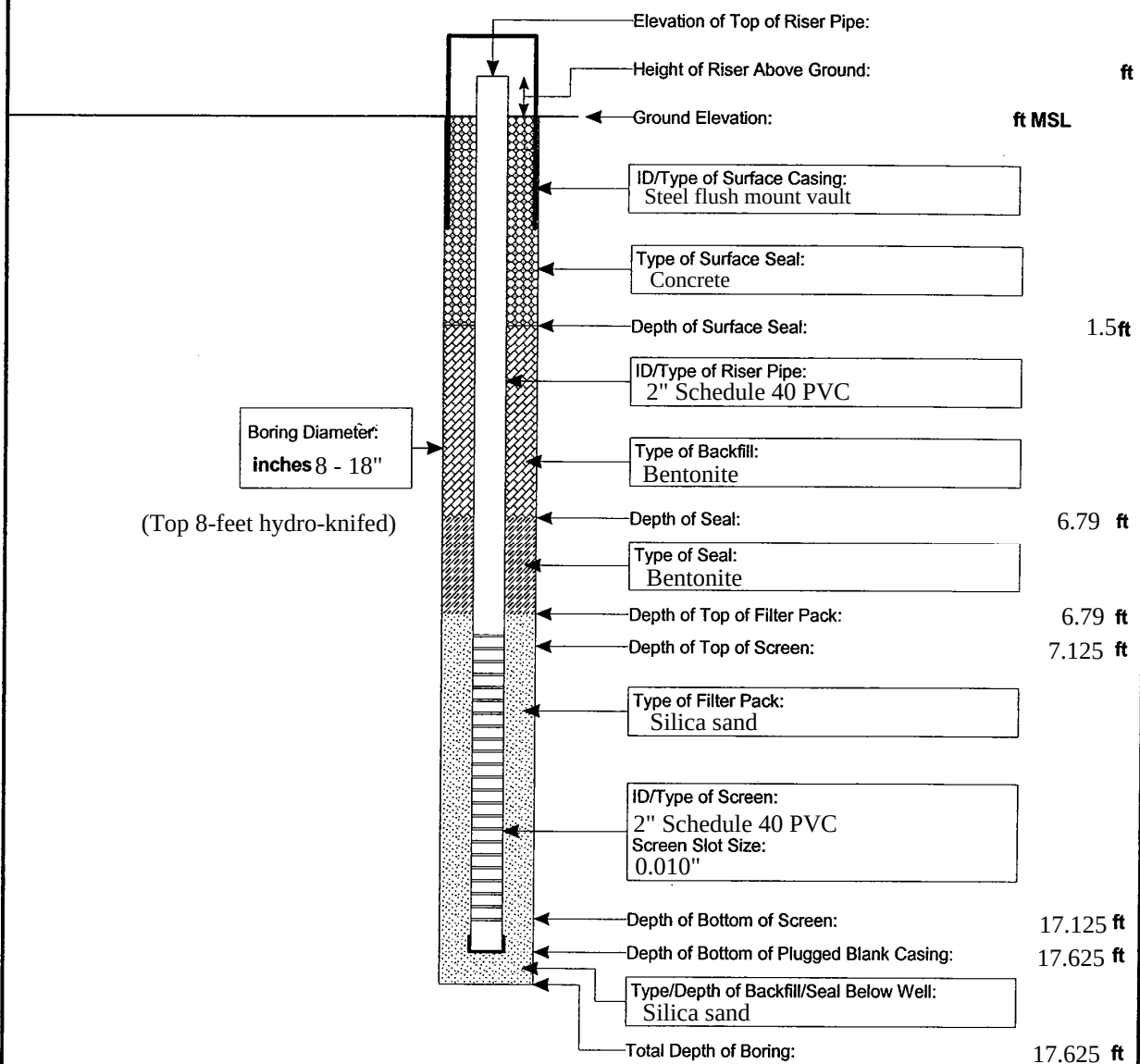
LOCATION ID: MW-71

Depth	Interval	Recovery	Blow Counts	Description (Include lithology, grain size, sorting, angularity, Munsell color name & notation, minerology, bedding, plasticity, density, consistency, etc., as applicable)	ASTM Code	Lithology	Water Content	Estimate % of Gr	Sa	Fi	Remarks (Include all sample types & depth, odor, organic vapor measurements, etc.)
10											
11				Sand, f-grained; silty; clayey; moist to wet; medium brown							No hydrocarbon odor
12											
13				Sand, f-grained; silty; damp to moist; medium to dark brown							No hydrocarbon odor
14											
15				Sand, f-grained; some gravel; trace clay; damp; medium gray							No hydrocarbon odor
16				Sand, f-grained; some silt and clay; damp to moist; light brown w/Fe staining							No hydrocarbon odor
17				Shale w/silt; reddish medium brown; very dense; very hard; dry to damp							No hydrocarbon odor
18				Refusal at bedrock (17.25' bgs) TD @ 17.25' bgs							
19											
20											
21											
22											
23											

Project: West Rail Remediation
Project Location: CMR - Great Falls, Montana
Project Number: 477-019-001

MONITORING WELL CONSTRUCTION LOG FOR

Well Location MW-72	Date(s) Installed 6/22/2017 Time 1030	
Installed By Borland Drilling	Observed By Paul Hildebrandt	Total Depth 17.625-ft
Method of Installation Hollow Stem Auger - CME-45 Track mounted		
Screened Interval 7.125 - 17.125-feet bgs	Completion Zone	
Remarks		



NOTE: DIAGRAM IS NOT TO SCALE

Trihydro CORPORATION

Report: ENV_WELL_CONSTR_ABOVE_GROUND; File: DUMMY.GPJ; 11/2/2001 1

Ramboll
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WELL ID: **MW-79S/D**
BORING NUMBER: **EB-01**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/7/19 **COMPLETED** 6/8/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3338.1 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197996.931 **EASTING** 1525905.834
DRILLER James Richardson
TOTAL BORING DEPTH 25 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH Not Measured **SCREEN INTERVAL** 5-15 ft/18.5-25
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
	5	216.8	CMR-EB01-0.5-1.0			(CL) **SILTY CLAY**, sub-rounded to sub-angular gravel, brown, soft, plastic, moist, slight hydrocarbon odor.		Cement seal
		4175						
						2.5	3335.6	
		4135				(SW) **GRAVELLY SAND**, black, sub-rounded to sub-angular gravel, loose, moist, strong hydrocarbon odor, staining.		Bentonite seal
						3.5	3334.6	
5			CMR-EB01-4.0-5.0			(CL) **CLAY**, black, trace sub-angular gravel, trace silt, soft, plastic, moist, strong hydrocarbon odor, staining. (CL) **AS ABOVE**, light gray, some black staining.		
						5.5	3332.6	
	5	4360				(CL) **SILTY CLAY**, light gray, some mottling, very stiff, slightly moist, strong hydrocarbon odor.		
		4359						
		4322				(CL) **AS ABOVE**, dark gray, red and yellow mottling.		
						9.0	3329.1	
10		3539				(CL) **SILTY CLAY**, dusky-red, laminated silts and clays, medium stiff, slightly moist to dry, hydrocarbon odor. (CL) **AS ABOVE**, moist.		Filter sand Sch. 40 PVC screen (MW-79S)
		258.4						
	4.5	380.5						
						14.0	3324.1	
15		800	CMR-EB01-14.0-15.0			(CL) **SILTY CLAY**, light dusky red to light brown, laminated silts and clays, stiff, moist, hydrocarbon odor.		
						15.0	3323.1	
		176.1				(CL) **SILTY CLAY**, dusky-red, 3-4" diameter very fine sandstone cobbles at 15 ft bgs, very dense, cemented, angular to sub-rounded, cross-bedded, carbonate precipate, very stiff, moist, hydrocarbon odor.		Bentonite seal
	5	107.9						
						18.0	3320.1	
20		132.5				(CL) **SILTY CLAY**, light gray, yellow and dusky-red mottling, plastic, moist, hydrocarbon odor.		
						20.0	3318.1	
		17.1				(CL) **SILTY CLAY**, light gray, some yellow mottling, slightly laminated, soft to medium stiff, dry to moist, no odor. (CL) **AS ABOVE**, wet seam.		Filter sand
		11.1						Sch. 40 PVC screen (MW-79D)
						(CL) **AS ABOVE**, wet seam.		
						23.0	3315.1	
		4.5				(CL) **SILTY CLAY**, dusky-red, laminations, medium stiff, dry, no odor.		
25						25.0	3313.1	

Bottom of borehole at 25.0 feet.

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WELL ID: **MW-81S/D**
BORING NUMBER: **EB-06D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/8/19 **COMPLETED** 6/8/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3337.85 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1198060.473 **EASTING** 1526223.724
DRILLER James Richardson
TOTAL BORING DEPTH 25 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH Not Measured **SCREEN INTERVAL** 5-17 ft/ 19-25 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0							
	5	21.9				(CL-ML) **SILTY CLAY**, medium gray to brown, trace fine-grained sand, trace sub-angular gravel, plastic, cohesive, moist, hydrocarbon odor.	Cement seal
		274.8				2.5 3335.4 (CL-ML) **SILTY CLAY**, gray, trace sub-angular to sub-rounded loose sand, plastic, cohesive, moist, strong hydrocarbon odor.	Bentonite seal
5		601				4.5 3333.4 5.0 3332.9 (SM) **SILTY SAND**, dark gray, some clay, very fine grain, sub-angular, very dense, very stiff, dry, hydrocarbon odor.	
	5	169.9				(CL-ML) **SILTY CLAY**, gray, trace sub-angular to sub-rounded sand, plastic, cohesive, moist, hydrocarbon odor.	
		1112				7.0 3330.9 (CL-ML) **AS ABOVE**, light brown, strong hydrocarbon odor.	
		654.2				8.0 3329.9 **SANDSTONE**, dark gray, very fine grain, very dense, competent, dry.	
10						(CL-ML) **SILTY CLAY**, light gray, mottling, some black staining, very stiff, dry, hydrocarbon odor. (CL-ML) **AS ABOVE**, dusky-red, no staining.	Filter sand
	5	490.3				(CL-ML) **AS ABOVE**, weakly laminated.	Sch. 40 PVC screen (MW-81S)
		395				(CL-ML) **AS ABOVE**, rust red, stiff, strongly laminated.	
15		372				15.0 3322.9 (CL-ML) **SILTY CLAY**, light reddish brown, some dark gray laminated silt and very fine sand, stiff, dry, very slight hydrocarbon odor.	
		0					
		352.3				17.0 3320.9 (CL-ML) **AS ABOVE**, some gray clay interbedded with red silt and clay, light yellow staining, slightly laminated, slightly moist.	
	5					(CL-ML) **SILTY CLAY**, light reddish brown, interbedded with competent and dark gray laminated silts and very fine sands, soft, dry, slight hydrocarbon odor.	Bentonite seal
		4.3					
20		0				20.0 3317.9 (CL-ML) **SILTY CLAY**, dusky-red, some mottling, medium stiff, weakly laminated, moist, no odor.	
						22.0 3315.9	Filter sand
	4.5					(ML) **SANDY SILT**, light gray, some mottling, medium stiff, very fine sand, weakly laminated, dry to slightly moist, no odor.	Sch. 40 PVC screen (MW-81D)
		0					
25						25.0 3312.9	

Bottom of borehole at 25.0 feet.

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WELL ID: **MW-97**
BORING NUMBER: **MW-97**

CLIENT Calumet
PROJECT NAME Monitoring Well Installation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, MT
DATE STARTED 4/17/19 **COMPLETED** 4/17/19
LOGGED BY Joel Krech **CHECKED BY** Michael Eddings/Aaron Hach
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3332.271 ft **TOC ELEVATION** 3332.12 ft
DRILLING EQUIPMENT Boart Longyear 10' Stroke Sonic
NORTHING 1197879.27 **EASTING** 1526103.25
DRILLER Travis Ratliff
TOTAL BORING DEPTH 20 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 18 ft bgs **SCREEN INTERVAL** 8-18 ft
SAMPLING METHOD Continuous Sampler
GROUNDWATER LEVEL AT TIME OF DRILLING 16.0 ft bgs

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**VACUUM EXCAVATION - NO RECOVERY**	Cement Grout
	0						2" PVC Riser
5							Bentonite Chips
						6.5 3325.8	
	3.5	0				(CL) **CLAY**, dusky red (2.5YR 3/2), stiff to very stiff, plastic, dry.	
		0				(CL) **AS ABOVE**, slight hydrocarbon odor.	
10		89.1				12.0 3320.3	
	5	38.6				(SP-SC) **CLAYEY SAND**, very dark gray (2.5Y 3/1), sheen, very fine to fine grain, rounded, loose, moist, strong hydrocarbon odor.	10/20 Silica Filter Pack
		66.5				14.0 3318.3	2" PVC Screen, 0.010" Slot Size
15		26.9	CMR-SB97-15-16	▽		(CL) **SANDY CLAY**, dusky red (2.5YR 3/2), black (2.5Y 2.5/1) fine sand, stiff to very stiff, plastic, dry, strong hydrocarbon odor.	
		1388				16.0 3316.3	
	5	875.3				(SP-SC) **CLAYEY SAND**, black (2.5Y 2.5/1), sheen, very fine to fine grain, rounded, loose, wet, strong hydrocarbon odor.	
						18.0 3314.3	
		171.8				(SP-SM) **CLAYEY SAND**, reddish gray (2.5 YR 5/1), staining, very fine to fine grain, rounded, dense, dry, hydrocarbon odor.	Sand backfill
20		123.1				(SP-SC) **AS ABOVE**, dark reddish brown (2.5YR 3/3), slight hydrocarbon odor. 20.0 3312.3	

Bottom of borehole at 20.0 feet.

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Telephone: 303-382-5482

WELL ID: **MW-98**
BORING NUMBER: **MW-98**

CLIENT Calumet
PROJECT NAME Monitoring Well Installation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, MT
DATE STARTED 4/15/19 **COMPLETED** 4/15/19
LOGGED BY Joel Krech **CHECKED BY** Michael Eddings/Aaron Hach
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3336.349 ft **TOC ELEVATION** 3336.08 ft
DRILLING EQUIPMENT Boart Longyear 10' Stroke Sonic
NORTHING 1197773.49 **EASTING** 1525766.19
DRILLER Travis Ratliff
TOTAL BORING DEPTH 26 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 25 ft bgs **SCREEN INTERVAL** 10-25 ft
SAMPLING METHOD Continuous Sampler
GROUNDWATER LEVEL AT TIME OF DRILLING 20.0 ft bgs

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0						**VACUUM EXCAVATION - NO RECOVERY**		Cement Grout
	0							
5								2" PVC Riser
								Bentonite Chips
						6.0	3330.3	
		0.2				(CL) **CLAY**, brown (7.5YR 4/2), some fine sand, medium stiff, plastic, slightly moist.		
	4							
10						(CL) **AS ABOVE**, dusky red (2.5YR 3/2), stiff, very plastic, dry.		
		0.3				12.0	3324.3	
	5	0.5				12.5 (SP-SC) **CLAYEY SAND**, very dark gray (2.5Y 3/1), very fine to fine grain, rounded, medium dense, dry.	3323.8	
						13.0	3323.3	
		0.3				(CL) **CLAY**, dusky red (2.5YR 3/2), stiff, very plastic, dry.		
15		0.5		▼		14.5 (SP-SC) **CLAYEY SAND**, very dark gray (2.5Y 3/1), very fine to fine grain, medium dense, rounded, dry.	3321.8	
						(CL) **CLAY**, dusky red (2.5YR 3/2), stiff, very plastic, slightly moist.		
						16.5	3319.8	
						17.0 (SP-SC) **CLAYEY SAND**, very dark gray (2.5Y 3/1), very fine to fine grain, rounded, medium dense, dry.	3319.3	10/20 Silica Filter Pack
	5	0.6				18.0	3318.3	2" PVC Screen, 0.010" Slot Size
		426.6	CMR-SB98-19-20			(CL) **CLAY**, dusky red (2.5YR 3/2), some fine sand, stiff, very plastic, dry.		
20		15.8		▽		20.0 (SP-SC) **CLAYEY SAND**, very dark gray (2.5Y 3/1), very fine to fine grain, rounded, medium dense, slightly moist, hydrocarbon odor.	3316.3	
		686.1				(SM) **SILTY SAND**, black (10YR 2/1), staining and some visible free product, very fine to fine grain, rounded, loose, wet, strong hydrocarbon odor.		
	5							
		945.4						
25						25.0	3311.3	
	1	286.9				26.0 (SM) **SILTY SAND**, dark reddish gray (5YR 4/2), trace black (10YR 2/1) staining, very fine to fine grain, subrounded, very dense, dry, slight hydrocarbon odor.	3310.3	Sand backfill
		479.2				(SM) **AS ABOVE**, bluish gray (GLEY 2 6/1).		

Bottom of borehole at 26.0 feet.

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WELL ID: **MW-99**
BORING NUMBER: **EB-15**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/14/19 **COMPLETED** 6/14/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3327.42 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197917.266 **EASTING** 1526288.961
DRILLER James Richardson
TOTAL BORING DEPTH 25 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 22 ft bgs **SCREEN INTERVAL** 17-22 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		0	CMR-EB15-0.5-1.0			0.5 (CL) **SANDY CLAY**, gray, well sorted, fine to medium grain, sub-angular to sub-rounded sand, trace roots, soft, non-plastic, wet. [FILL]	3326.9	Cement seal
	4	0				2.5 (SM) **SANDY SILT**, brown, some clay, some poorly sorted, medium to coarse, sub-rounded gravel, soft, moist, trace odor. [FILL]	3324.9	
		0				(CL-ML) **SILTY CLAY**, reddish brown, some poorly sorted, fine to coarse, sub-angular to sub-rounded gravel, stiff, plastic, moist. [FILL]		
5								
		0						Sch 40 PVC riser
	3.5	0				(CL-ML) **AS ABOVE**, some greenish gray mottling, less gravel than above.		Bentonite seal
10						10.0	3317.4	
		0.2				(CL-ML) **SILTY CLAY**, light brown, some fine sand, some fine to coarse sub-rounded to sub-angular gravel, medium stiff, slightly plastic, moist. [FILL]		
						12.0	3315.4	
	4					12.5 (CL-ML) **SILTY CLAY**, reddish brown, some poorly sorted, fine to medium grain, sub-angular to sub-rounded gravel, stiff, slightly plastic, moist. [FILL]	3314.9	
		0.1				(CL-ML) **SILTY CLAY**, brown, some well sorted, fine sand, and some poorly sorted, fine to coarse, sub-rounded to sub-angular gravel, stiff, slightly plastic, moist. [FILL]		
15						15.0 (CL-ML) **AS ABOVE**, yellow brown, greater clay content.	3312.4	
		0.3	CMR-EB15-15.0-16.0			(CL-ML) **SILTY CLAY**, reddish brown, some fine to medium, sub-rounded to sub-angular gravel, medium stiff, slightly plastic, moist. [FILL]		Filter sand
	5	0						
						18.0 (CL) **AS ABOVE**, a 1" thick seam of reddish/gray fine grain sand, very dense, well cemented.	3309.4	
		0.3	CMR-EB15-18.0-19.0			(CL) **SILTY CLAY**, light tan with some gray, some fine sand, soft, plastic, wet, hydrocarbon odor. [FILL]		
20						19.5	3307.9	
		0				20.0 (CL) **AS ABOVE**, black asphalt cobble composed of poorly sorted, fine to coarse, sub-rounded to sub-angular gravel.	3307.4	Sch. 40 PVC screen
		312.4	CMR-EB15-20.5-21.5			21.0 (SP-SC) **CLAYEY SAND**, dark gray, fine grain, poorly graded, sand content decreases with depth, plastic, loose, wet.	3306.4	
		112.9				21.5 (CL-ML) **SILTY CLAY**, dark to light gray, some yellow and red staining stiff, very plastic, moist, slight hydrocarbon odor.	3305.9	
						(SP-SC) **CLAYEY FINE SAND**, yellow, with gray clay, trace roots, laminated, medium dense, hydrocarbon odor.		
		19.2				**SANDSTONE**, well sorted, fine grain, strongly cemented, cross-bedded, dense, dry, hydrocarbon odor. **AS ABOVE**, moist.		Bentonite seal
25						25.0	3302.4	

Bottom of borehole at 25.0 feet.

Ramboll
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Denver, CO 80202
Telephone: 303-382-5460

WELL ID: **MW-105**
BORING NUMBER: **MW-105**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME MW Install; AOC-16 Interim Measures Design
PROJECT NUMBER 1690017652; 1690014124-003
PROJECT LOCATION Great Falls, MT
DATE STARTED 6/17/20 **COMPLETED** 6/17/20
LOGGED BY Brooks Bailey **CHECKED BY** Kit Carson
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear LS250 MiniSonic
NORTHING Not Measured **EASTING** Not Measured
DRILLER Aaron Bradley
TOTAL BORING DEPTH 10 ft bgs **BOREHOLE SIZE** 4.5 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 10 ft bgs **SCREEN INTERVAL** 5-10 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0							
		5.6				(SC) **SAND**, fine to very fine with clay, gray (10YR 5/1), trace fine gravel, soft, moist, low plasticity, trace rootlets.	Cement seal and flushmount well completion
		361.5				2.0 (SM) **SILTY SAND**, dusky red (10R 3/3), firm, dry, medium dense, hydrocarbon odor.	Sch. 40 2" PVC Riser
		4.7				3.5 (CL) **SANDY CLAY**, little fine sand, pale brown (10YR 6/3), soft, slightly moist, medium plasticity.	Bentonite seal (hydrated)
5						4.5 (SM) **VERY FINE SAND AND SILT**, dusky red (10R 3/3), gray mottling, hard, dense, dry, weakly laminated, diminishing mottling from 7-9 feet, very dense, hydrocarbon odor.	
		5.2					Filter pack (No. 10/20)
		209.1					Sch. 40 2" PVC Screen (20-slot)
		343.3				9.0	
10		100.3				9.5 (CL) **FINE SANDY CLAY**, dusky red (10R 3/3), gray mottling, soft, wet, medium plasticity, hydrocarbon odor.	
						10.0 (SM) **VERY FINE SAND AND SILT**, dusky red (10R 3/3), gray mottling, less dense, dry to slightly moist, faint hydrocarbon odor.	

Bottom of borehole at 10.0 feet.

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WELL ID:
BORING NUMBER:**WB-14D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/25/19 **COMPLETED** 6/25/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3321.275 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197734.688 **EASTING** 1525031.599
DRILLER James Richardson
TOTAL BORING DEPTH 40 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 25 ft bgs **SCREEN INTERVAL** 20-25 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		0.2				1.0 **FILL**, silty sand, very dark grayish brown (10YR 3/2), poorly graded, trace medium subangular gravel, trace rootlets, fine grain, loose, moist	3320.3	
		0				(SM) **SILTY SAND**, dusky red (2.5YR 3/2), non to weakly laminated, loose, slightly moist.		Open borehole
	5	0.1				3.0	3318.3	
		0.1				(CL-ML) **SILTY CLAY**, dusky red (2.5YR 3/2), trace sand, weakly laminated, clay content increases with depth, hard, slightly to moderately plastic, slightly moist.		
5		0.1				5.0	3316.3	
		0.1	CMR-WB14-5.0-6.0			(ML) **SILT**, dusky red (2.5YR 3/2), little clay, trace sand, non-cohesive, non-laminated, soft, slightly moist.		
	5	0				(ML) **AS ABOVE**, hard, weakly laminted.		
						7.5	3313.8	
						8.0 (SP) **WEAKLY CEMENTED SAND**, dusky red (2.5YR 3/2), stiff to hard clay laminations, fine grain, dense, dry.	3313.3	
		0				(SP) **SILTY SAND**, brown (7.5YR 4/4), fine sand laminations alternate with clayey silt laminations, moderately cemented, dry.		
10						10.0	3311.3	Sch. 40 PVC riser (casing suspended)
		0				(MH) **CLAYEY SILT**, mottled dusky red (2.5YR 3/2) to greenish gray (GLEY1 5/1) from 10 to 11 ft bgs, slightly to moderately plastic, non-cohesive, dry to slightly moist.		
	4.75					(MH) **AS ABOVE**, sand content increases between 12 to 12.75 ft bgs.		
						13.0	3308.3	
		0.5				13.3 (SP) **MODERATELY CEMENTED SAND**, brown (7.5YR 4/4), fine grain, very dense, laminated, dry.	3308.0	
						14.0	3307.3	
15						(ML) **CLAYEY SILT**, mottled dusky red (2.5YR 3/2) to greenish gray (GLEY1 5/1), laminated, weakly to moderately cemented, dry.		
						(CL) **CLAY**, (GLEY1 5/1), weak dark gray to black laminations, hard, slightly moist.		
		0						
	5					17.5	3303.8	
		0.1				(CL-ML) **SILTY CLAY**, weak red (2.5YR 4/2), slightly mottled greenish gray (GLEY1 5/1), moderately to strongly cemented, weakly laminated, non-cohesive, dry.		
20		0.1				(CL-ML) **AS ABOVE**, dusky red (2.5YR 3/2).		
			CMR-WB14-20.0-21.0			(CL-ML) **AS ABOVE**, weakly cemented near 20 ft bgs.		
		0.4						
						22.0	3299.3	
	5					(CL-ML) **AS ABOVE**, moisture seam immediately above sandstone.		Sch. 40 PVC screen (casing suspended)
						23.0 **SANDSTONE**, dark gray, strongly cemented, laminated, dry.	3298.3	
						23.5	3297.8	
		0.1				(CL) **CLAY**, reddish gray (2.5YR 5/1), soft, moderately plastic, moist.		
						24.5	3296.8	
25		0.1				**SANDSTONE**, dark gray, strongly cemented, fractured, dry.		

(Continued Next Page)

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WELL ID:
BORING NUMBER:**WB-14D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
25						**AS ABOVE**, wet in fractures at 24 ft bgs.		
		0				(CL) **SANDY CLAY**, reddish brown (2.5Y 4/3), fine sand, slightly plastic, weakly laminated, dry to moist. *(continued)*		
	5	0						
						28.8	3292.5	
						29.5 **SILTSTONE**, very dark greenish gray (GLEY1 3/1), strongly laminated, weakly to moderately cemented, dry.	3291.8	
30		0.2				30.0	3291.3	
						(OL) **SILT**, black (GLEY1 2.5/N), organic-rich, siltstone fragments, laminated, non-cohesive, slightly moist.		
		0.1				**SILTSTONE**, black (GLEY1 2.5N), hard, moderately cemented, weakly laminated, dry.		
	4.25					32.0	3289.3	
		0.3				(CL-ML) **SILTY CLAY**, greenish gray to (GLEY1 5/1) to black (GLEY1 2.5N), organic-rich, interbedded with siltstone, stiff to hard, moist.		Open borehole
35								
						(CL-ML) **AS ABOVE**, black (GLEY 1 5/1).		
	4.25	0.2				(CL-ML) **AS ABOVE**, non-laminated, non-cohesive.		
40						40.0	3281.3	

Bottom of borehole at 40.0 feet.

APPENDIX B
Geology Survey Photolog

LOCATION 1: SILTSTONE/MUDSTONE (IN-SITU)

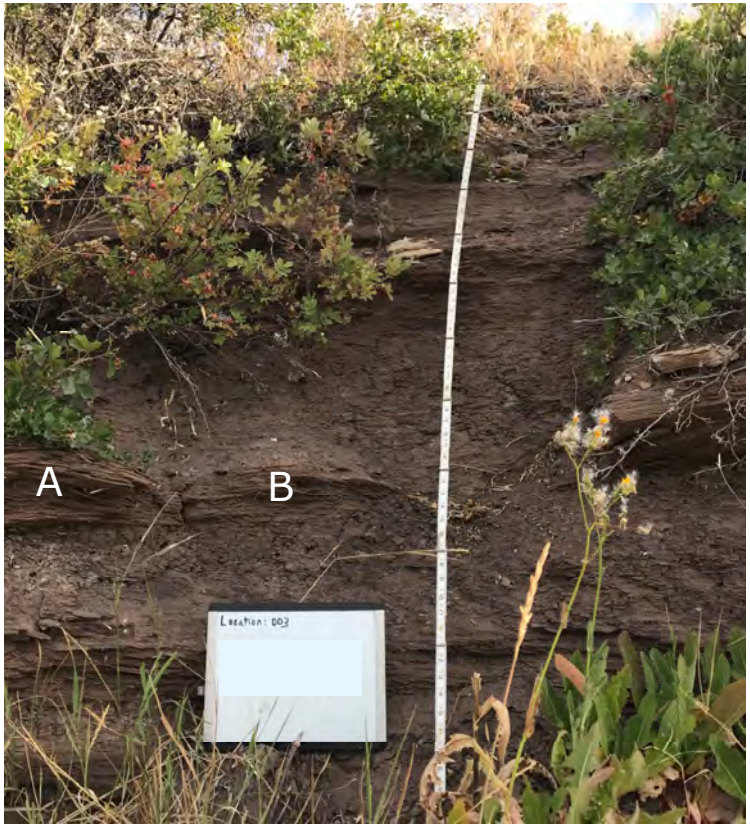
Description: Dusky-red, mottled, thinly-laminated, with various amounts of sand
Geologic Unit: Fifth member of the Kootenai Formation
Hydro-Stratigraphic Unit: Perched Unconfined

LOCATION 2: SILTSTONE/MUDSTONE (IN-SITU)

Description: Dusky-red, thinly-laminated, with various amounts of sand
Geologic Unit: Fifth member of the Kootenai Formation
Hydro-Stratigraphic Unit: Perched Unconfined

LOCATION 3: SILTSTONE/MUDSTONE (IN-SITU)

Description: Dusky-red, mottled, thinly-laminated, with various amounts of sand
Geologic Unit: Fifth member of the Kootenai Formation
Hydro-Stratigraphic Unit: Upper Aquitard



LOCATION 4: SILTSTONE/MUDSTONE (IN-SITU)

Description: Gray to dark gray, thinly-laminated, wet
Geologic Unit: Fifth member of the Kootenai Formation
Hydro-Stratigraphic Unit: Upper Bedrock Semi-Confined

LOCATION 5: SILTSTONE/MUDSTONE

Description: Gray to dark gray, beneath soil horizon, moist
Geologic Unit: Fifth member of the Kootenai Formation
Hydro-Stratigraphic Unit: Upper Bedrock Semi-Confined

LOCATION 6: SILTSTONE/MUDSTONE (IN-SITU)

Description: Gray to dark gray, yellow mottling, thinly-laminated
Geologic Unit: Fifth member of the Kootenai Formation
Hydro-Stratigraphic Unit: Upper Bedrock Semi-Confined

LOCATION 7: SANDSTONE (FLOAT)

Description: Gray, strongly-lithified, thinly-bedded
Geologic Unit: Fifth member of the Kootenai Formation

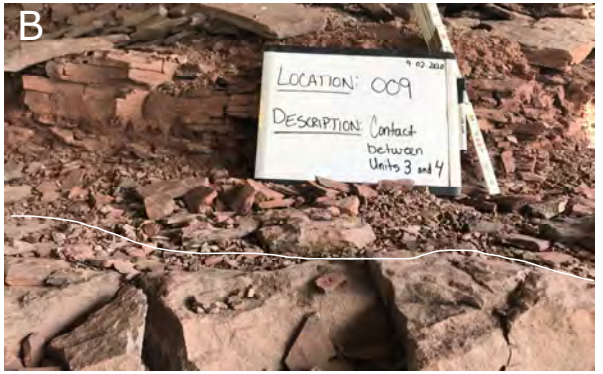
LOCATION 8: SILTSTONE/MUDSTONE (FLOAT)

Description: Red, thinly-laminated
Geologic Unit: Fifth member of the Kootenai Formation

LOCATION 9: CROSS-SECTION BENEATH 15TH STREET BRIDGE

Geologic Unit: Fifth member of the Kootenai Formation

A: Contact between sandstone and siltstone



B: Contact between siltstone and sandstone

C: Contact between sandstone and siltstone

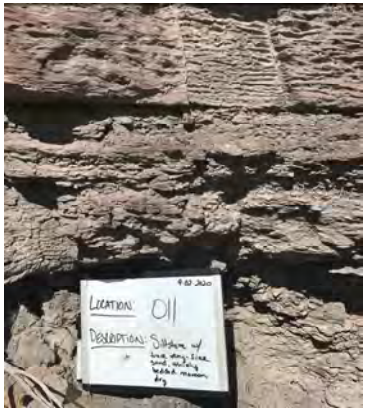
D: Contact between red and gray siltstone/mudstone

LOCATION 10: SANDSTONE (IN-SITU)

Description: Gray, strongly-lithified, cross-bedded
Geologic Unit: Fifth member of the Kootenai Formation

LOCATION 11: SILTSTONE (IN-SITU)

Description: Maroon, thinly-bedded, various amounts of fine sand
Geologic Unit: Fifth member of the Kootenai Formation



LOCATION 12: LIMESTONE (IN-SITU)

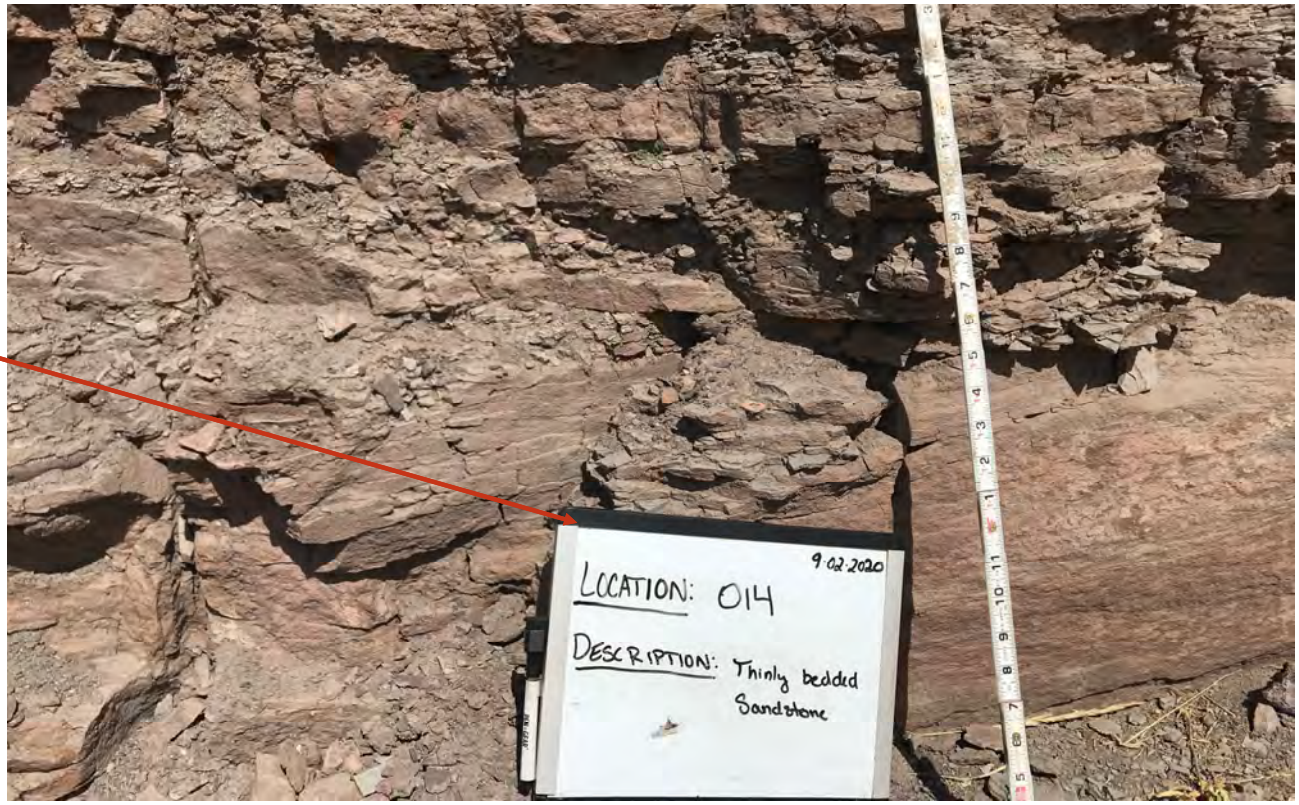
Description: Gray, coarse-grain, crystalline, jointing
Geologic Unit: Fourth member of the Kootenai Formation

LOCATION 13: SILTSTONE (IN-SITU)

Description: Maroon, thinly-bedded, various amounts of fine sand
Geologic Unit: Fifth member of the Kootenai Formation

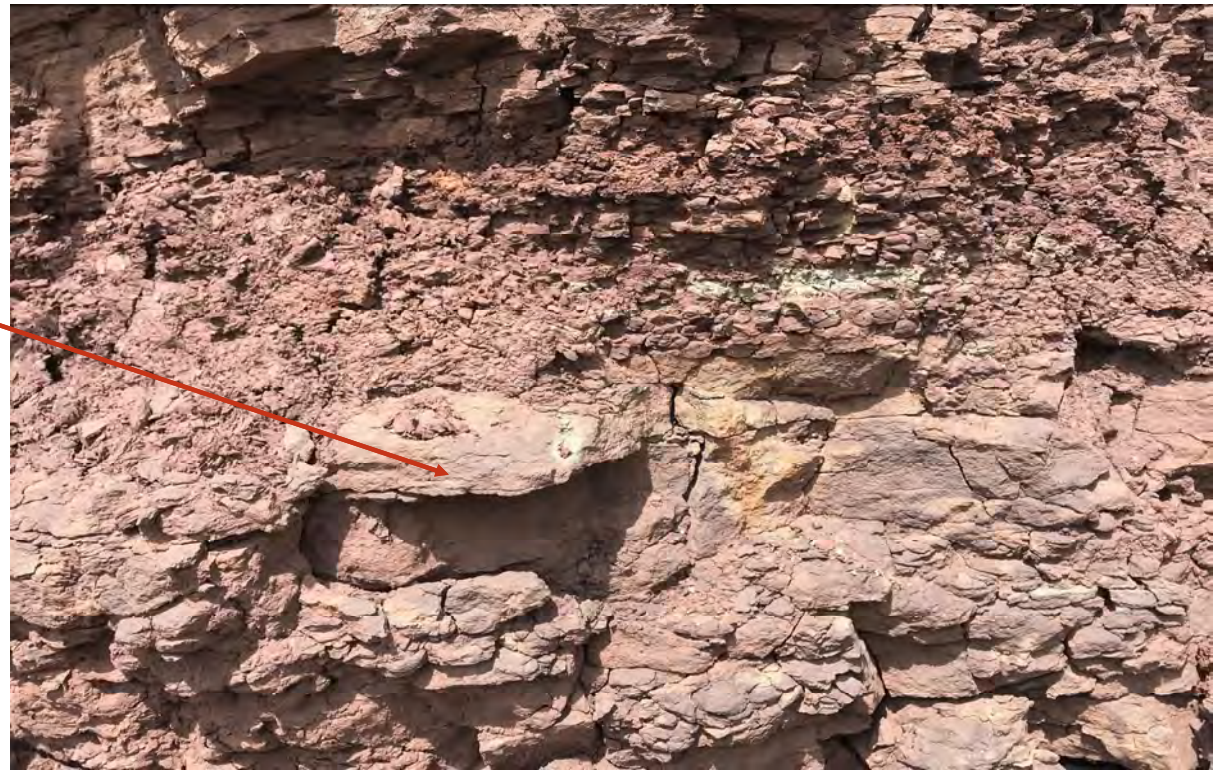
LOCATION 14: SANDSTONE (IN-SITU)

Description: Gray, thinly-bedded
Geologic Unit: Fifth member of the Kootenai Formation



LOCATION 15: SILTSTONE (IN-SITU)

Description: Maroon, thinly-laminated, mottled, various amounts of fine sand
Geologic Unit: Fifth member of the Kootenai Formation



APPENDIX C
Domestic Well Information from the Great Falls area

299323

224908

34589

302544

268738

N

Select Domestic Wells in the Great Falls Area

Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

RAMBOLL

FIGURE C-1

DRAFTED BY: DFM	DATE: 1/12/2021	PROJECT: 1690019871

Facility Boundary

Domestic Well

0 750 1,500

SCALE IN FEET

D:\GIS\PROJECT\2018\CALUMET\CALUMET_Pro_20191219\DOCS\CMR_PRO_20190619\CMR_PRO_20190619.aprx

Table C-1
Local Domestic and Irrigation Wells
Calumet Montana Refinery, LLC - Great Falls, Montana

Well Owner	GWIC ID	County	Latitude	Longitude	Ground Surface Elevation[1] (ft-amsl)	Purpose	Drilling Method	Well Completion Date	Total Well Depth (ft)	Total Well Depth (ft-amsl)	Screen Interval (ft)	Screen Interval (ft-amsl)	Static Water Level (ft)	Static Water Level (ft-amsl)	Well Production[2] (gpm)	Aquifer
Rivers Edge Dental	268738	Cascade	47.516667	-111.26667	3,408	Irrigation	Rotary	8/22/2012	270	3,138	210 - 250	3,198 - 3,158	57	3,351	25	Kootenai [3]
Winn, Mike	224908	Cascade	47.526473	-111.28474	3,420	Domestic	Rotary	3/29/2006	210	3,210	180 - 210	3,240 - 3,210	130	3,290	7	Kootenai [3]
Tri-Angle Tire Co.	34589	Cascade	47.528331	-111.27681	3,456	Domestic	Cable	4/13/1974	161	3,295	145 - 161	3,311 - 3,295	120	3,336	15	Kootenai [3]
Immaculate Heart of Mary Heart	302544	Cascade	47.524083	-111.27323	3,405	Irrigation	Rotary	7/2/2019	527	2,878	506 - 527	2,899 - 2,878	105	3,300	15	Madison Group
CC Pet	299323	Cascade	47.531975	-111.28679	3,507	Unknown	Rotary	11/5/2018	920	2,587	880 - 920	2,627 - 2,587	216	3,291	95	Madison Group

Notes:

Domestic wells within 1.5 miles of the Calumet Montana Refining facility.
Well information obtained from the Montana Bureau of Mines and Geology (MGMB) Science and Service webpage (https://mbmg.mtech.edu/mapper/mapper.asp?view=Wells&).

GWIC ID = Ground Water Information Center Identification
Fm. = Formation
ft = feet
ft-amsl = feet above mean sea level
gpm = gallons per minute
[1] Ground surface elevation estimated using Google Earth
[2] During the well test the discharge rate shall be as uniform as possible. This rate may or may not be the sustainable yield of the well. Sustainable yield does not include the reservoir of the well casing.
[3] It is possible the well screen interval is located in the basal Sunburst member (i.e., Sunburst Sandstone Aquifer) of the Kootenai Formation based on total depth, screen interval, and lithologic unit the well was installed.

Table C-2
Geologic Unit Description
Calumet Montana Refinery, LLC - Great Falls, Montana

GWIC ID: 268738				
Top of Unit (ft)	**Top of Unit (ft-amsl)**	**Bottom of Unit (ft)**	**Bottom of Unit (ft-amsl)**	**Unit Description**
0	3408	5	3403	Gravel
5	3403	8	3400	Red Shale
8	3400	68	3340	Gray and Green Shale
68	3340	114	3294	Red Mudstone
114	3294	125	3283	Hard Gray Shale
125	3283	210	3198	Light Gray Siltstone
210	3198	248	3160	Gray Sandstone[1]
248	3160	270	3138	Dark Gray Shale

Notes:

GWIC ID = Ground Water Information Center Identification

ft = feet

ft-amsl = feet above mean sea level

[1] Based on the total well depth, screen interval, and lithologic unit, this well appears to be installed in the Sunburst Sandstone member.

Table C-3
Geologic Unit Description
Calumet Montana Refinery, LLC - Great Falls, Montana

GWIC ID: 224908				
Top of Unit (ft)	**Top of Unit (ft-amsl)**	**Bottom of Unit (ft)**	**Bottom of Unit (ft-amsl)**	**Unit Description**
0	3420	6	3414	Topsoil
6	3414	10	3410	Sand
10	3410	50	3370	Decomposed Sandstone
50	3370	80	3340	Gray Sandstone
80	3340	90	3330	Red Shale
90	3330	120	3300	Gray Shale
120	3300	150	3270	White Sandstone
150	3270	160	3260	Black and White Sandstone
160	3260	180	3240	Red Sandstone
180	3240	205	3215	Gray Sandstone[1]
205	3215	210	3210	Gray Shale

Notes:

GWIC ID = Ground Water Information Center Identification

ft = feet

ft-amsl = feet above mean sea level

[1] Based on the total well depth, screen interval, and lithologic unit, this well appears to be installed in the Sunburst Sandstone member.

Table C-4
Geologic Unit Description
Calumet Montana Refinery, LLC - Great Falls, Montana

GWIC ID: 34589				
Top of Unit (ft)	**Top of Unit (ft-amsl)**	**Bottom of Unit (ft)**	**Bottom of Unit (ft-amsl)**	**Unit Description**
0	3456	3	3453	Fill Gravel
3	3453	25	3431	Gumbo
25	3431	35	3421	Clay and Sand Hardpan
35	3421	76	3380	Sandstone
76	3380	82	3374	Clay and Sand Hardpan
82	3374	94	3362	Gray Sandstone
94	3362	102	3354	Clay and Sand
102	3354	110	3346	Red Shale
110	3346	150	3306	Clay Hardpan
150	3306	161	3295	White Sandstone and Water[1]

Notes:

GWIC ID = Ground Water Information Center Identification
ft = feet
ft-amsl = feet above mean sea level
[1] Based on the total well depth, screen interval, and lithologic unit, it is uncertain whether this well was installed in the Sunburst Sandstone member.

Table C-5
Geologic Unit Description
Calumet Montana Refinery, LLC - Great Falls, Montana

GWIC ID: 302544				
Top of Unit (ft)	**Top of Unit (ft-amsl)**	**Bottom of Unit (ft)**	**Bottom of Unit (ft-amsl)**	**Unit Description**
0	3405	6	3399	Brown Sand
6	3399	12	3393	Brown Clay
12	3393	40	3365	Brown and Gray Sandstone
40	3365	45	3360	Gray Shale
45	3360	55	3350	Red and Gray Shale
55	3350	105	3300	Gray Shale and Sandstone
105	3300	115	3290	Red and Gray Shale
115	3290	160	3245	Red Shale with Sandstone
160	3245	205	3200	Gray Shale and Sandstone
205	3200	218	3187	Red and Gray Sandstone
218	3187	225	3180	Gray Shale
225	3180	265	3140	White Sandstone[1]
265	3140	270	3135	Gray Shale
270	3135	290	3115	Salt and Pepper Sandstone
290	3115	295	3110	Gray Shale
295	3110	300	3105	Tan Sandstone
300	3105	310	3095	Gray Shale
310	3095	320	3085	Gray Sandstone
320	3085	365	3040	Gray Shale
365	3040	380	3025	Gray Sandstone
380	3025	415	2990	Gray Shale
415	2990	440	2965	Gray Shale and Sandstone
440	2965	451	2954	Gray Shale
451	2954	527	2878	White and Tan Limestone

Notes:

GWIC ID = Ground Water Information Center Identification
ft = feet
ft-amsl = feet above mean sea level
[1] Based on the elevation, unit thickness, and lithological unit, this sandstone likely represents the Sunburst Sandstone member.

Table C-6
Geologic Unit Description
Calumet Montana Refinery, LLC - Great Falls, Montana

GWIC ID: 299323				
Top of Unit (ft)	**Top of Unit (ft-amsl)**	**Bottom of Unit (ft)**	**Bottom of Unit (ft-amsl)**	**Unit Description**
0	3507	8	3499	Sandy Clay/Gravel Fill
8	3499	15	3492	Tan Sandstone
15	3492	18	3489	Tan Sandy Shale
18	3489	41	3466	Gray Shale
41	3466	50	3457	Gray Sandstone
50	3457	52	3455	Red Shale
52	3455	61	3446	Gray Shale
61	3446	75	3432	Red Shale
75	3432	77	3430	Gray Silty Shale
77	3430	102	3405	Red Shale
102	3405	135	3372	Gray Sandy Shale
135	3372	155	3352	Gray Sandstone
155	3352	180	3327	Dark Gray Sandstone
180	3327	210	3297	Salt and Pepper Sandstone
210	3297	340	3167	Dark Gray Shale with Coal Seams
340	3167	351	3156	Gray Sandstone
351	3156	355	3152	Gray Shale
355	3152	359	3148	Coal
359	3148	375	3132	Gray Sandstone
375	3132	398	3109	Gray Shale
398	3109	405	3102	Creamy White Sandstone
405	3102	545	2962	Gray/Blue Variegated Mud Stone
545	2962	560	2947	Light Gray Sandstone
560	2947	575	2932	Gray Mudstone with Pyrite
575	2932	595	2912	Blue Mudstone
595	2912	608	2899	Dark Gray Sandstone
608	2899	625	2882	Gray Shale
625	2882	630	2877	Gray Sandstone Salt and Pepper (5 gpm water)
630	2877	715	2792	White and Tan Limestone with High Porosity (250 gpm with 9000 tds)
715	2792	880	2627	White and Tan Limestone with Low Porosity
880	2627	920	2587	White and Tan Limestone with High Porosity (95 gpm with 220 tds)

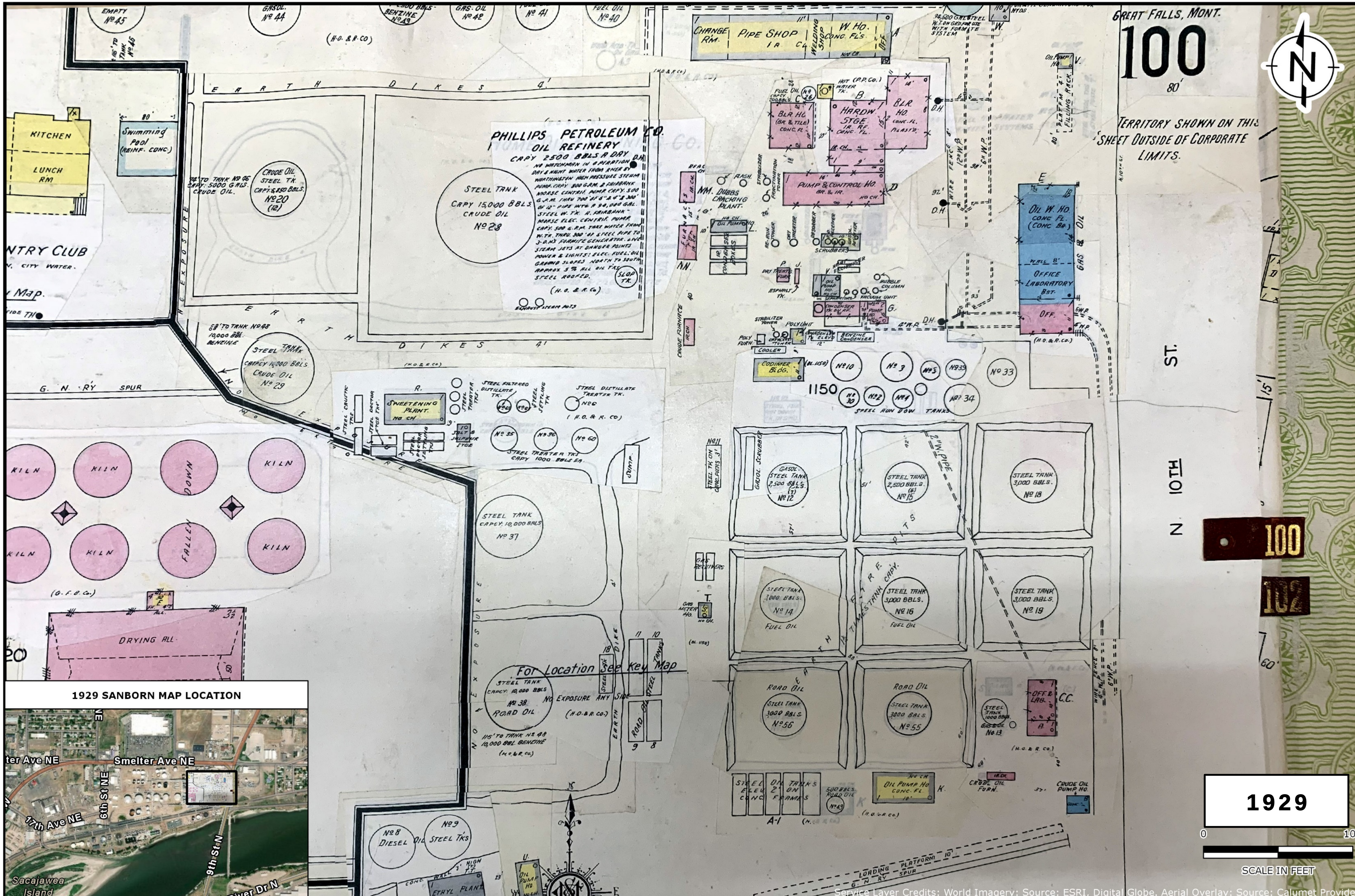
Notes:

GWIC ID = Ground Water Information Center Identification
ft = feet
ft-amsl = feet above mean sea level
tds = total dissolved solids

APPENDIX B
Historical Aerial Photographs

Sometime Between 1922 to 1933


23rd Ave NE
23rd Ave NE
4th St NE
6th St NE
22nd Ave NE
22nd Ave NE
5th St NE
21st Ave NE
8th St NE
10th St NE
Old Havre Hwy
Montana Ave NE
N
Smelter Ave NE
Smelter Ave NEnelter Ave NE
Smelter Ave NE
87
Smelter Ave NE
4th St NE
3rd St NW
6th St NE
11th St NE
12th St NE
100
N River Rd
17th Ave NE
Burlington Northern Santa Fe
17th Ave NE
Burlington Northern Santa Fe
9th St N
9th St N
9th St N
Missouri River
Missouri River
Missouri River
4th St NE
Missouri River
Sacajawea Island
Missouri River
River Dr N
1929
0
1,000
SCALE IN FEET
Service Layer Credits: World Imagery: Source: ESRI, Digital Globe. Aerial Overlay: Source: Calumet Provided.


GREAT FALLS, MONT.
100
TERRITORY SHOWN ON THIS SHEET OUTSIDE OF CORPORATE LIMITS.
PHILLIPS PETROLEUM CO.
OIL REFINERY
CAPY 2500 BBLS A DAY
NO WATCHMAN IN OPERATION DAY & NIGHT WATER FROM RIVER BY WORTHINGTON HIGH PRESSURE STEAM PUMP. CAPY 800 G.P.M. & FAIRBANK MORSE CENTRIF. PUMP CAPY. 500 G.P.M. THRU 700' OF 6" & 4" & 300' OF 12" PIPE INTO A 94,000 GAL. STEEL W. TK. A. FAIRBANK MORSE ELEC. CENTRIF. PUMP CAPY. 500 G.P.M. TAKE WATER FROM W. TK. THRU 300' OF STEEL PIPE TO 3-O.H'S FORMITE GENERATOR. LIVE STEAM JETS AT DANGER POINTS POWER & LIGHTS: ELEC. FUEL: OIL GROUND SLOPES NORTH TO SOUTH APPROX 5% ALL OIL TKS STEEL ROOFED.
(H.O. & R. Co)
STEEL TANK CAPY 15,000 BBLS CRUDE OIL Nº 28
KITCHEN
LUNCH RM
Swimming Pool (REINF. CONC.)
NTRY CLUB
N. CITY WATER.
CRUDE OIL STEEL TK. CAPY. 6,850 BBLS. Nº 20 (12)
STEEL TANK CAPCY 10,000 BBLS CRUDE OIL Nº 29
EARTH DIKES
G. N. RY SPUR
SWEETENING PLANT
CHANGE RM.
PIPE SHOP
WELDING SHOP
W. HO. CONC. FL'S
BLR. HO. (BR. & TILE) CONC. FL.
HARDW. STGE.
BLR. HO.
PUMP & CONTROL HO.
DUBBS CRACKING PLANT.
OIL W. HO. CONC. FL. (CONC BR.)
OFFICE LABORATORY BST.
OFF.
CODIMER BLDG.
1150
STEEL RUN DOW TANKS
KILN
DOWN
FALLEN
DRYING
(G. F. B. Co.)
STEEL TANK CAPCY. 10,000 BBLS Nº 37
STEEL TANK CAPCY. 10,000 BBLS Nº 38 ROAD OIL
NO EXPOSURE ANY SIDE
For Location See Key Map
GASOL. STEEL TANK 2,500 BBLS. Nº 12
STEEL TANK 2,500 BBLS. Nº 15
STEEL TANK 3,000 BBLS. Nº 18
STEEL TANK 3,000 BBLS. Nº 14 FUEL OIL
STEEL TANK 3,000 BBLS. Nº 16 FUEL OIL
STEEL TANK 3,000 BBLS. Nº 19
ROAD OIL STEEL TANK 3000 BBLS. Nº 56
ROAD OIL STEEL TANK 3000 BBLS. Nº 55
EARTH FIRE PITS
OIL PUMP HO. CONC. FL.
OFF. & LAB.
CRUDE OIL PUMP HO.
ETHYL PLANT
Nº 8 DIESEL OIL
Nº 9 STEEL TKS
LOADING PLATFORM
G. N. RY SPUR
N. 10TH ST.
100
102
1929 SANBORN MAP LOCATION
Smelter Ave NE
6th St NE
17th Ave NE
9th St N
River Dr N
Sacajawea Island
1929
0
100
SCALE IN FEET
Service Layer Credits: World Imagery: Source: ESRI, Digital Globe. Aerial Overlay: Source: Calumet Provided.


23rd Ave NE
23rd Ave NE
4th St NE
22nd Ave NE
22nd Ave NE
6th St NE
8th St NE
10th St NE
Old Havre Hwy
Montana Ave NE
5th St NE
21st Ave NE
Smelter Ave NE
Smelter Ave NEnelter Ave NE
Smelter Ave NE
Smelter Ave NE
87
4th St NE
3rd St NW
6th St NE
10th St NE
11th St NE
12th St NE
N River Rd
17th Ave NE
17th Ave NE
Burlington Northern Santa Fe
Burlington Northern Santa Fe
9th St N
9th St N
4th St NE
Missouri River
Missouri River
Missouri River
Missouri River
Sacajawea Island
River Dr N
1946
0
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Service Layer Credits: World Imagery: Source: ESRI, Digital Globe. Aerial Overlay: Source: USGS Earth Explorer.


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12th St NE
N River Rd
17th Ave NE
17th Ave NE
Burlington Northern Santa Fe
Burlington Northern Santa Fe
9th St N
4th St NE
Missouri River
Missouri River
Missouri River
Missouri River
Sacajawea Island
9th St N
9th St N
1953
0
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Burlington Northern Santa Fe
Burlington Northern Santa Fe
4th St NE
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Missouri River
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Missouri River
Sacajawea Island
Missouri River
9th St N
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1957
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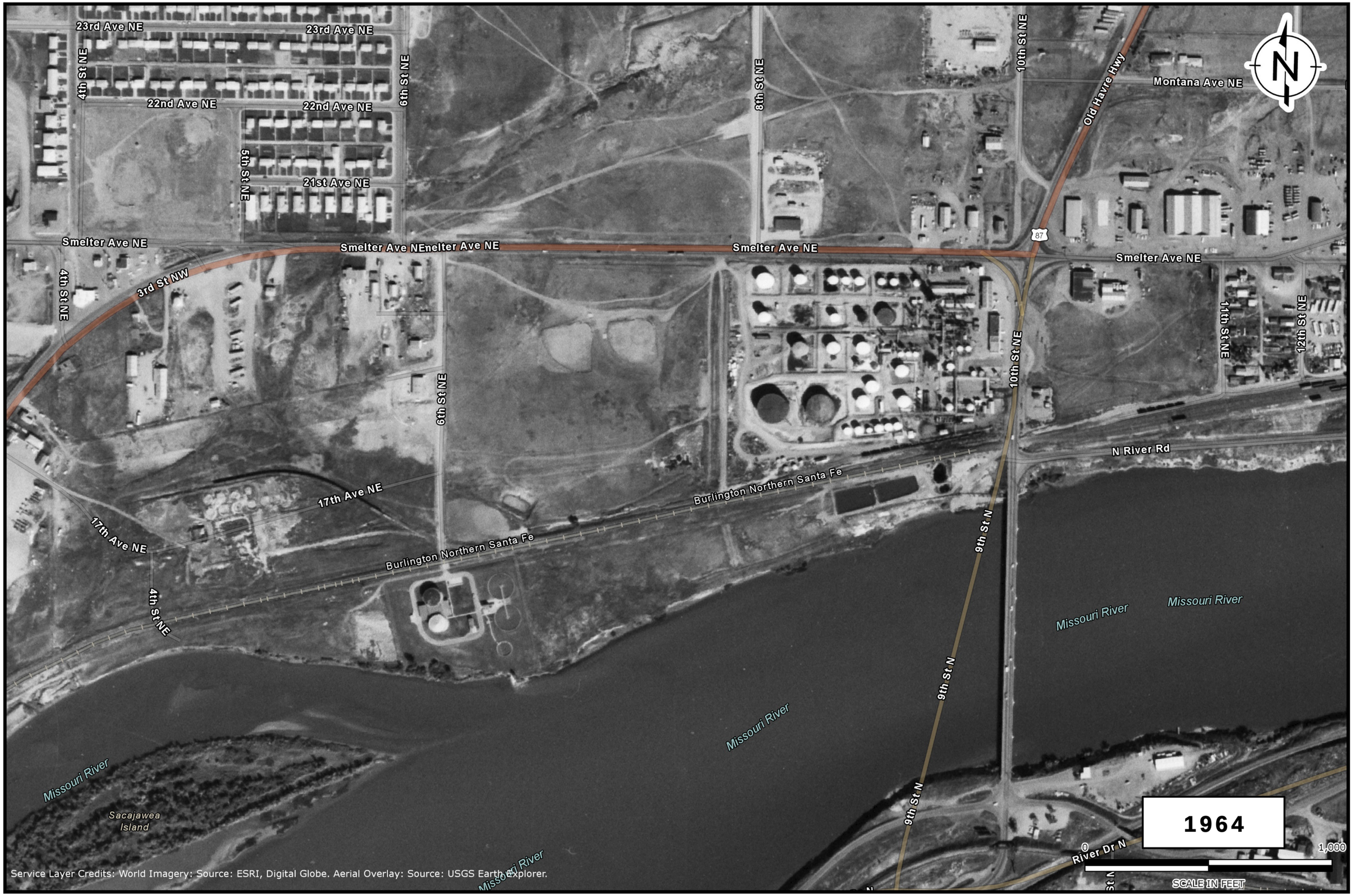
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N River Rd
17th Ave NE
17th Ave NE
Burlington Northern Santa Fe
Burlington Northern Santa Fe
4th St NE
9th St N
9th St N
Missouri River
Missouri River
Missouri River
Missouri River
Sacajawea Island
River Dr N
1964
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17th Ave NE
Burlington Northern Santa Fe
N River Rd
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Burlington Northern Santa Fe
4th St NE
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9th St N
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Sacajawea Island
Missouri River
River Dr N
1966
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SCALE IN FEET
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87
3rd St NW
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17th Ave NE
Burlington Northern Santa Fe
17th Ave NE
Burlington Northern Santa Fe
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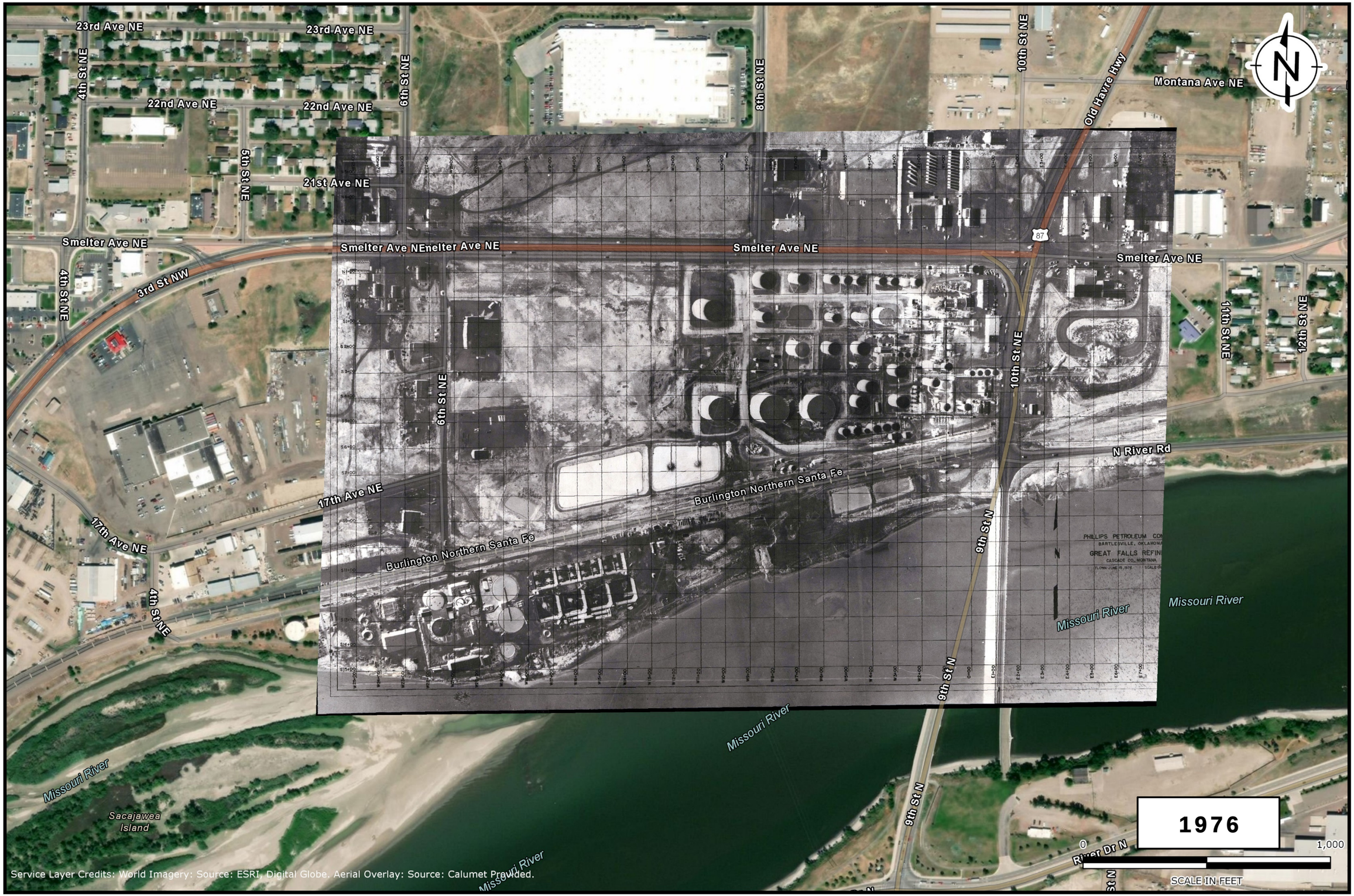
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1976
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YEAR: 1984

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N

EDR

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INQUIRY #: 5700081.4

YEAR: 1984

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1995

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17th Ave NE
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Missouri River
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Missouri River
Sacajawea Island
River Dr N
2011
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SCALE IN FEET
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INQUIRY #: 5700081.4

YEAR: 2013

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4th St NE
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Missouri River
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Missouri River
Missouri River
Sacajawea Island
River Dr N
2015
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YEAR: 2017

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INQUIRY #: 5700081.4

YEAR: 2017

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Burlington Northern Santa Fe
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Sacajawea Island
9th St N
9th St N
River Dr N
2019
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1,000
SCALE IN FEET
Service Layer Credits: World Imagery: Source: ESRI, Digital Globe. Aerial Overlay: Source: UAV Flight Data.

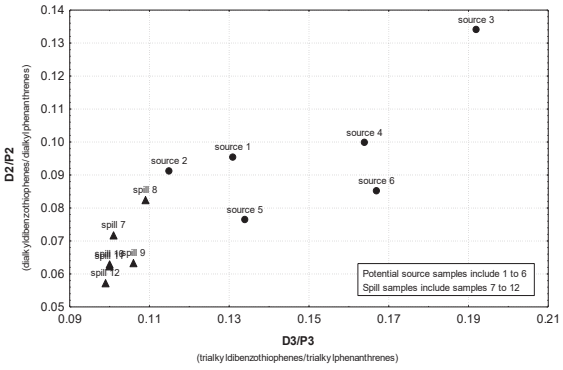
APPENDIX C
LNAPL Fingerprinting Results

ATTACHMENT C3

MW-70 LNAPL FINGERPRINTING ANALYTICAL RESULTS

Environmental Forensic Report

Figure 1. Double Ratio Plot



MW-70

SDG: F170012

Report To:

Calumet Montana Refining, LLC
1900 10th St. NE
Great Falls, MT 59404

Report By:

META Environmental, Inc.
1000 Turk Hill Road
Fairport, NY 14450

August 29, 2017

Identifying and allocating sources of pollutants in complex environments.

META

Executive Summary

One NAPL sample from the Calumet Montana Refining site (MW-70) was analyzed for hydrocarbon fingerprint and an expanded list of monocyclic aromatic hydrocarbons (MAHs), including benzene, toluene, ethylbenzene, and xylenes, polycyclic aromatic hydrocarbons (PAHs), and saturated hydrocarbons.

Sample MW-70 was a mixture of No. 2 fuel oil or diesel fuel and gasoline (or similar product).

Sample RW HC 7-27-17 was compared to one NAPL sample collected from the site in April 2017, 3 NAPL samples collected from the site in September and October of 2016, a sediment sample collected from the site in May 2017, and a NAPL sample collected from the site in July 2017.

Based on a qualitative review of the fingerprints, sesquiterpane biomarker patterns, and tetraethyl lead content, the material in sample MW-70 was similar to MW-41 and MW-53.

Table of Contents

Introduction

One NAPL sample was received by ESS Laboratory of Cranston RI for META on 8/09/2017. The NAPL was analyzed for hydrocarbon fingerprint, an expanded list of MAHs and PAHs, and saturated hydrocarbons.

This report summarizes the findings and compares the samples.

Sample Delivery Group

Project:	MW-70
Client	Calumet Montana Refining, LLC 1900 10th St. NE Great Falls, MT 59404
Report Contact:	Maurice Frey
Dates of Receipt:	8/09/2017
META Project Number:	C32001
SDG No.:	F170012

Chain of Custody

Chain of custody documentation is included in the ESS Laboratory Report (Appendix D).

Methods

One NAPL sample was prepared in duplicate by solvent dilution (EPA 3580) using dichloromethane (DCM). The extracts were spiked with internal standard and analyzed by GC/FID (EPA 8015M) for fingerprinting, alkanes, and total petroleum hydrocarbons and by GC/MS/SIM (EPA 8270M) for MAHs and PAHs, alkyl PAH homologues and other selected compounds.

Results

Sample results are presented in several appendices which follow this narrative.

Appendix A: GC/FID Fingerprints
Appendix B: Extended MAH/PAH Profiles – Bar Graphs
Appendix C: Extracted Ion Current Profiles (EICPs)
Appendix D: ESS Laboratory Report

Quality Control

The quality control measures, criteria, and results are provided in the ESS laboratory report.

Discussion

Background

Crude petroleum, many of its refined products (e.g., kerosene, diesel fuel, motor oil), coal, coal

tar, and many coal tar products consist primarily of hydrocarbons – chemicals made up of carbon and hydrogen. There are several types of hydrocarbons that are commonly grouped by similar chemical structures, such as alkanes, cyclic alkanes, and aromatic hydrocarbons. MAHs and PAHs are one group of hydrocarbons that are present at high relative amounts in crude oil, coal, coal tar, and many of their products. In environmental forensic chemistry and geochemistry, MAHs and PAHs are placed in subgroups according to their origins. These groups include diagenic, or recently produced; petrogenic, produced at relatively low temperatures over long periods of time; and pyrogenic, produced at high temperatures with a shortage of oxygen. Petrogenic MAHs and PAHs are those found in crude oil, refined petroleum products, and coal. Pyrogenic MAHs and PAHs are those found in coal tar and related substances, and from the incomplete combustion of organic matter (PICs) such as in fires and engines.

PAHs commonly form the basis for source identification at sites involving petrogenic or pyrogenic materials. Studies have shown that the pattern of PAHs clearly distinguishes petrogenic from pyrogenic substances and can be used to identify and classify petrogenic or pyrogenic substances of different origins. For example, ASTM Method D 5739-06 is the method used extensively by the U.S. Coast Guard to determine the source of oil spilled in public waterways. That method relies on the determination of selected PAHs and alkylated PAHs in oil, soil, or water samples by gas chromatography with mass spectrometric detection (GC/MS) and the use of the qualitative patterns and quantitative ratios of those PAHs to determine which oil samples have a common origin. Similarly, work by META Environmental, Inc. (META) has shown that the same methodology can be used to identify the sources of pyrogenic PAHs at foundries, coke plants, tar refineries, wood treating facilities, former manufactured gas plants, and in urban background (among others).

Sample-Specific Observations

MW-70

Sample MW-70 contained petrogenic material (see Definitions). The petrogenic material was indicated by a broad, unresolved complex mixture (UCM) of hydrocarbons that extended from about 14 minutes (decane; n-C10) to about 40 minutes (tetracosane; n-C24) in the GC/FID chromatogram (Appendix A). Normal alkanes, alkylcyclohexanes, and sesquiterpanes, and other hydrocarbons were visible in the GC/MS extracted ion profiles (Appendix C); but not tri- and tetraterpanes and steranes. These characteristics are consistent with heavy distillate fuel oils including No. 2 fuel oil and diesel fuel.

Sample MW-70 also contained normal alkanes, alkylcyclohexanes, and alkylated benzenes from about 5 minutes (hexane; n-C6) to about 14 minutes (n-C10) in addition to the diesel range hydrocarbons. The distribution of normal alkanes, alkylcyclohexanes, and alkylated benzenes in the lower boiling range was characteristic of gasoline.

Tetraethyl lead, a gasoline additive, was qualitatively detected in the GC/MS data.

No other petroleum products or other materials were evident in the data.

The laboratory duplicate analysis of RW HC 7-27-17 was similar.

Relative Amounts of Gasoline and No.2 Fuel Oil

The ranges of gasoline and No. 2 fuel oil (diesel) overlap; therefore, it is not possible to determine the relative amounts of each in a single sample exactly. However, assuming that all mass that elutes before undecane (n-C11) is gasoline, and all mass that elutes after undecane is

diesel, then about 40% of the mass was gasoline and 60% of the mass was No. 2 fuel oil (diesel).

Comparison of MW-70 to Samples Previously Analyzed from the Site

Sample MW-70 was compared to one NAPL sample collected from the site in April 2017, 3 NAPL samples collected from the site in September and October of 2016, a sediment sample collected from the site in May 2017, and a NAPL sample collected from the site in July 2017.

Sample Tank 201 was a crude oil reference sample provided by Calumet Refining. Samples MW-41 and MW-53 were gasoline/distillate mixtures. Sample C-32 LNAPL was No. 2 fuel oil or diesel fuel, and Sample RW HC 7-27-17 was weathered No. 2 fuel oil or diesel. The identity of sample SED-08 (4'-6') was uncertain, but appeared to be severely weathered crude oil.

Based on a qualitative review of the biomarker patterns (Appendix C), the diesel-range material in sample MW-70 was No. 2 fuel oil/diesel similar to C-32 LNAPL. The sesquiterpane biomarker ratio analysis (Figure 1) suggests that the oil in MW-70 and in C-32 LNAPL was the same.

Samples MW-70, MW-41, and MW-53 were all gasoline/diesel mixtures. All three samples contained tetraethyl lead; indicating that at least a portion of the gasoline was an historic variant. It was not possible to determine if the gasoline components of the three samples were same with the available data and because of interferences in the chemical distributions from the diesel-range component.

Qualifications

The interpretation and conclusions in this report are based on the analysis of 1 NAPL sample by GC/FID (EPA Method 8015mod) and GC/MS (EPA Method 8270mod). Systematic or random biases or errors in the data could affect the interpretations; and the conclusions could change with additional data.

Definitions

The following terms and definitions are used throughout this report for consistency and clarity.

Pyrogenic PAHs are generated at relatively high temperature in the absence of oxygen. This includes coal tar, oil tar, their refined products, and the products of incomplete combustion.

Petrogenic PAHs are generated at relatively low temperatures and high pressures over many years. This includes petroleum, refined petroleum products, and coal.

Oil is a mixture of hydrocarbons consisting of crude oil or refined crude oil products such as No.2 fuel oil, No. 6 fuel oil and various lubricating, insulating, and hydraulic oils. Oils are usually less dense than water.

LPAHs and HPAHs refer to low molecular weight PAHs (i.e., 2- and 3-ring PAHs) and high molecular weight PAHs (i.e., 4-, 5-, and 6-ring PAHs).

Background is site-specific and is typically a mixture of pyrogenic HPAHs and weathered petroleum products.

PAH16 is the sum of the 16 U.S. EPA priority pollutant PAHs.

UCM – unresolved complex mixture: a feature frequently observed in gas chromatographic (GC) data of crude oils and refined petroleum products. The reason for the UCM (or hump in the baseline) appearance is that GC cannot resolve a significant portion of the hundreds of hydrocarbon compounds in the sample. The resolved components appear as peaks while the UCM appears as a Gaussian-shaped hump or irregularly-shaped background in the chromatogram.

PICs – products of incomplete combustion. In the context of hydrocarbon forensics, PICs are mostly aromatic compounds, pyrogenically produced.

References

Stout, S., Wang, Z. "Oil Spill Environmental Forensics," Academic Press, New York 2007.

"Chemical Fingerprinting of Hydrocarbons," in: Introduction to Environmental Forensics. B.L. Murphy and R.D. Morrison editors, Academic Press, San Diego, CA 2002.

Certification

This certifies that this package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed herein. The results included in this data report relate only to the samples as received and analyzed by the laboratory.

This report shall not be reproduced except in full, without the written approval of META Environmental, Inc.

Release of the data contained in this hardcopy or electronic copy data package has been authorized by the following signature(s).

August 29, 2017

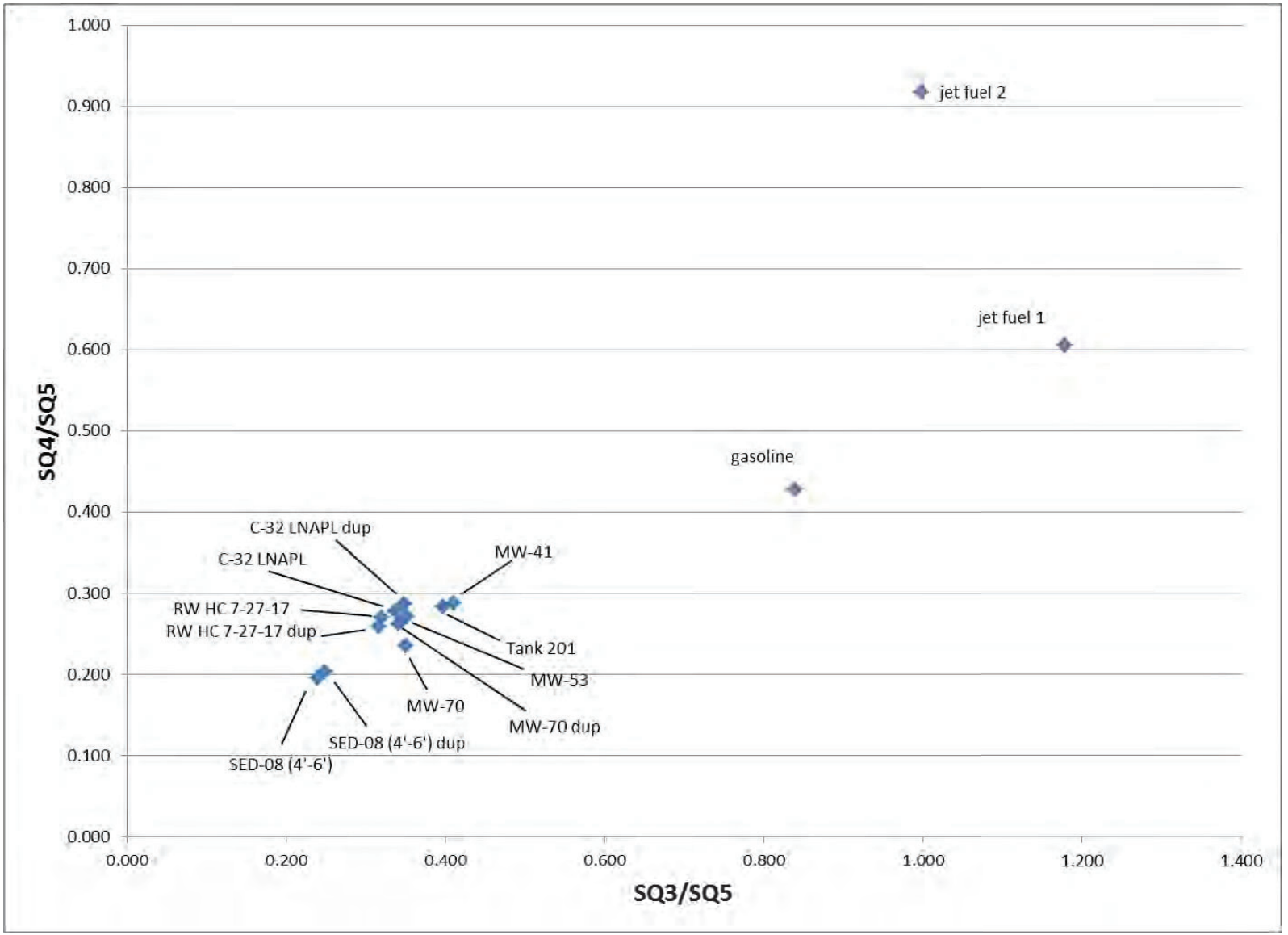
David M. Mauro
President, Senior Scientist

Date

META Environmental, Inc.
115 Dean Avenue, Suite 300
Franklin MA 02038
Phone: 508-541-9146
E-Mail dmauro@metaenv.com

Figures

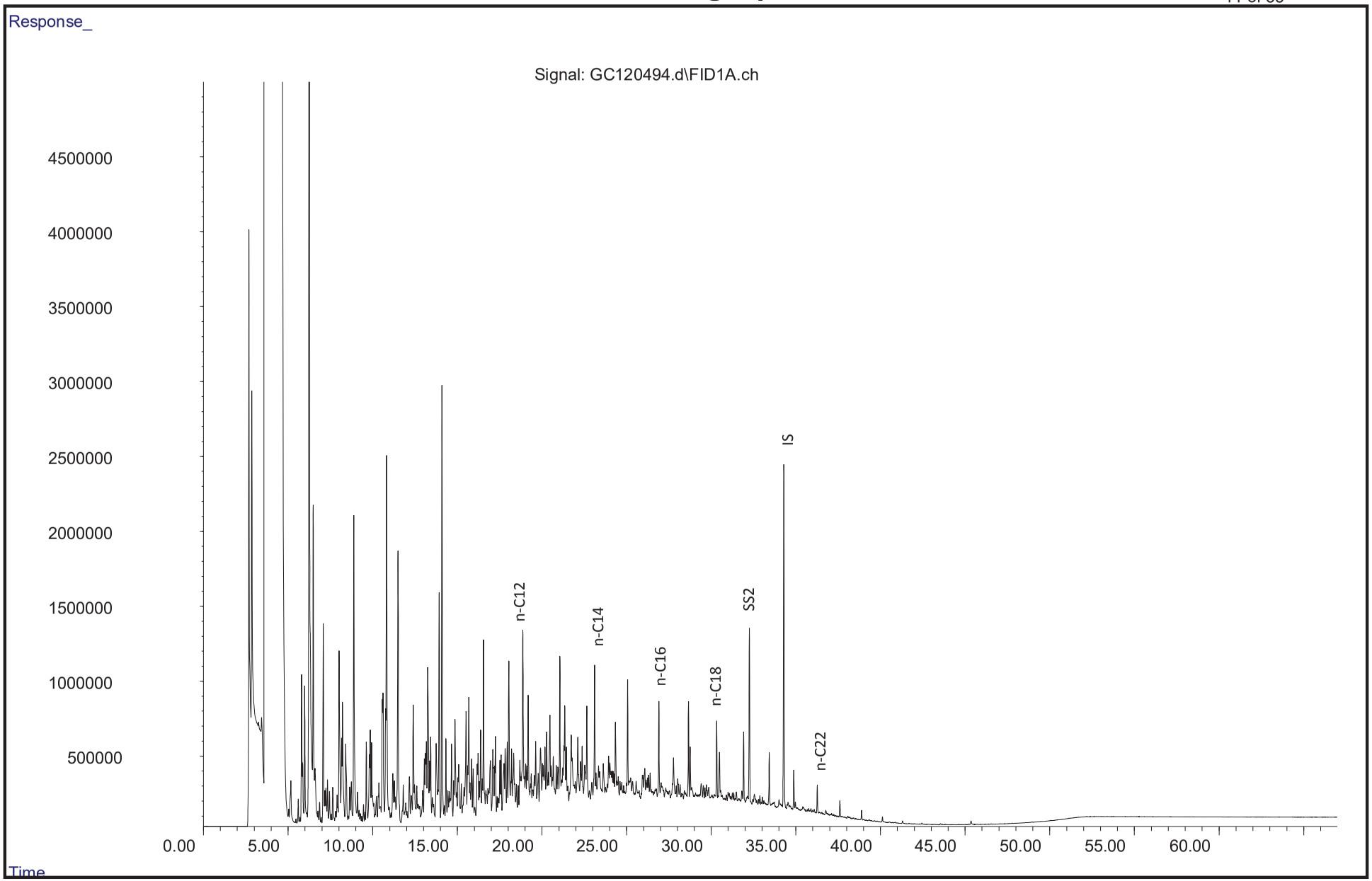
Figure 1. Sesquiterpane Biomarker Double Ratio Plot



Appendix A

GC/FID Fingerprints

GC/FID Fingerprint

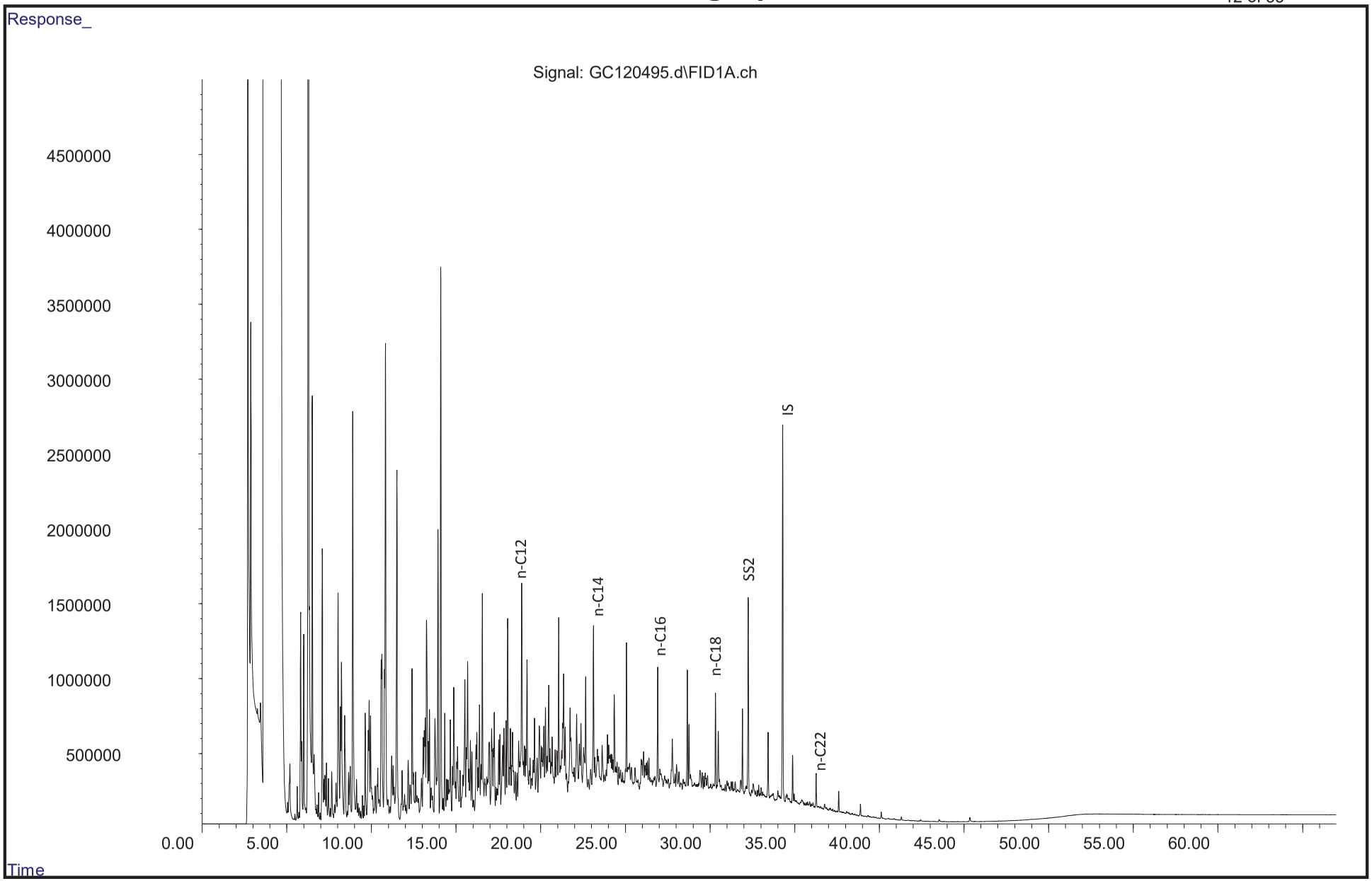


Analysis Date: 08/17/2017

IS – 5α-androstane
SS2 – o-terphenyl

Field ID: MW-70
Laboratory ID: F170012-01
Method: EPA 8015M

GC/FID Fingerprint



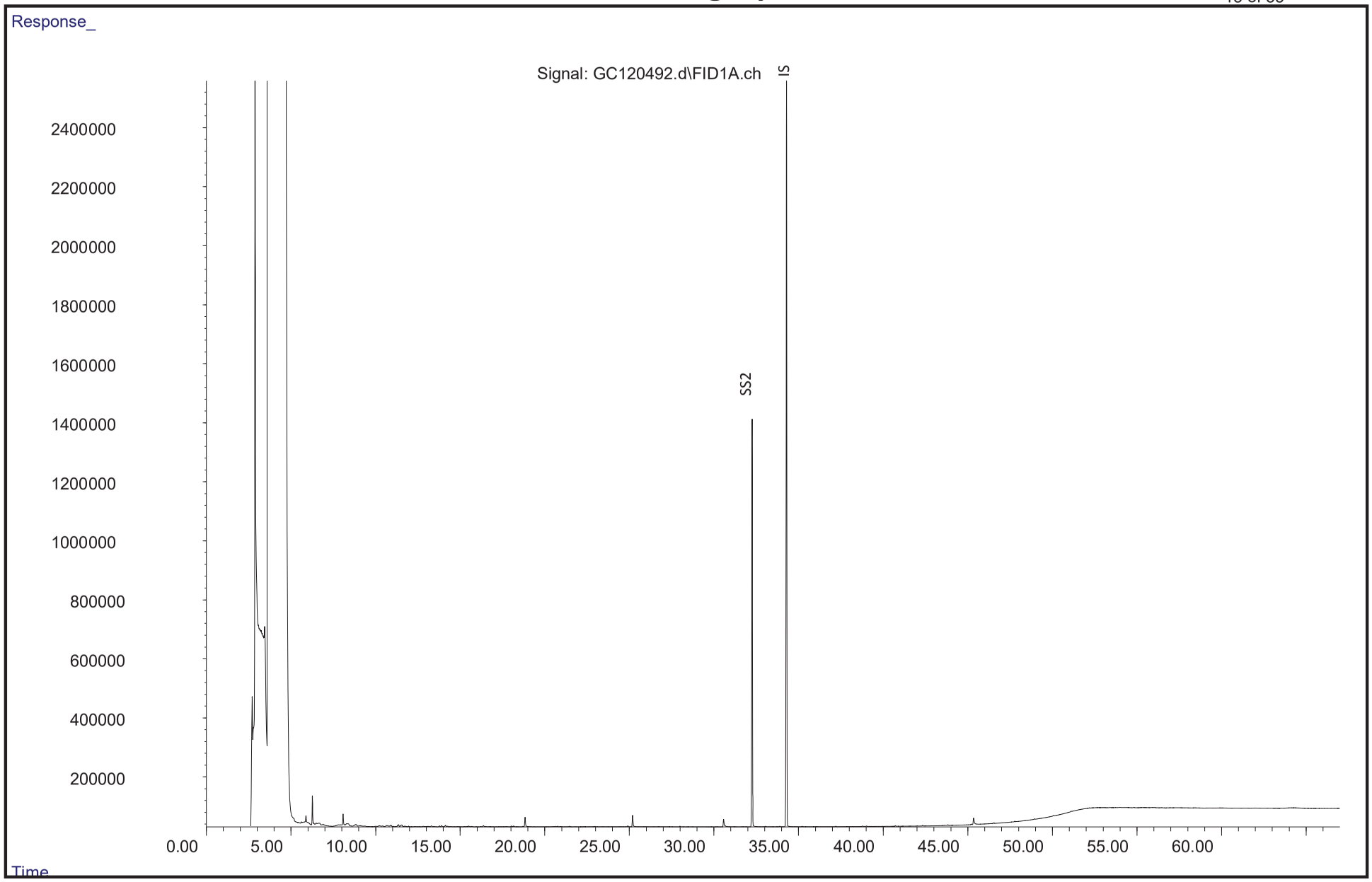
Analysis Date: 08/17/2017

IS – 5α-androstane
SS2 – o-terphenyl

Field ID:	**MW-70 dup**
Laboratory ID:	FH71001-DUP1
Method:	EPA 8015M

META

GC/FID Fingerprint

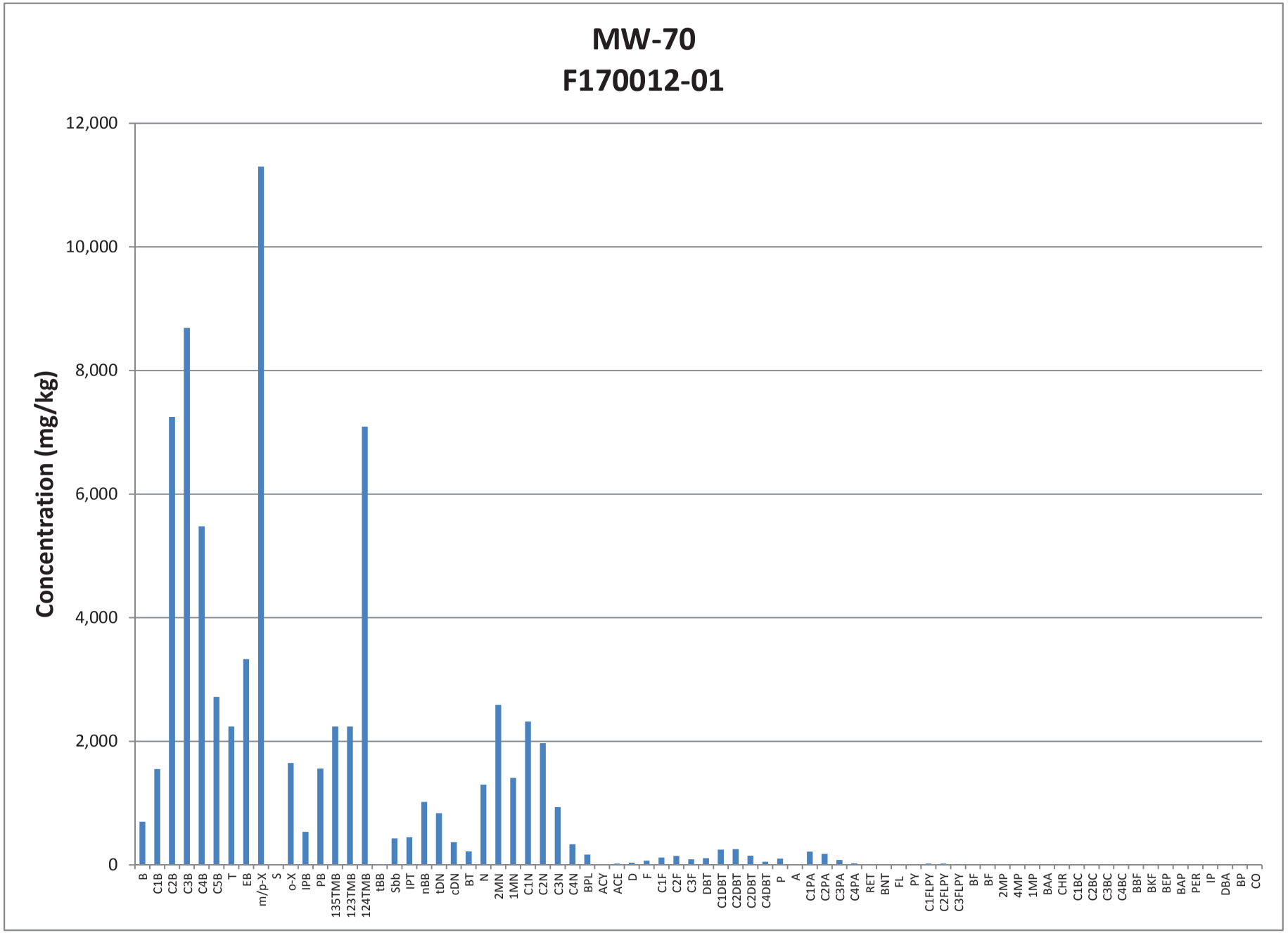


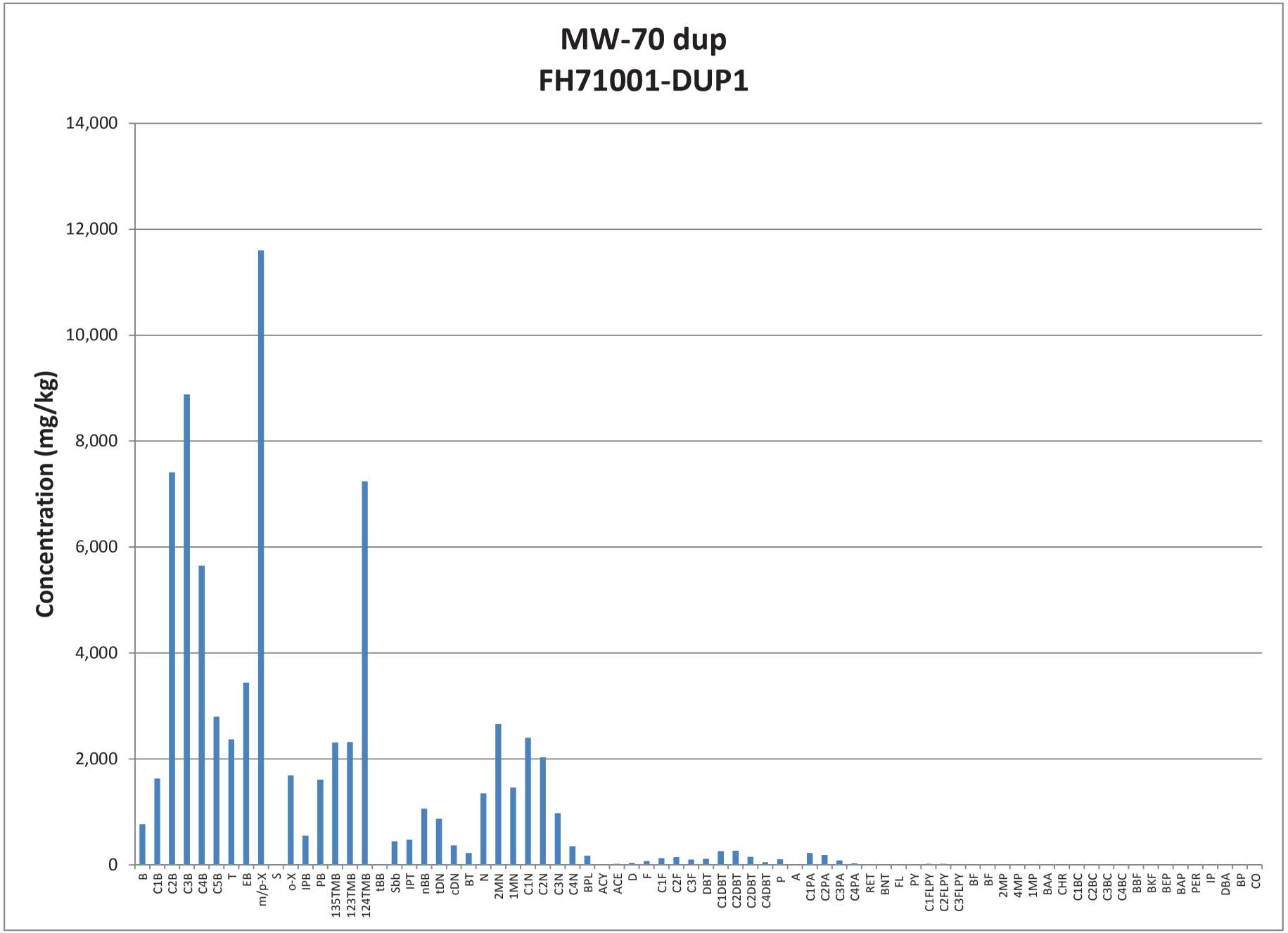
Analysis Date: 08/17/2017

IS – 5α-androstane
SS2 – o-terphenyl

Field ID:	**Method Blank**
Laboratory ID:	FH71001-BLK1
Method:	EPA 8015M

Appendix B
Bar Graphs


MW-70
F170012-01
Concentration (mg/kg)
12,000
10,000
8,000
6,000
4,000
2,000
0
B
C1B
C2B
C3B
C4B
C5B
T
EB
m/p-X
S
o-X
IPB
PB
135TMB
123TMB
124TMB
tBB
Sbb
IPT
nBB
tDN
cDN
BT
N
2MN
1MN
C1N
C2N
C3N
C4N
BPL
ACY
ACE
D
F
C1F
C2F
C3F
DBT
C1DBT
C2DBT
C2DBT
C4DBT
P
A
C1PA
C2PA
C3PA
C4PA
RET
BNT
FL
PY
C1FLPY
C2FLPY
C3FLPY
BF
BF
2MP
4MP
1MP
BAA
CHR
C1BC
C2BC
C3BC
C4BC
BBF
BKF
BEP
BAP
PER
IP
DBA
BP
CO


MW-70 dup
FH71001-DUP1
Concentration (mg/kg)
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
B
C1B
C2B
C3B
C4B
C5B
T
EB
m/p-X
S
o-X
IPB
PB
135TMB
123TMB
124TMB
tBB
Sbb
IPT
nBB
tDN
cDN
BT
N
2MN
1MN
C1N
C2N
C3N
C4N
BPL
ACY
ACE
D
F
C1F
C2F
C3F
DBT
C1DBT
C2DBT
C2DBT
C4DBT
P
A
C1PA
C2PA
C3PA
C4PA
RET
BNT
FL
PY
C1FLPY
C2FLPY
C3FLPY
BF
BF
2MP
4MP
1MP
BAA
CHR
C1BC
C2BC
C3BC
C4BC
BBF
BKF
BEP
BAP
PER
IP
DBA
BP
CO

Appendix C

Extracted Ion Current Profiles (EICPs)

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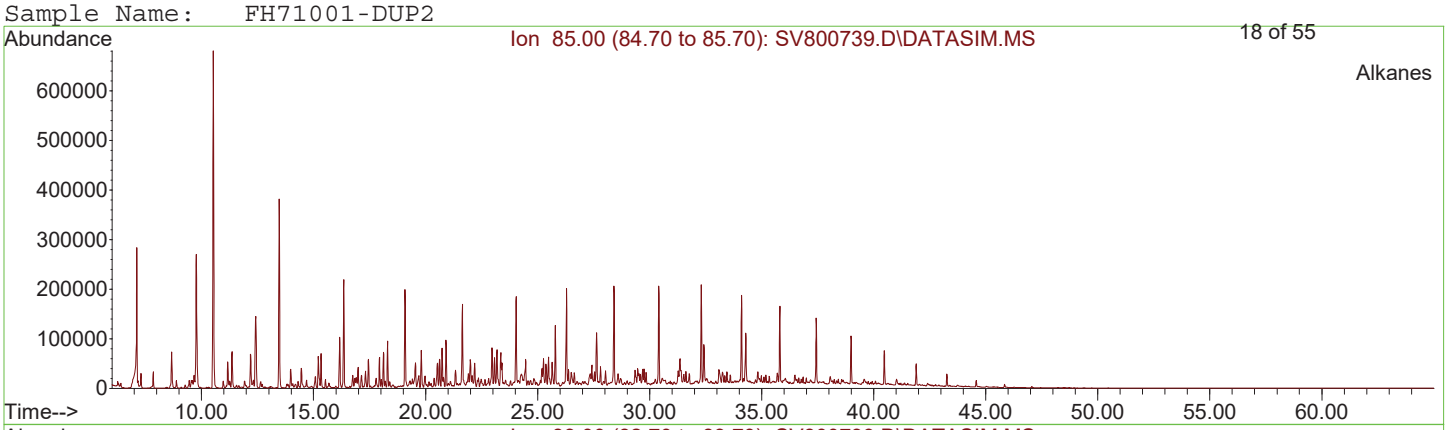

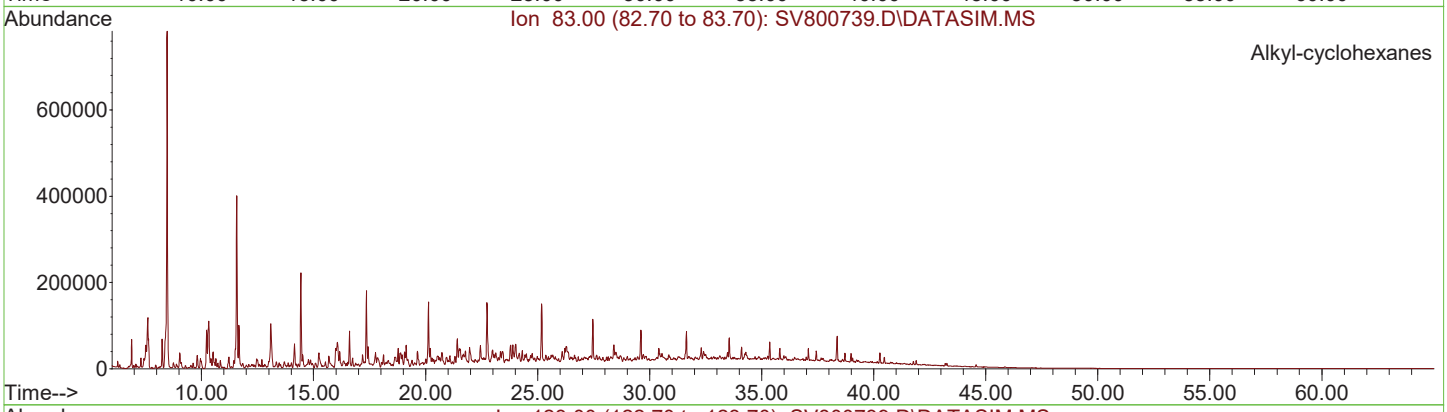

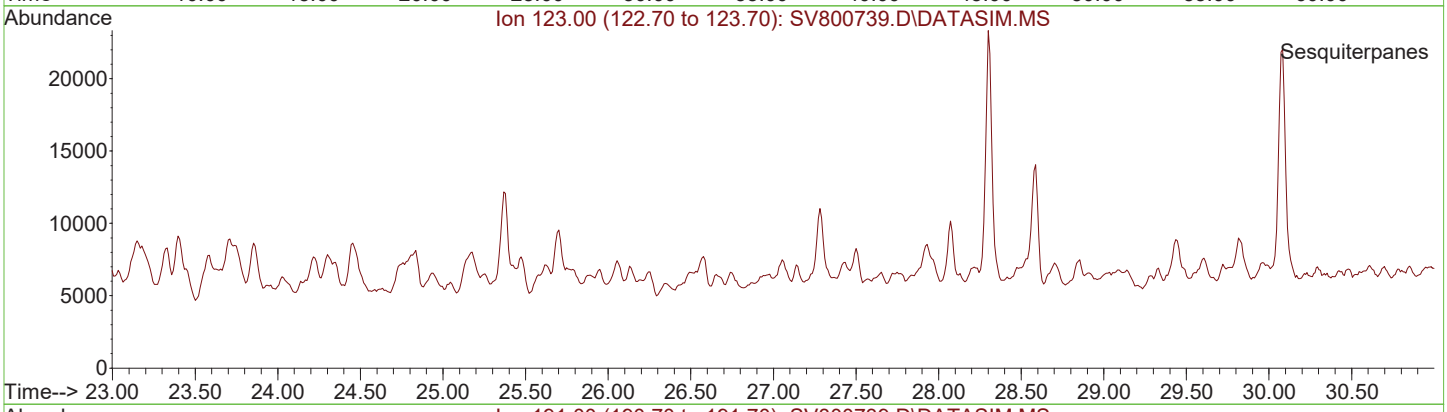

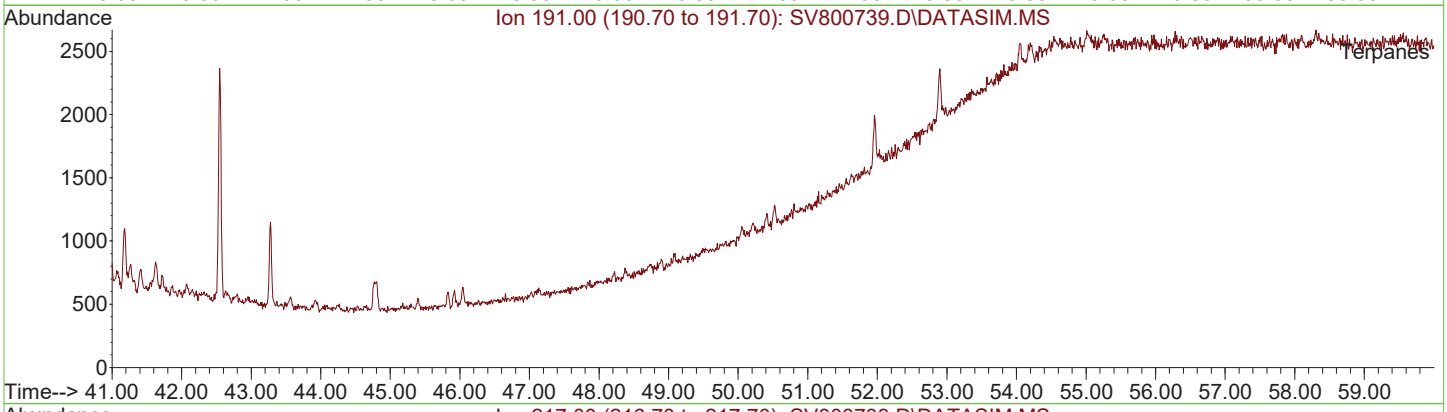

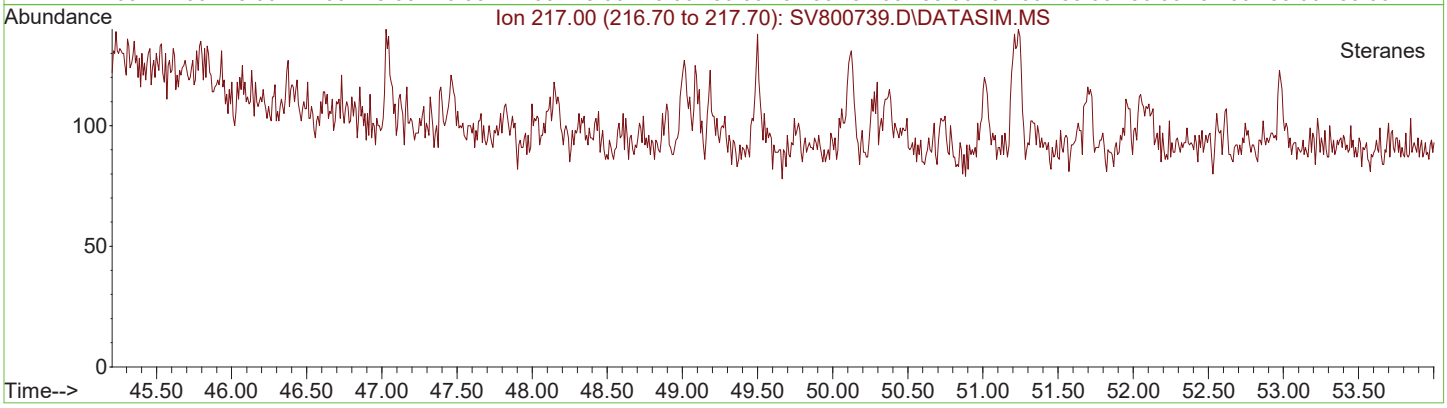

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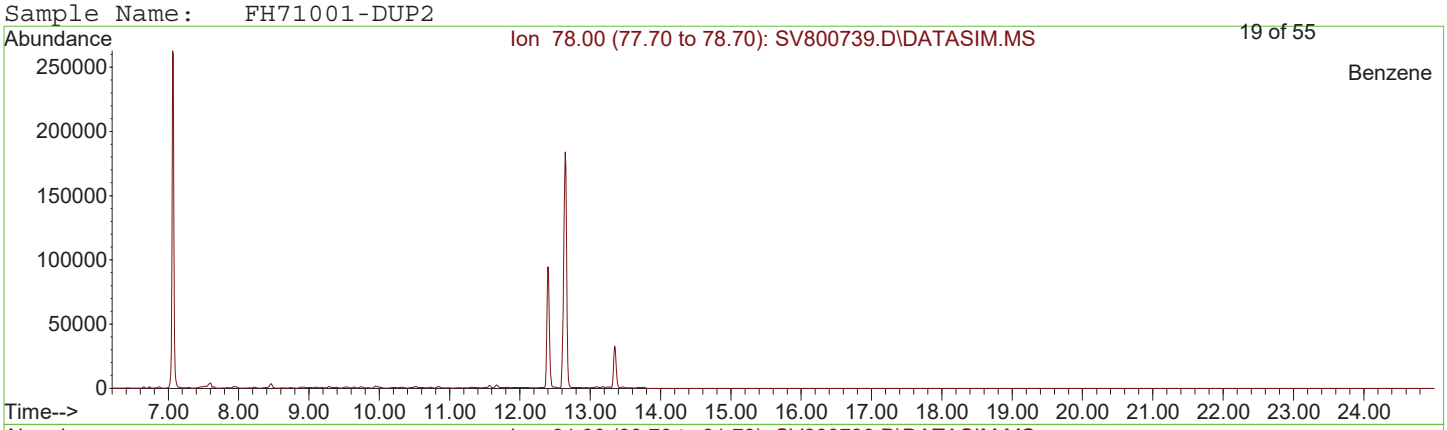

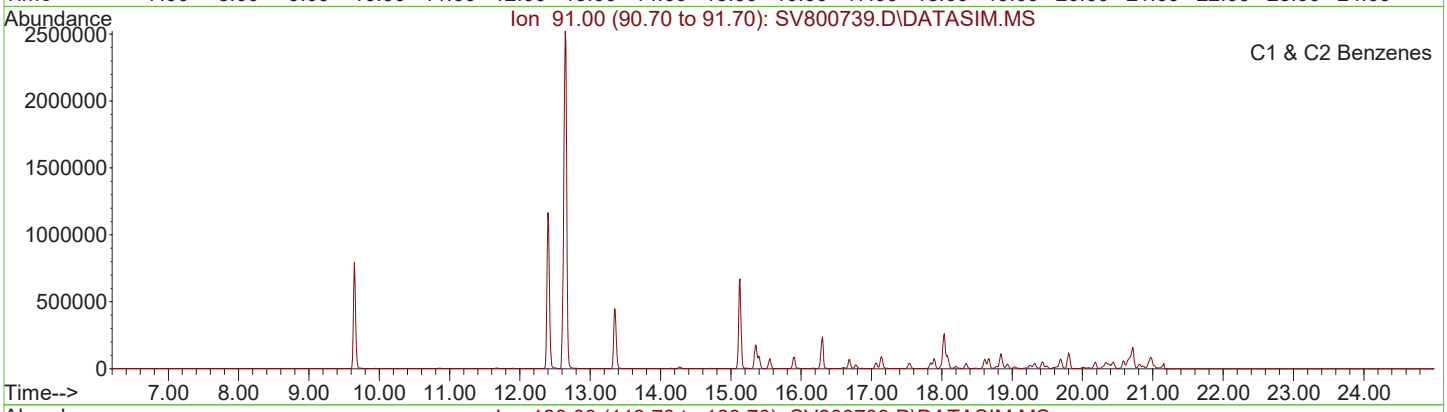

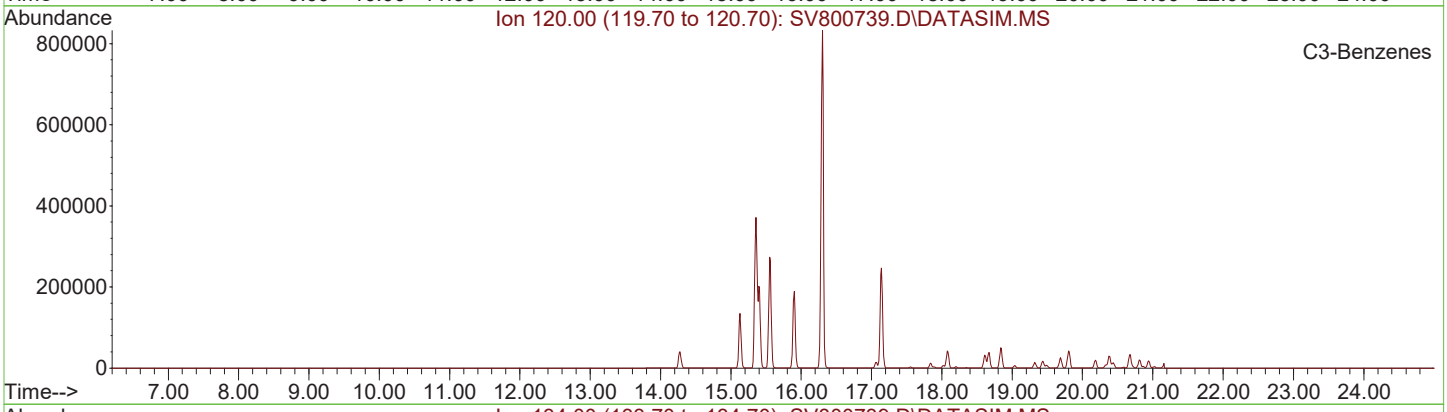

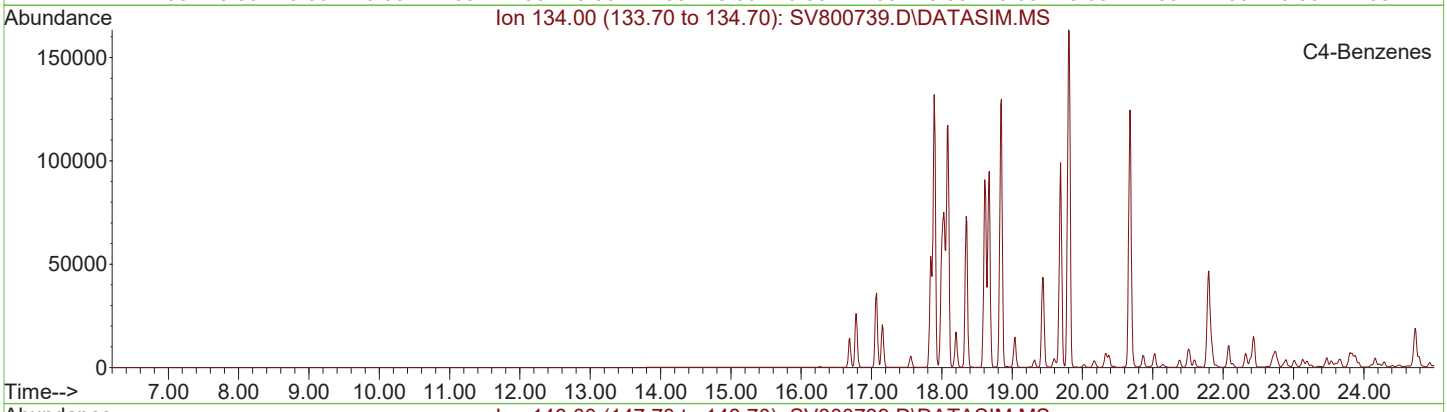

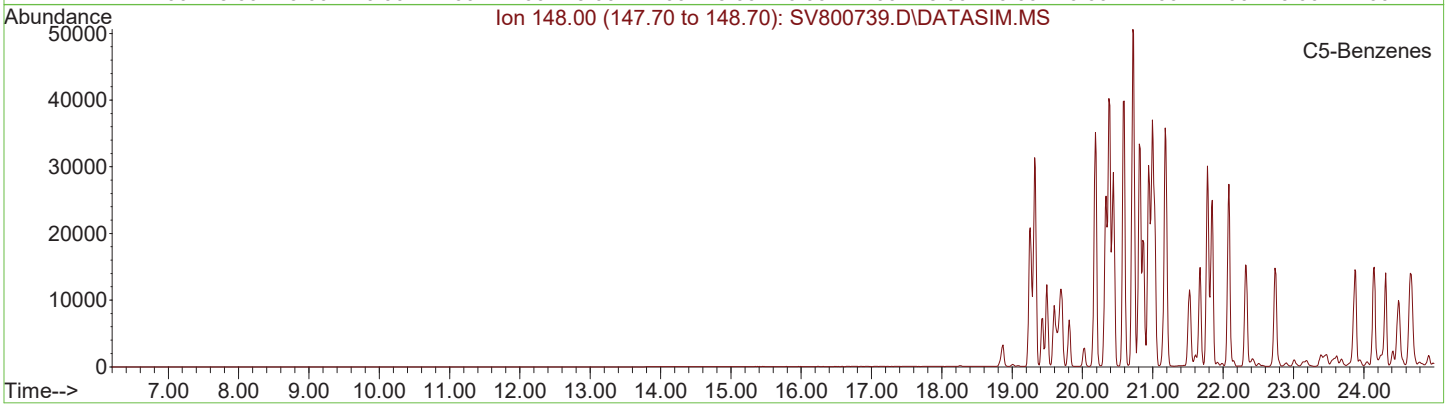

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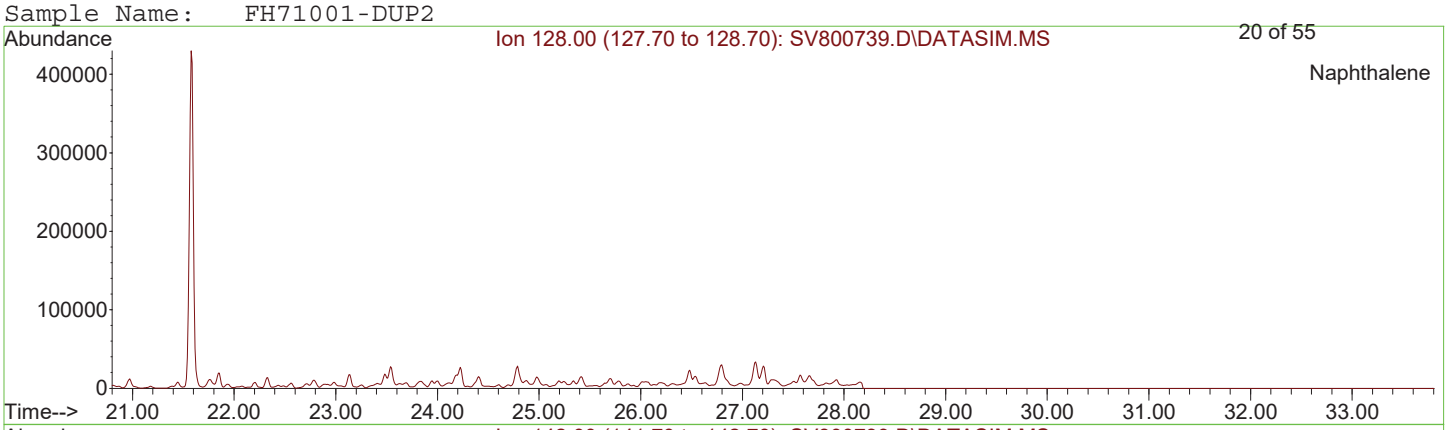

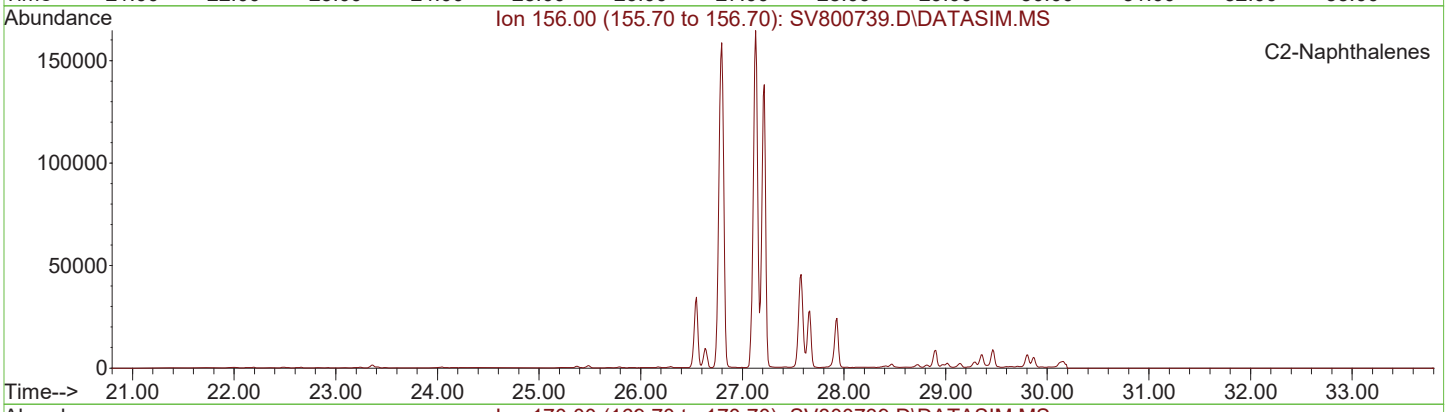

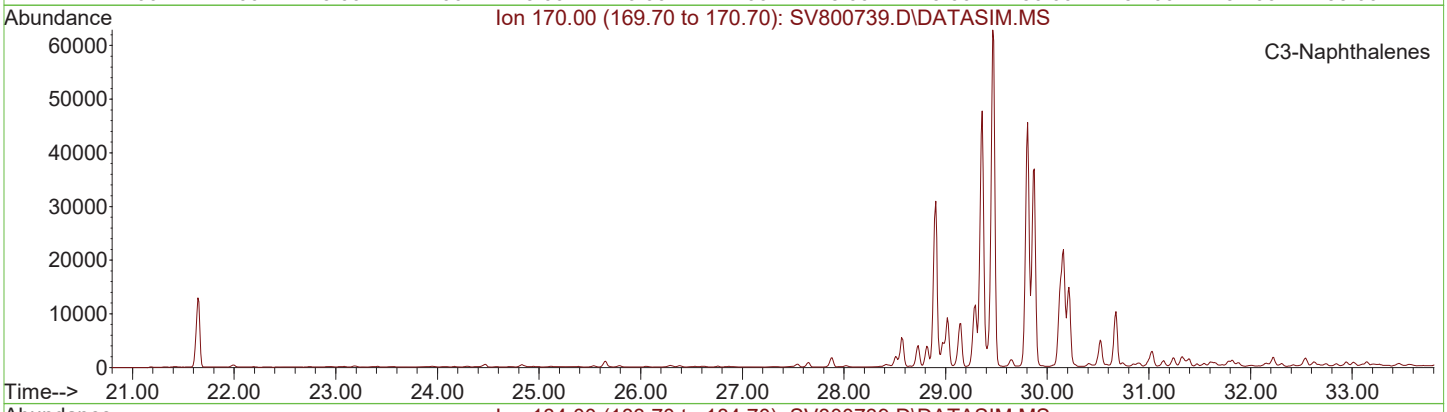

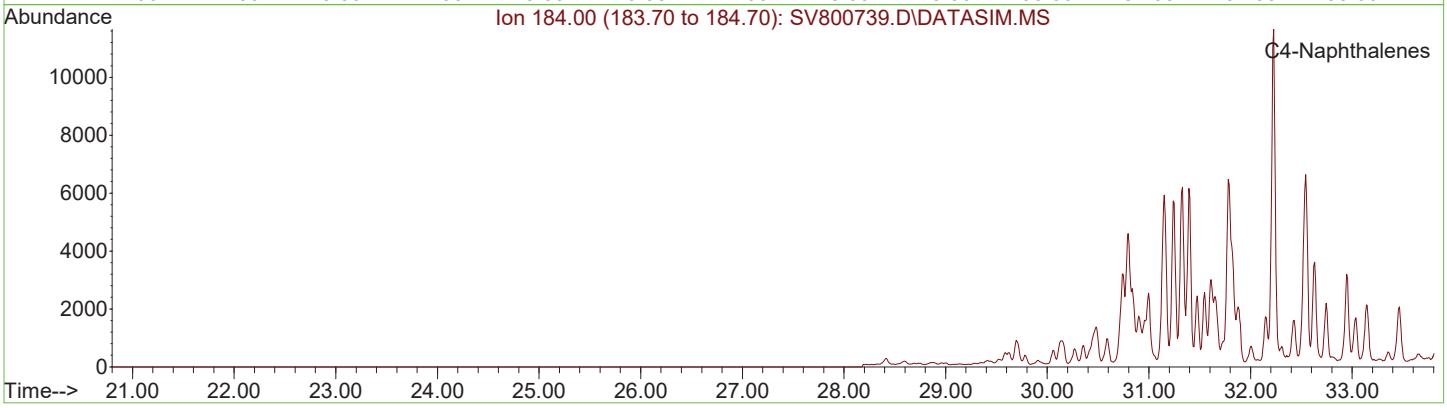

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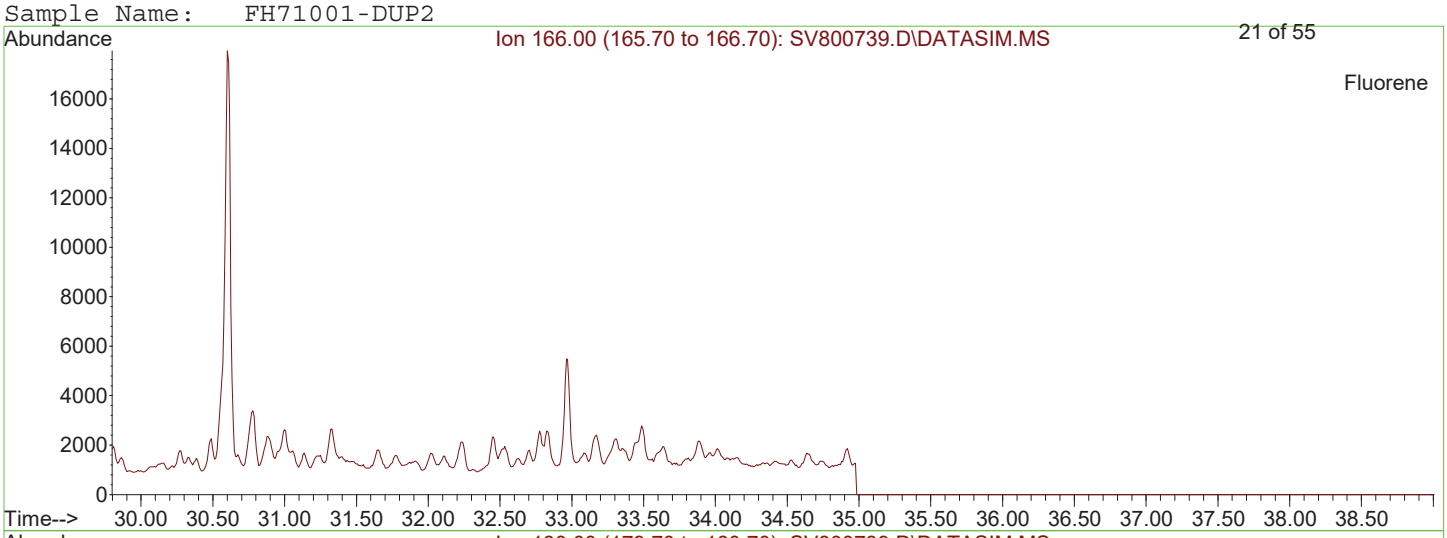

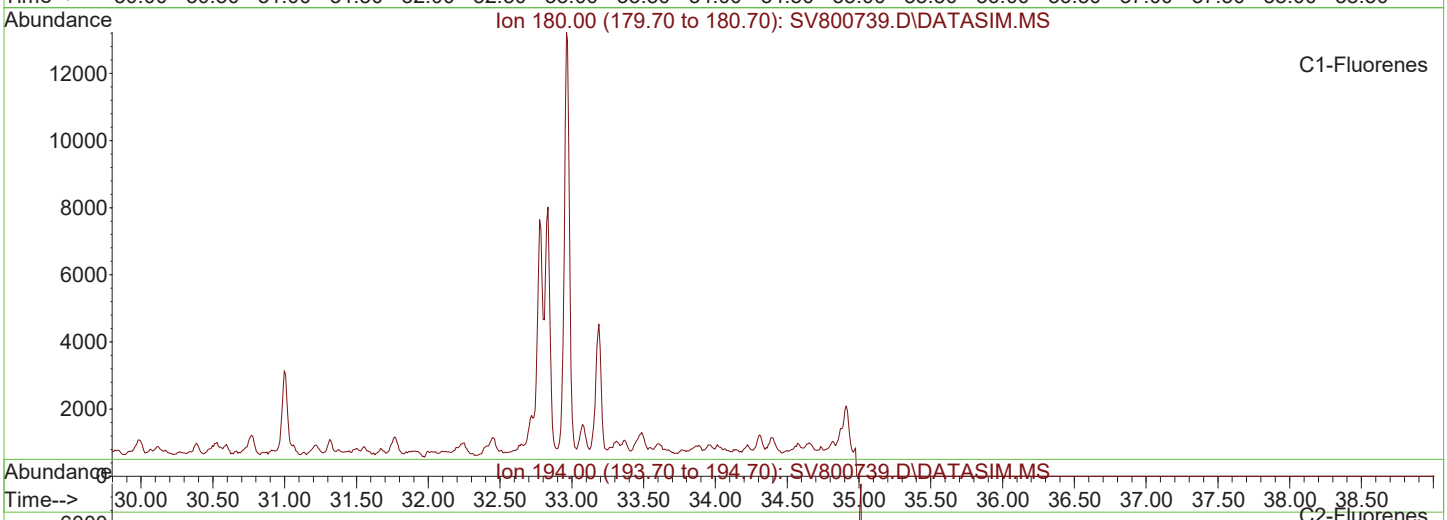

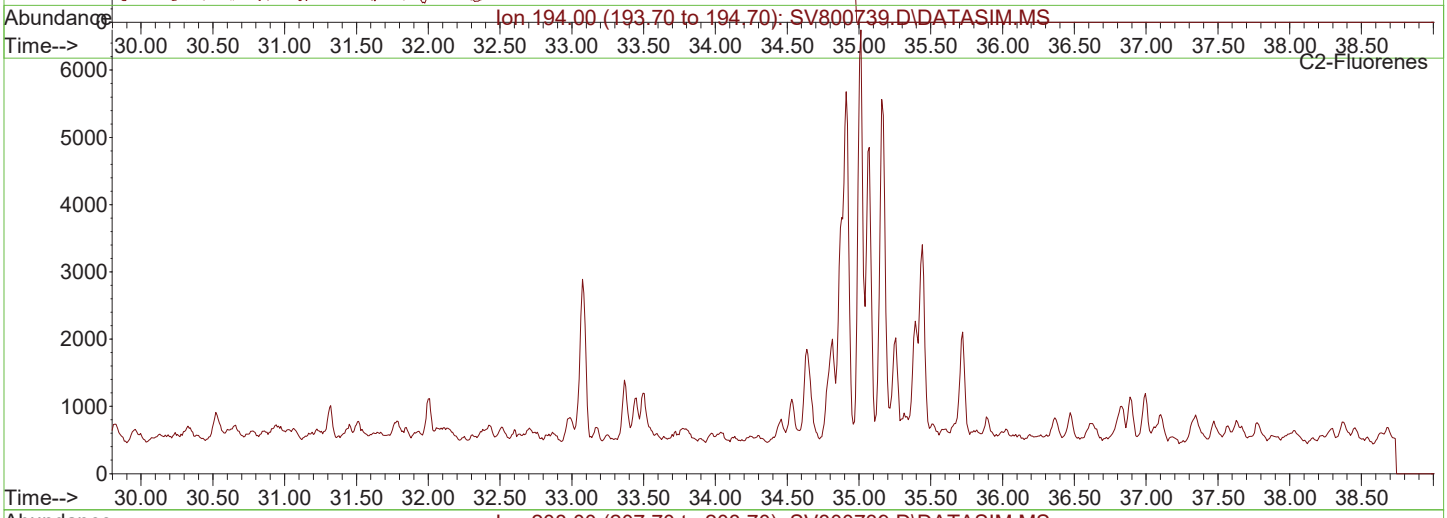

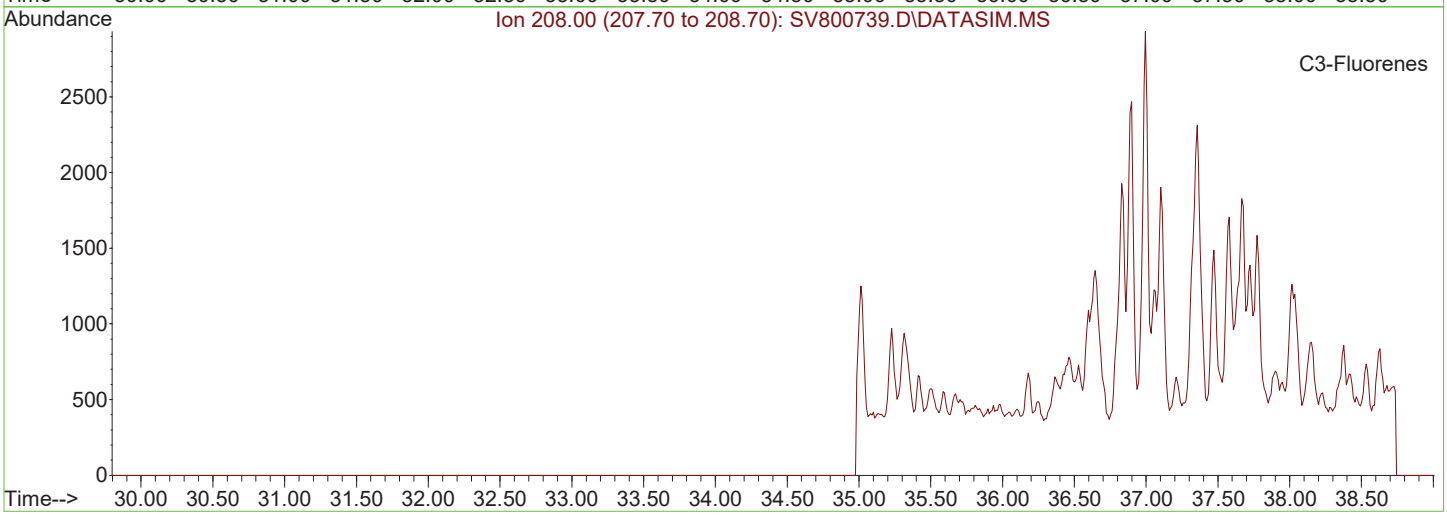

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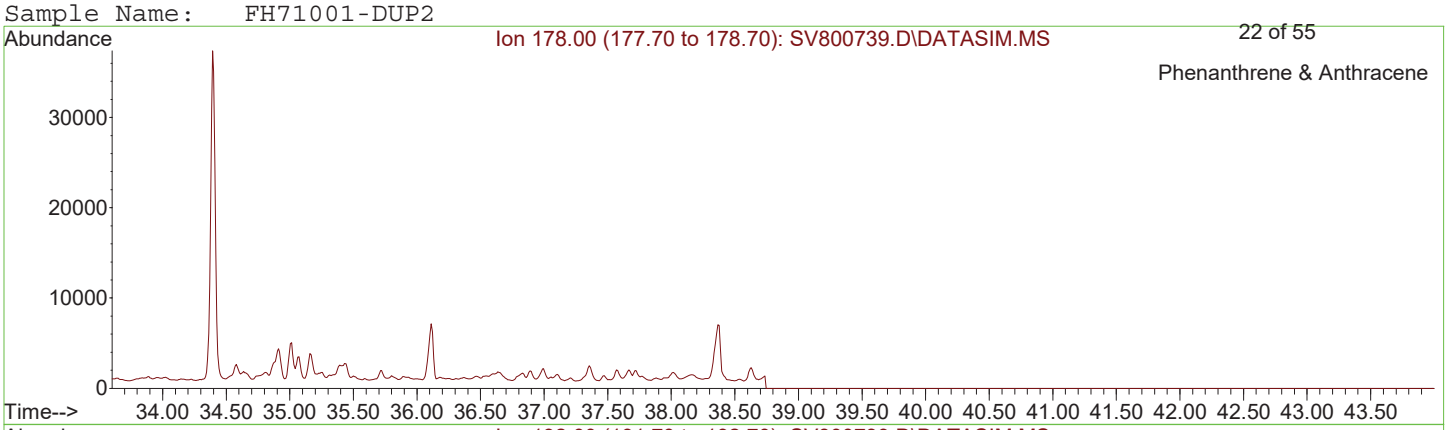

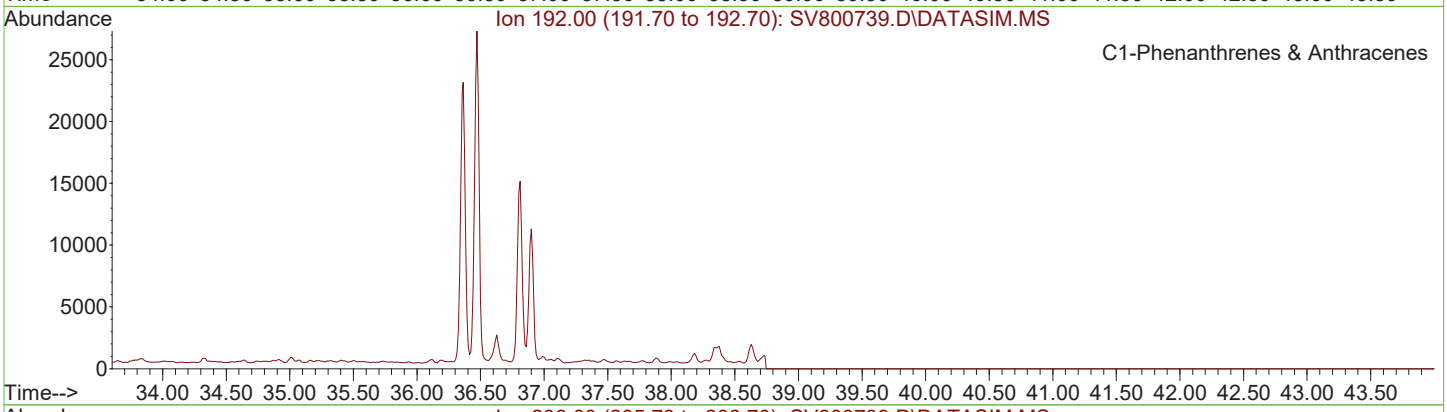

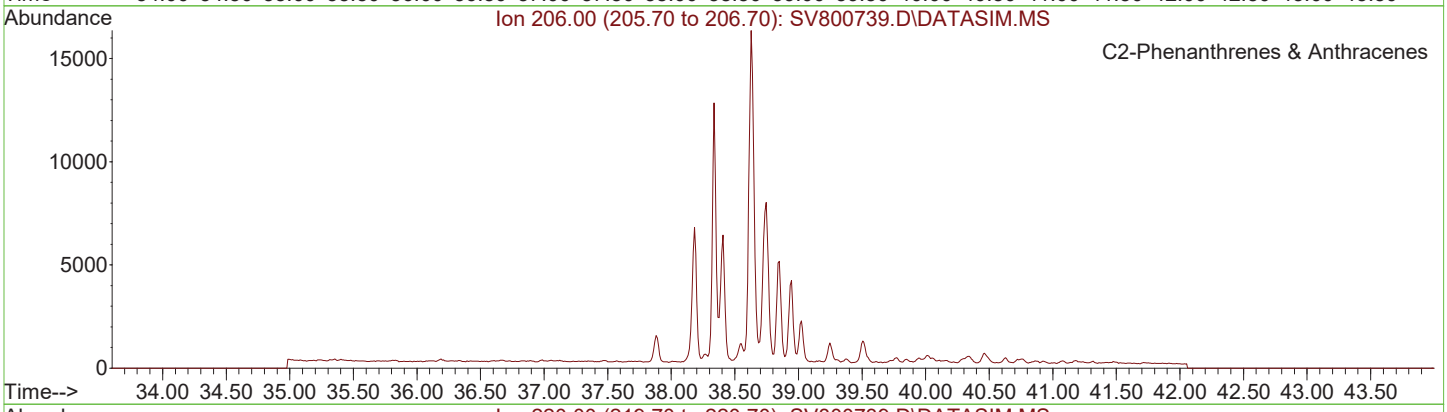

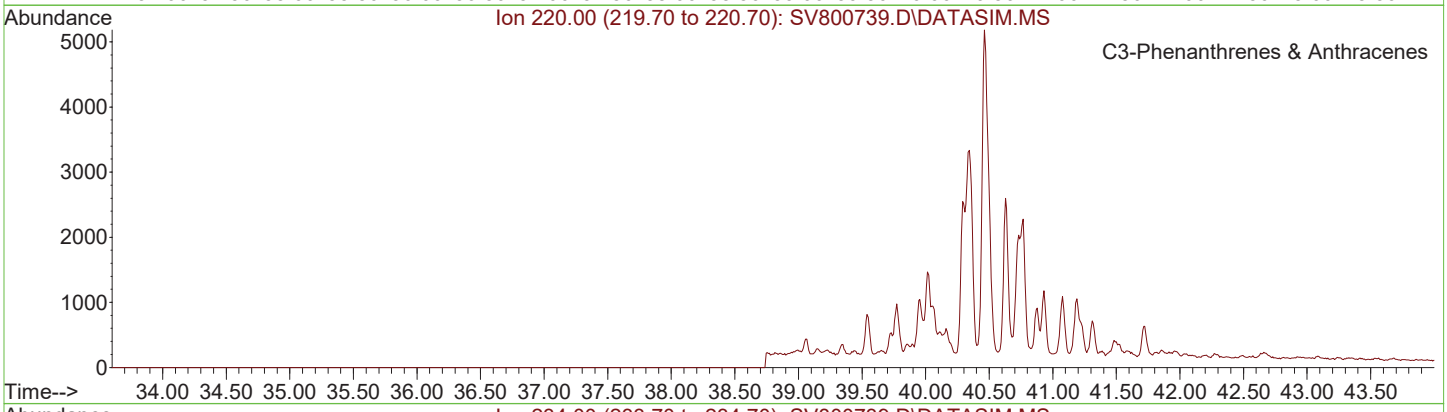

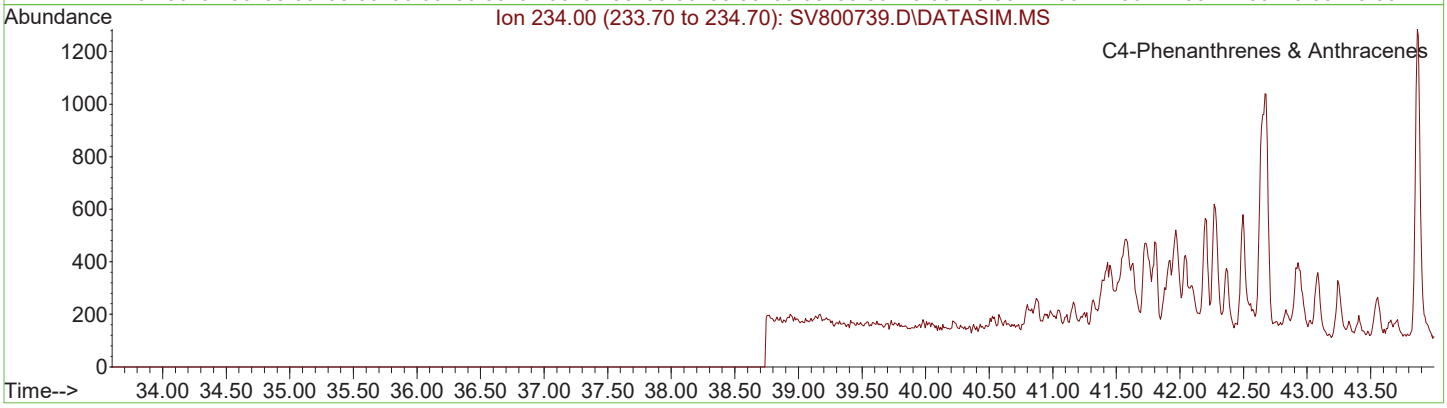

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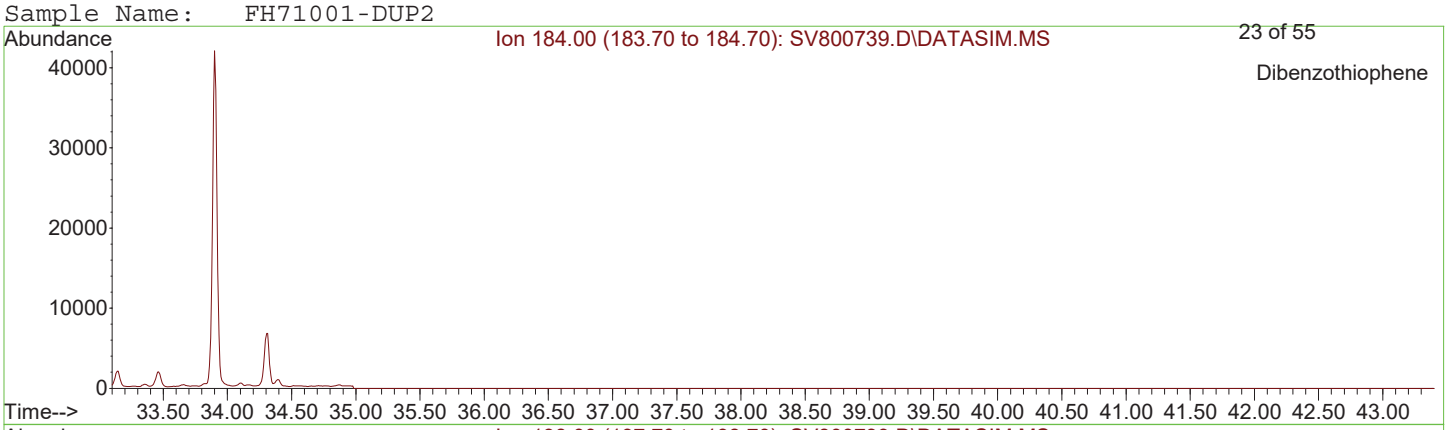

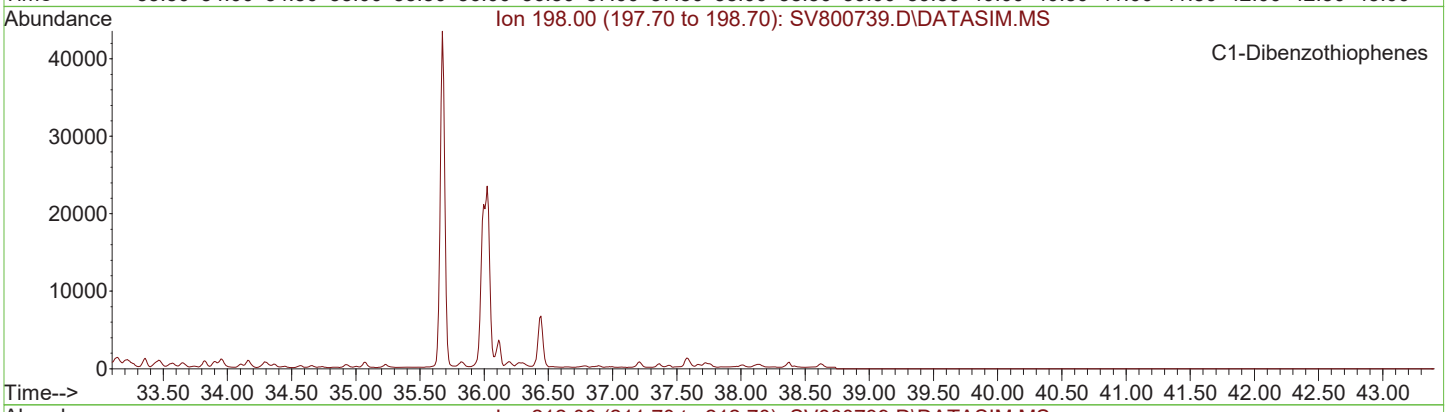

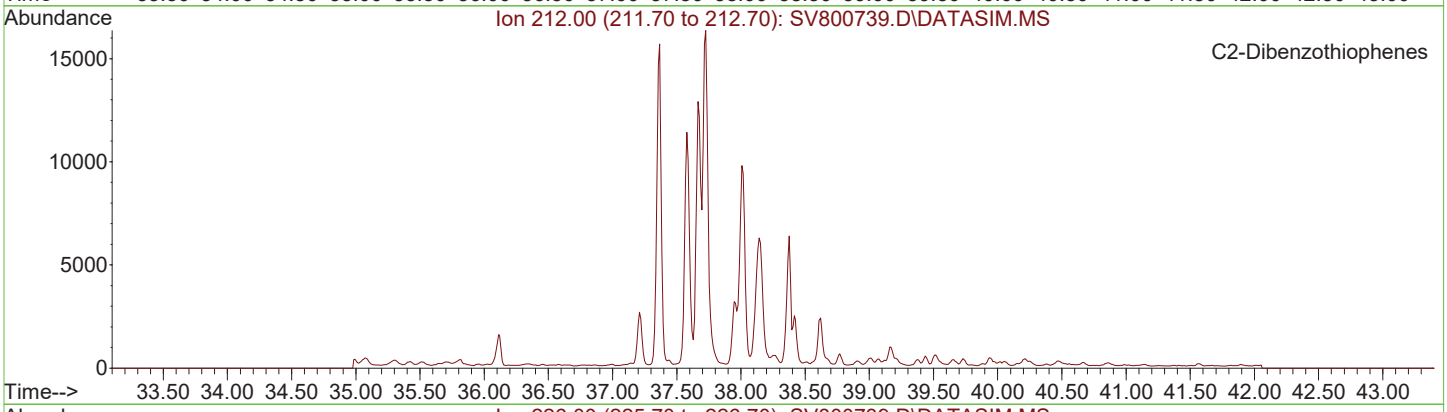

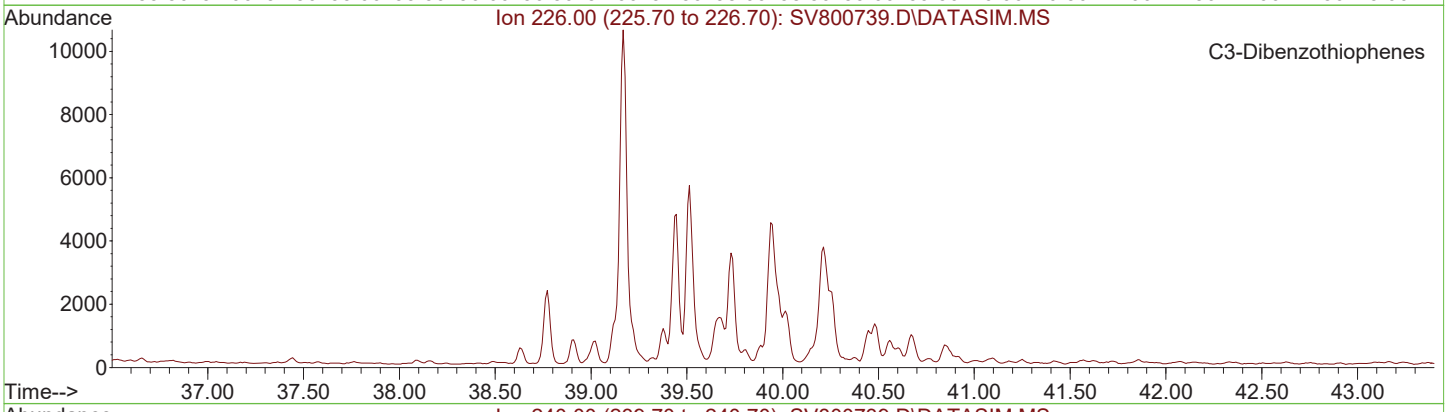

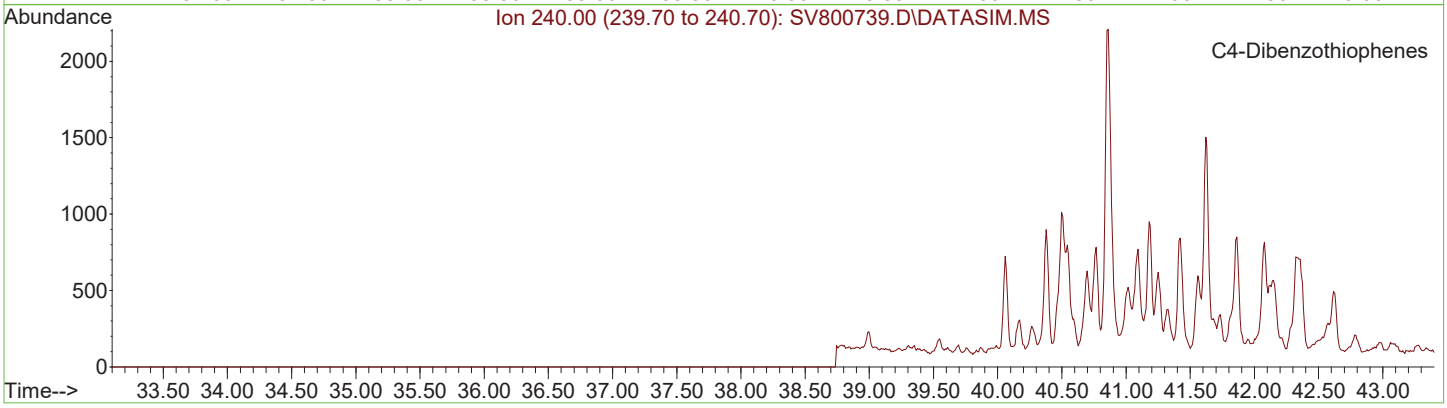

GC/MS EXTRACTED ION CHROMATOGRAM

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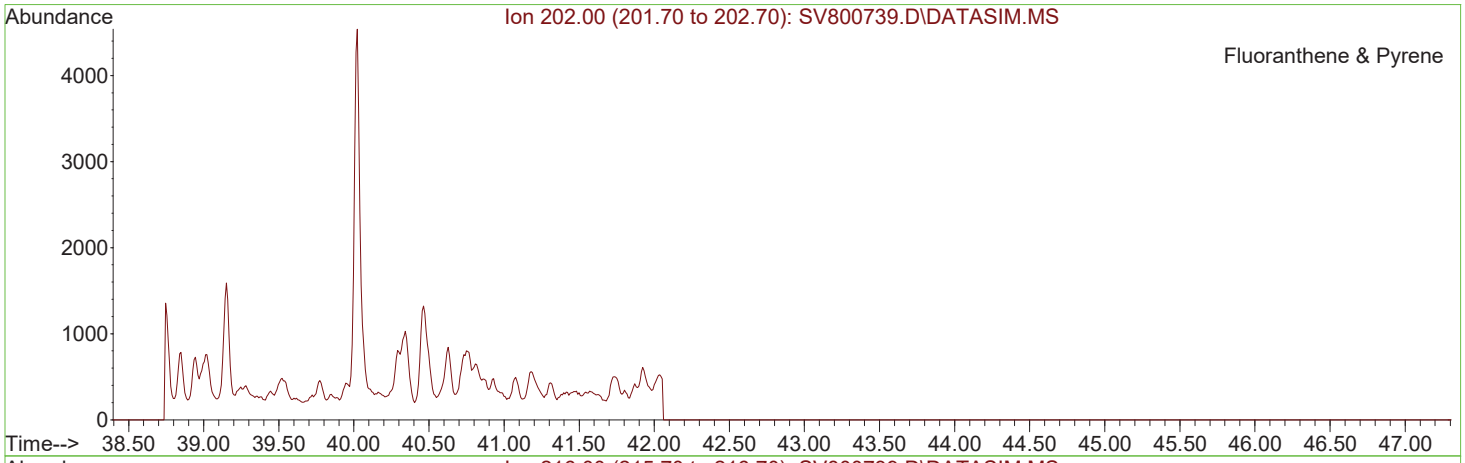

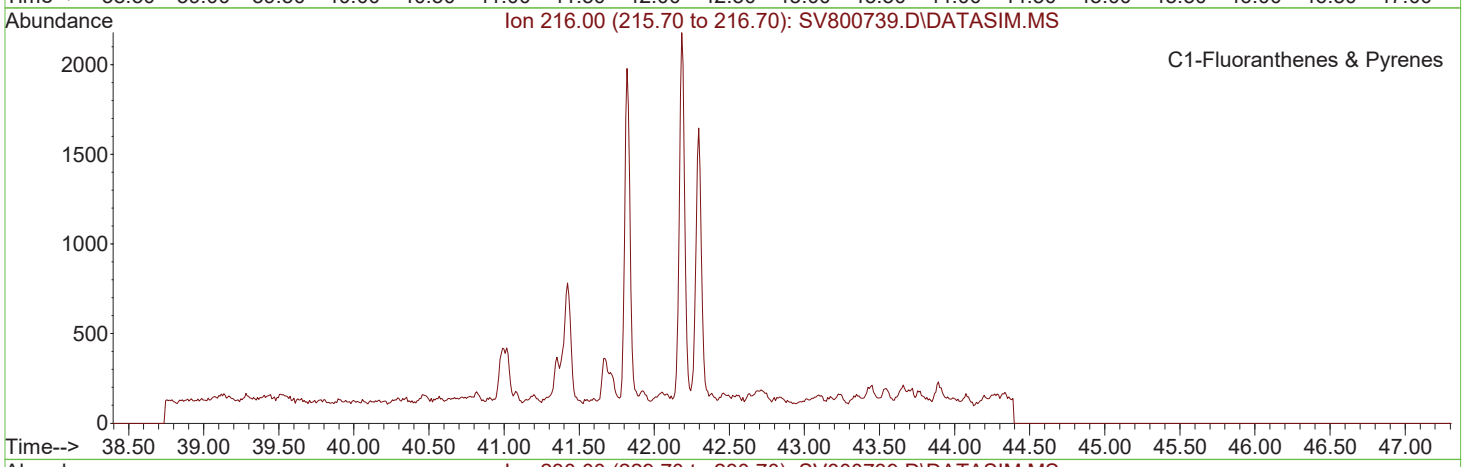

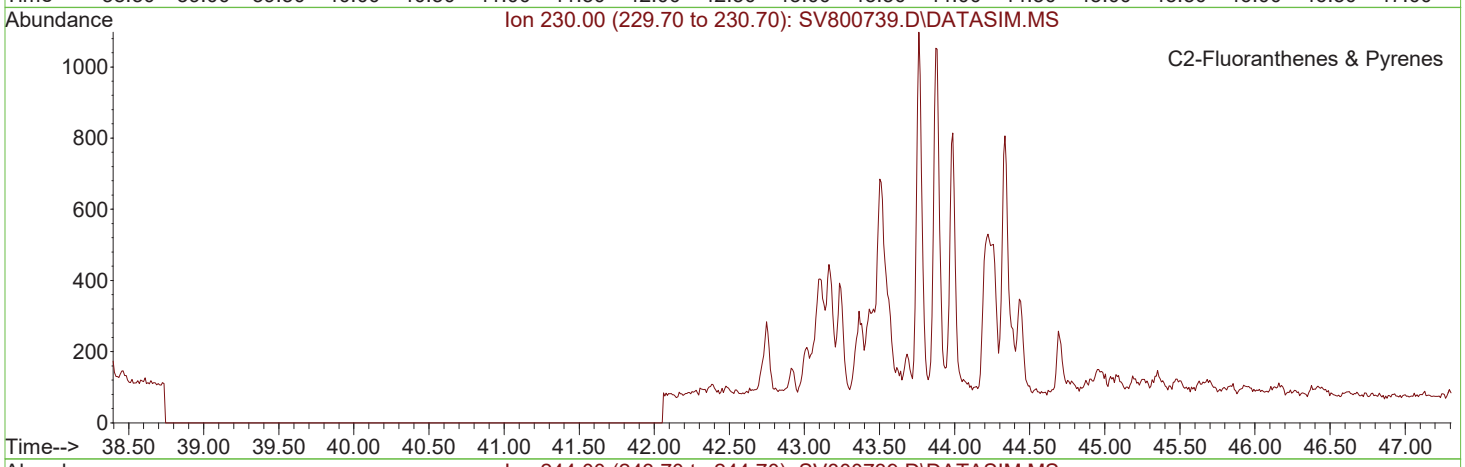

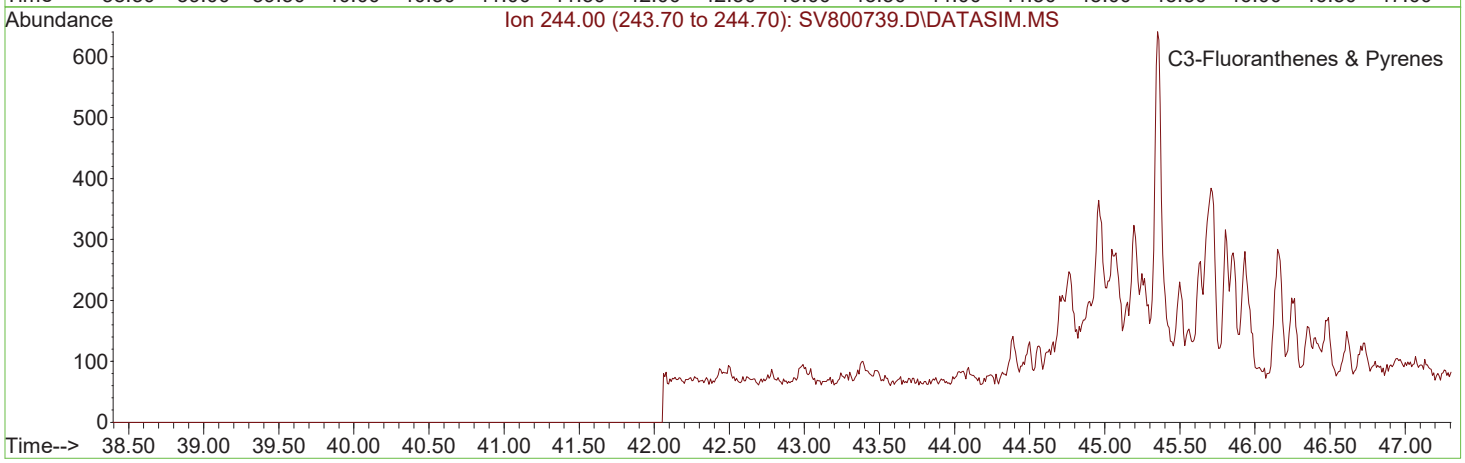

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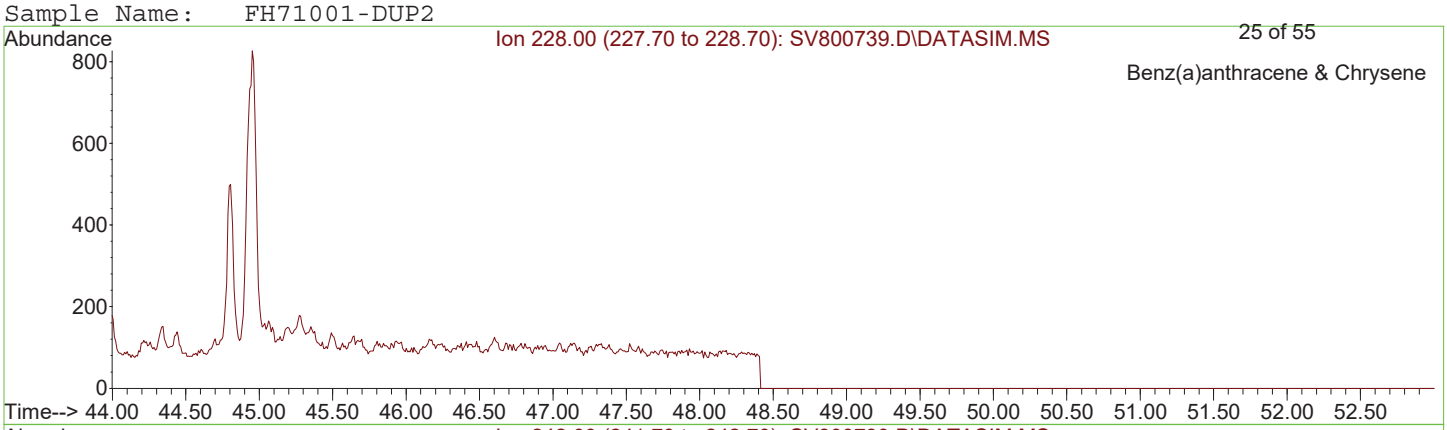

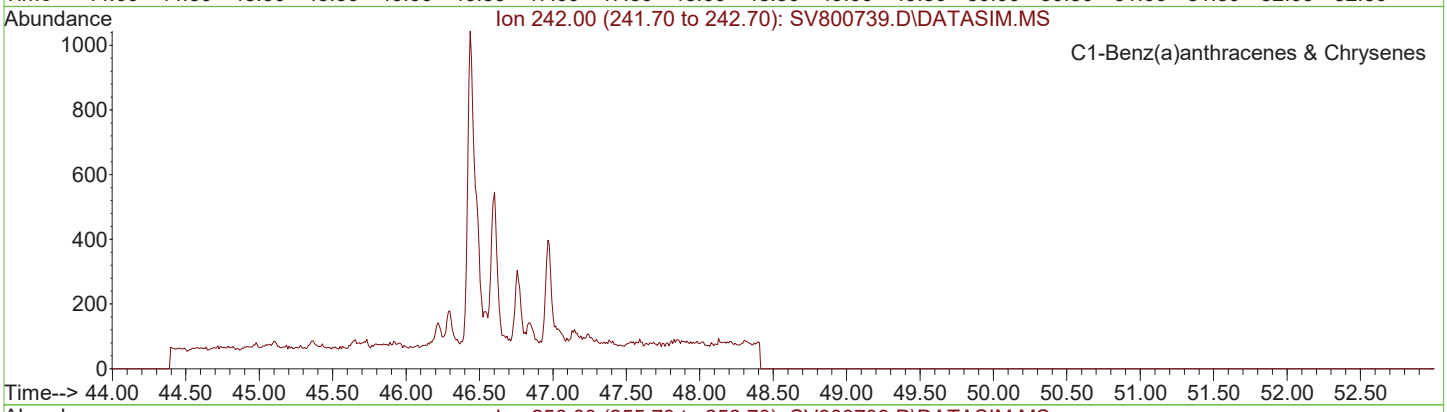

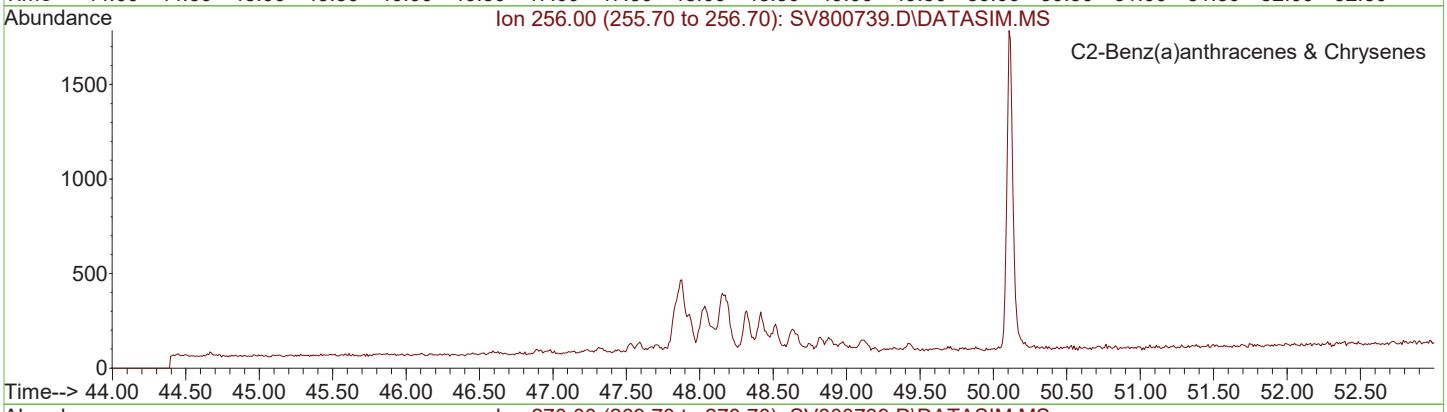

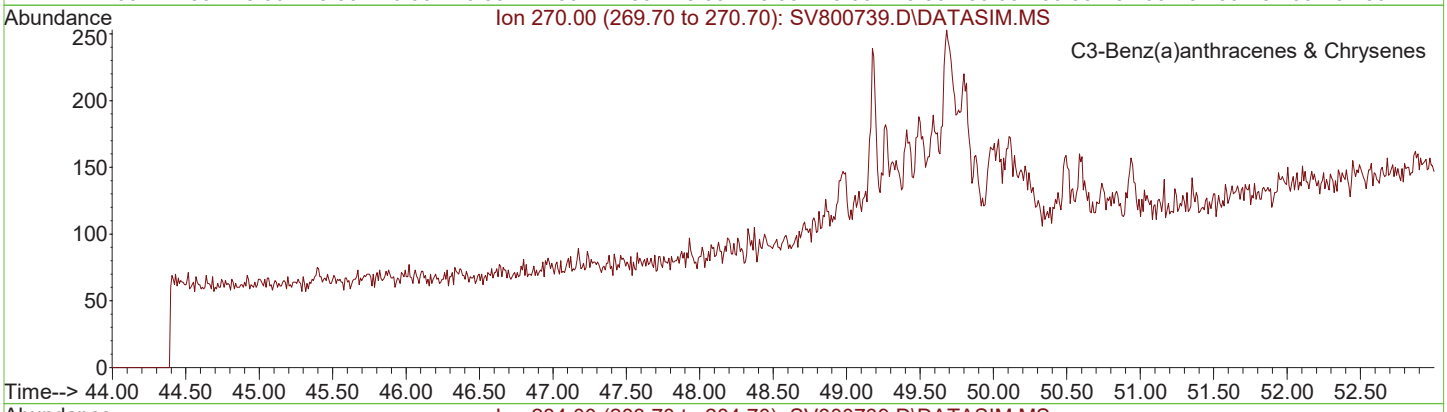

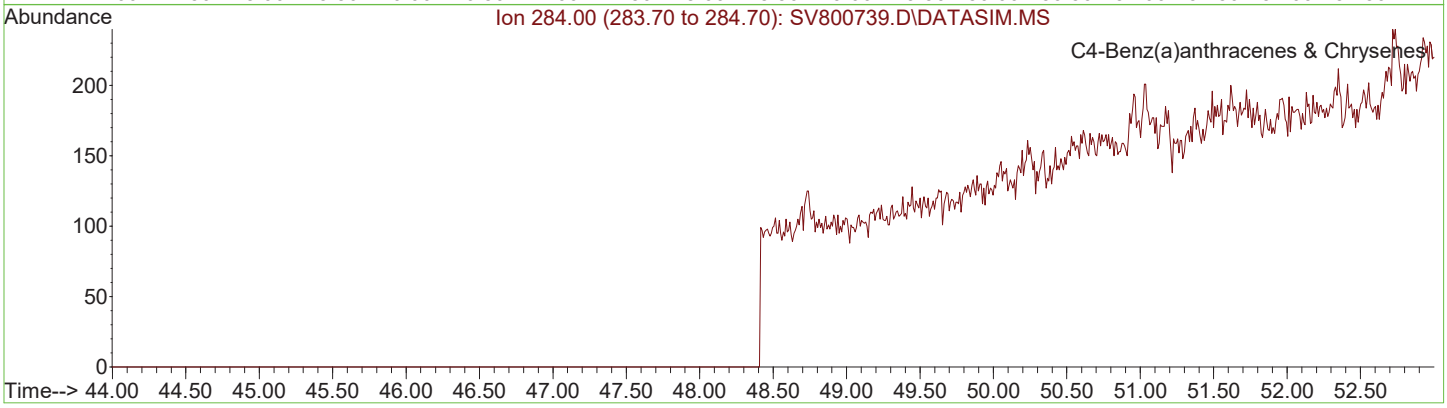

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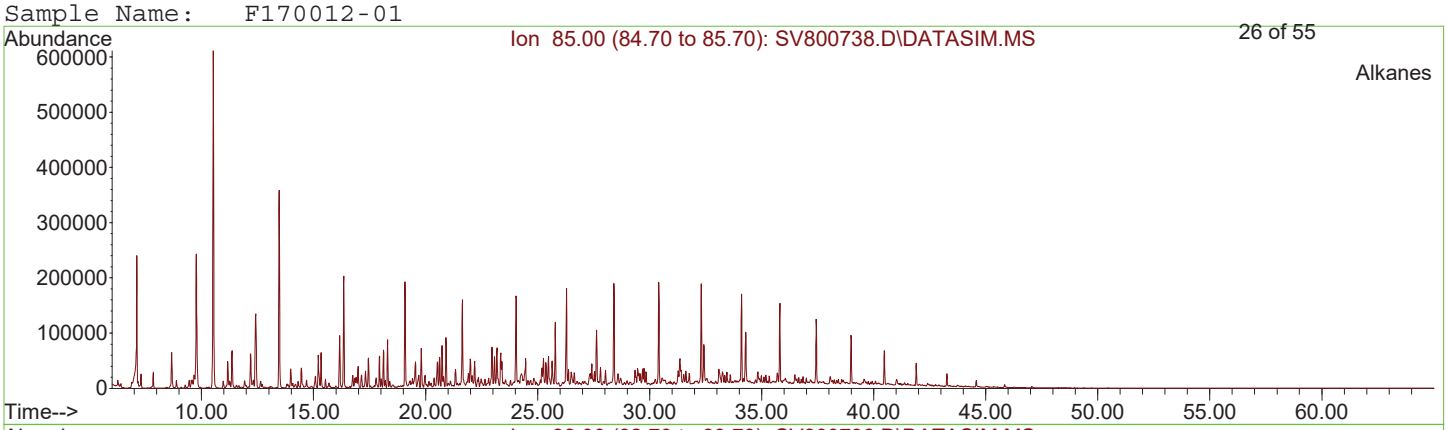

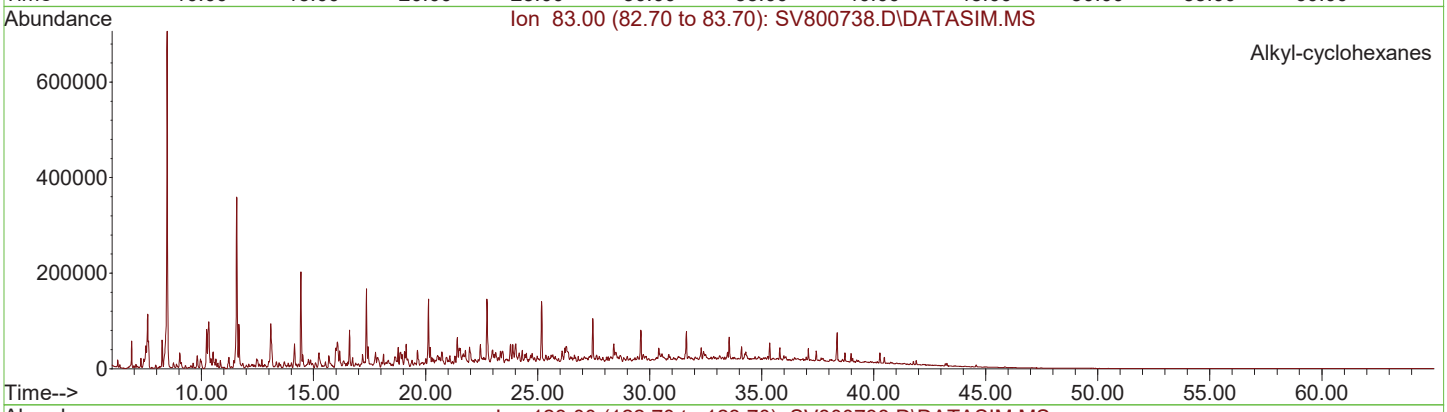

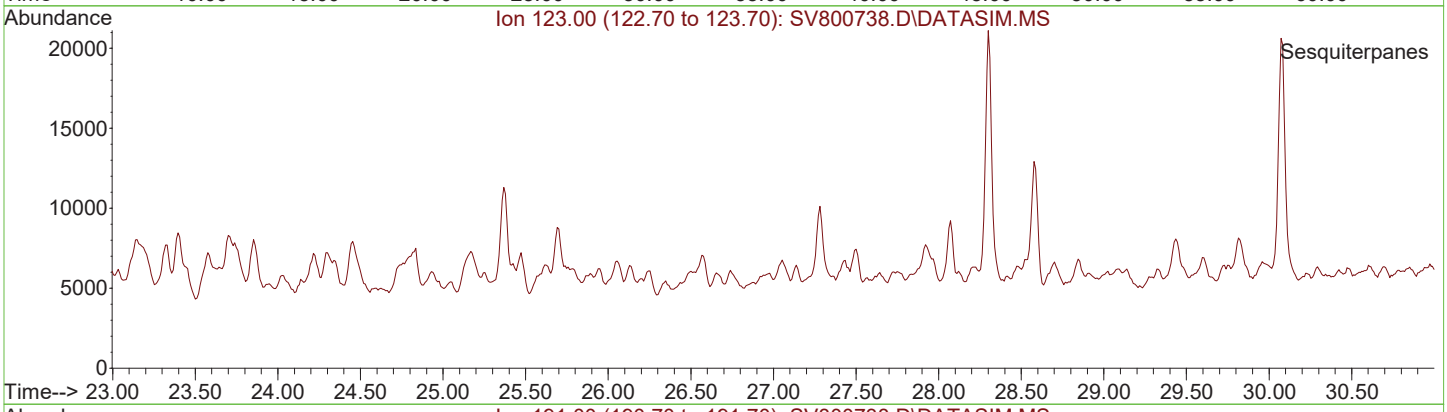

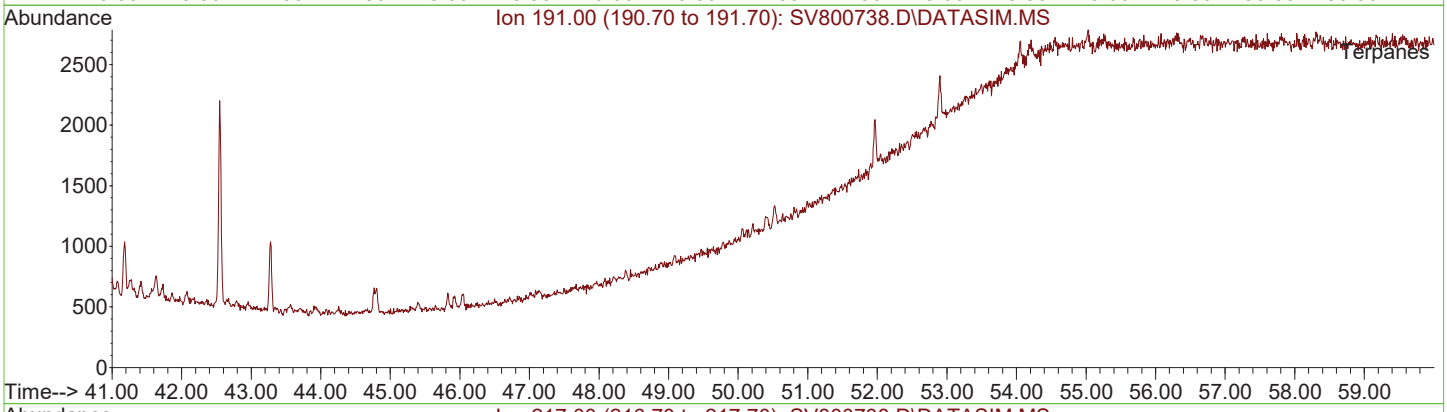

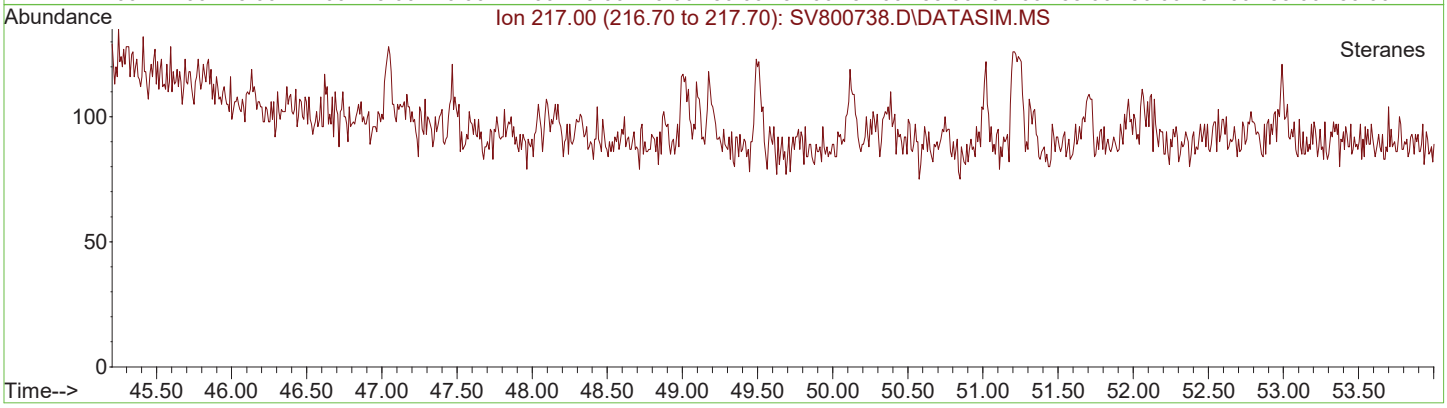

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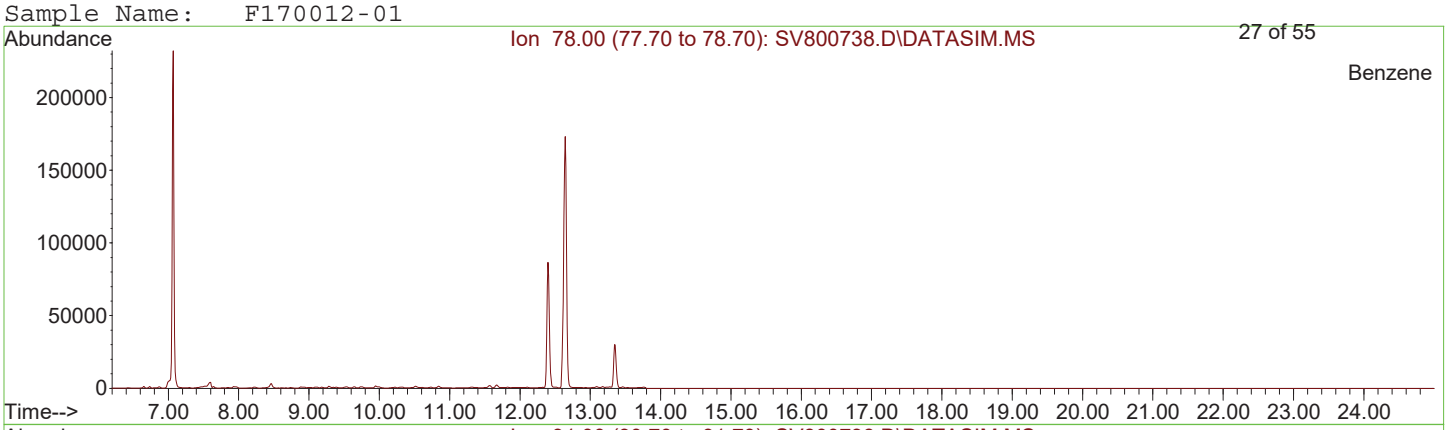
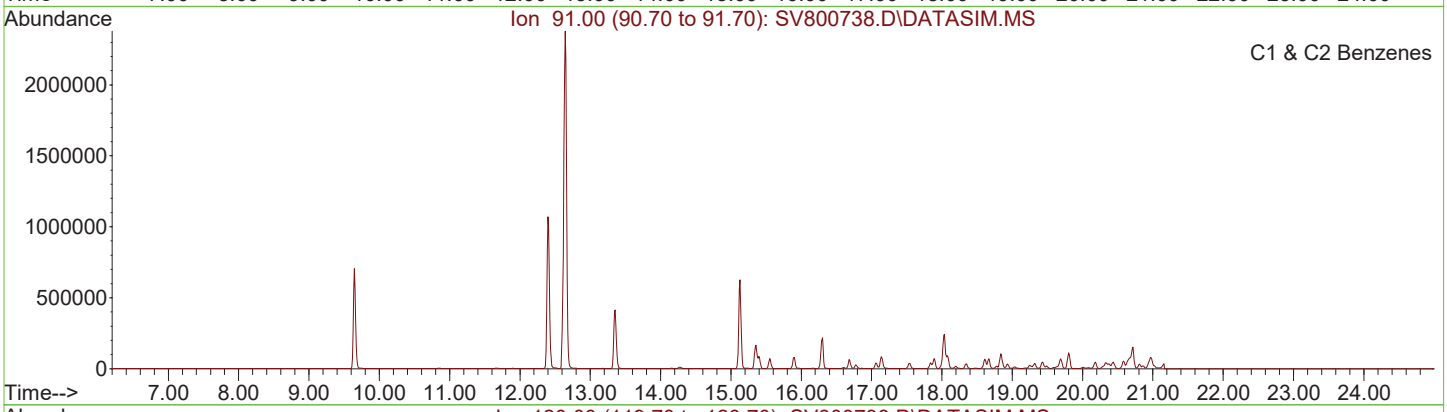
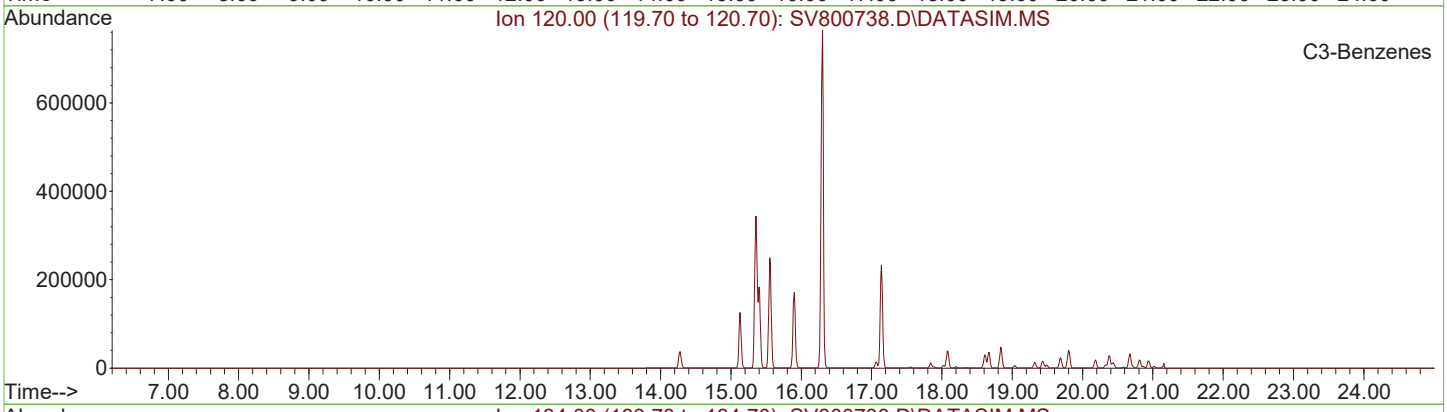
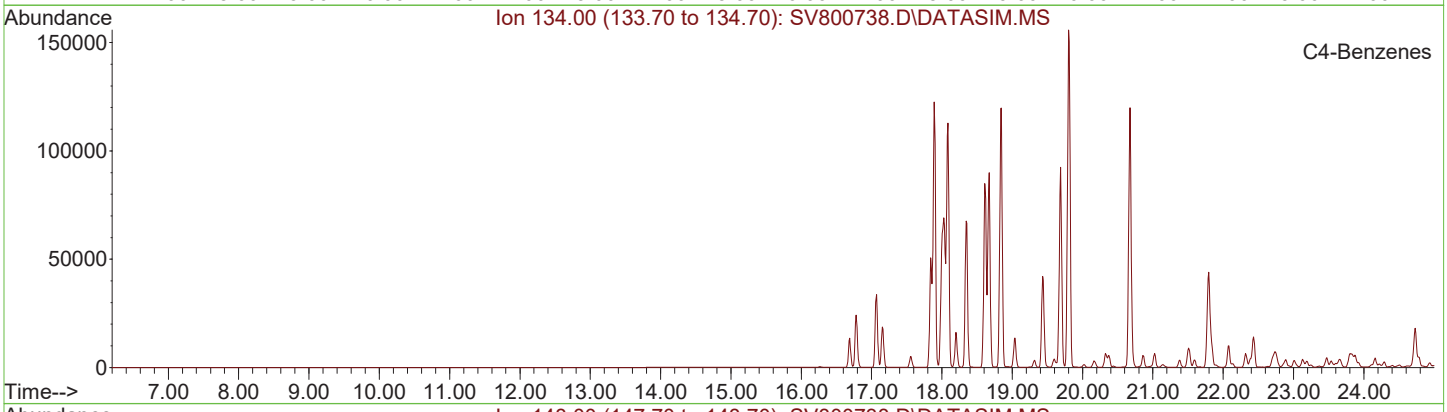
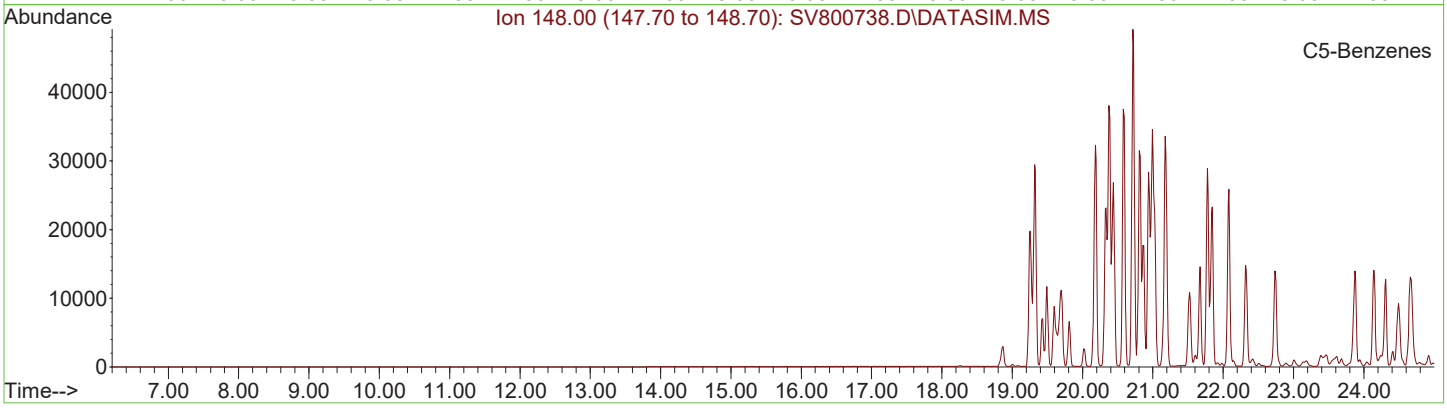
Sample Name: F170012-01











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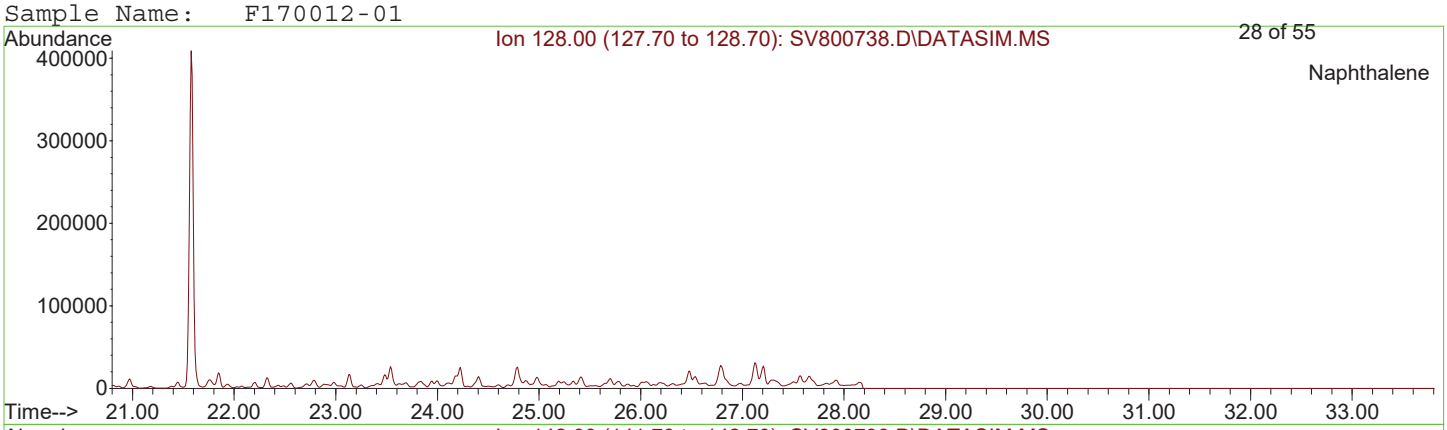

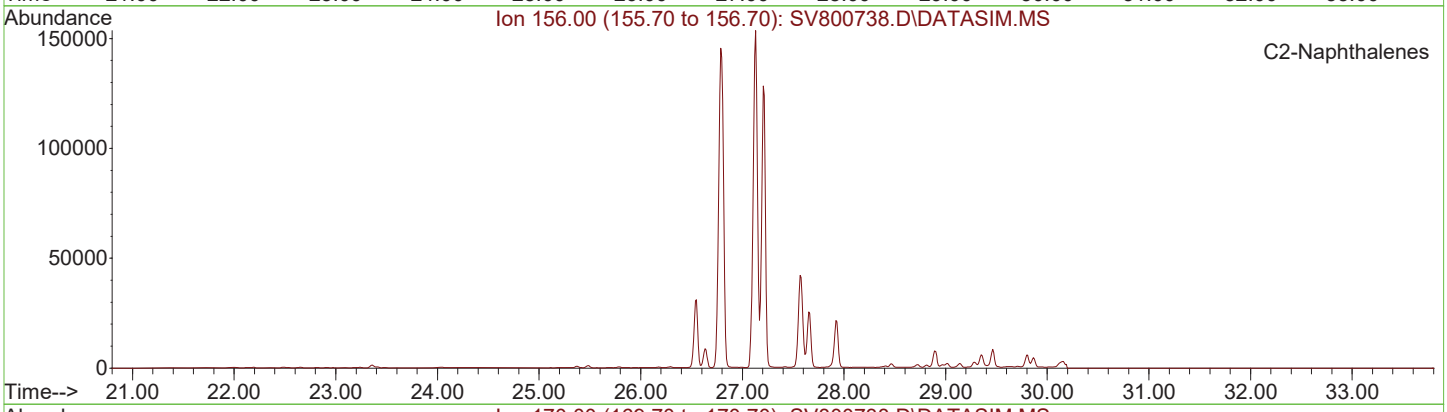

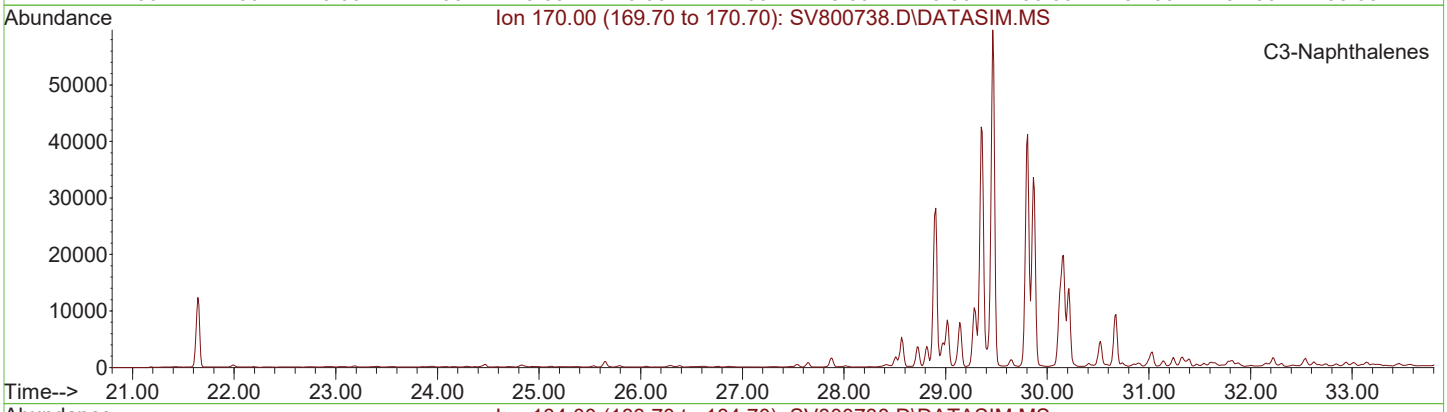

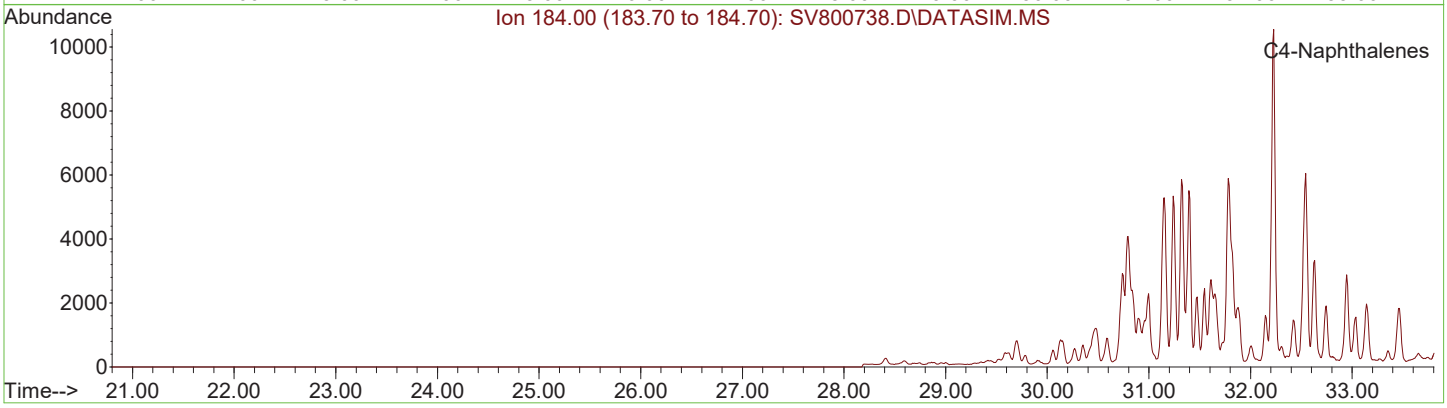

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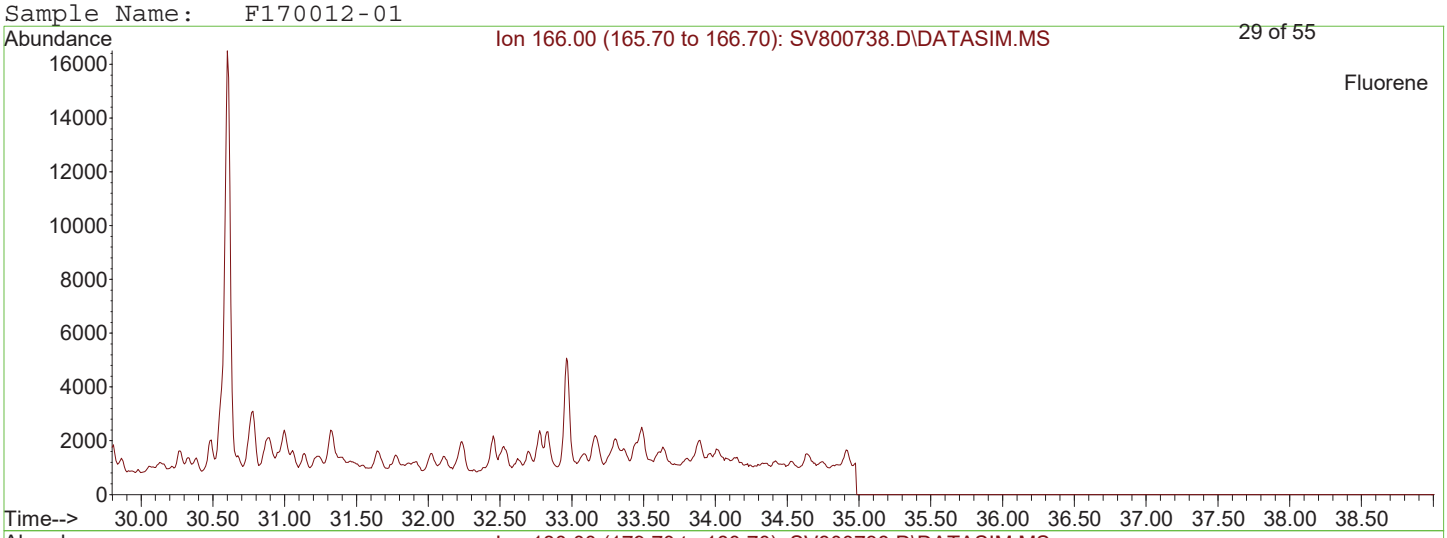

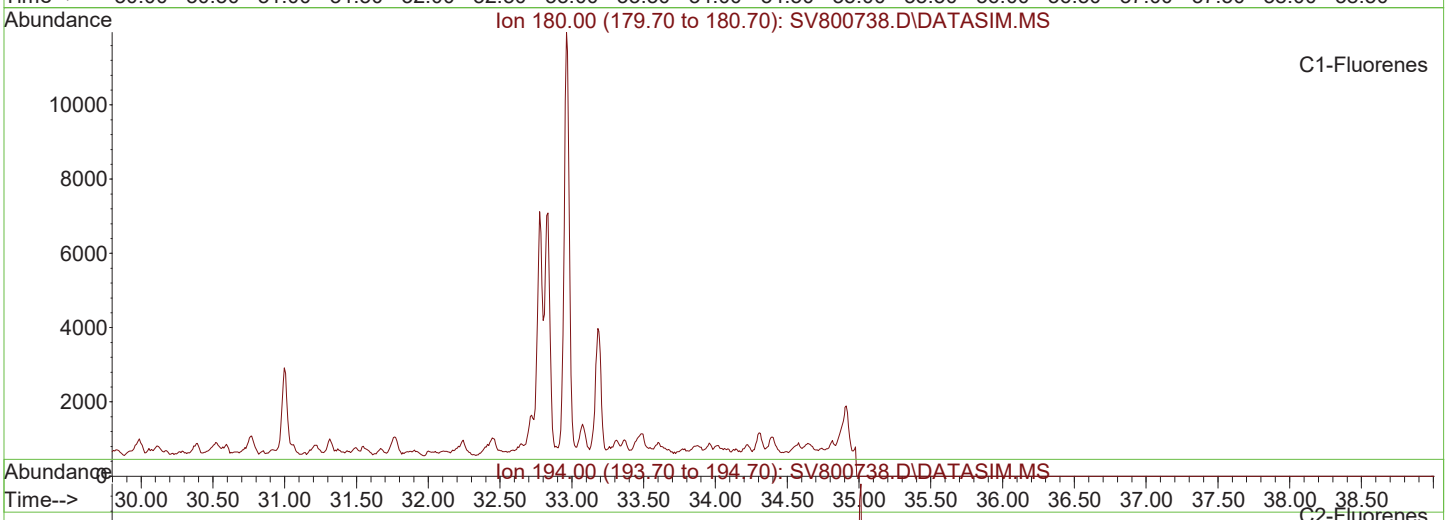

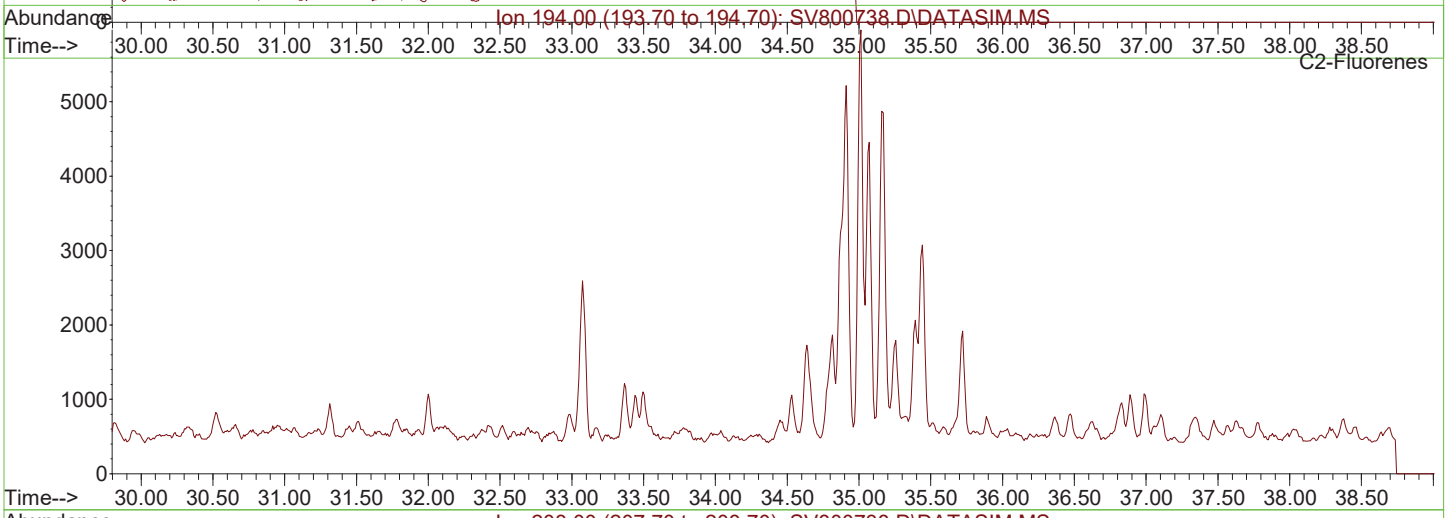

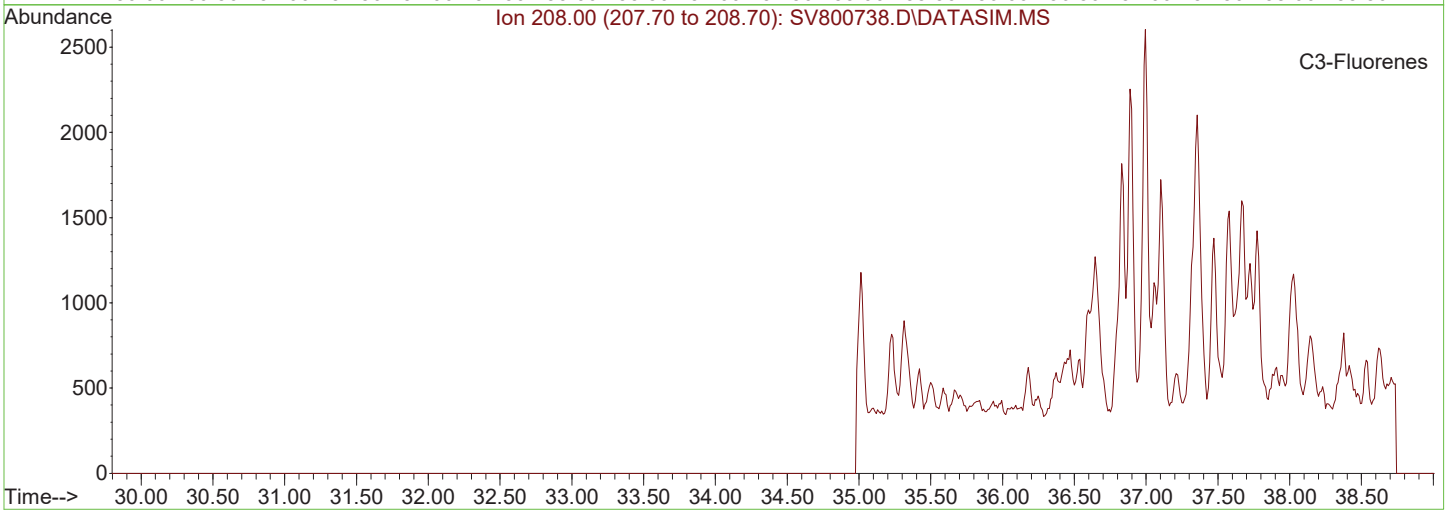

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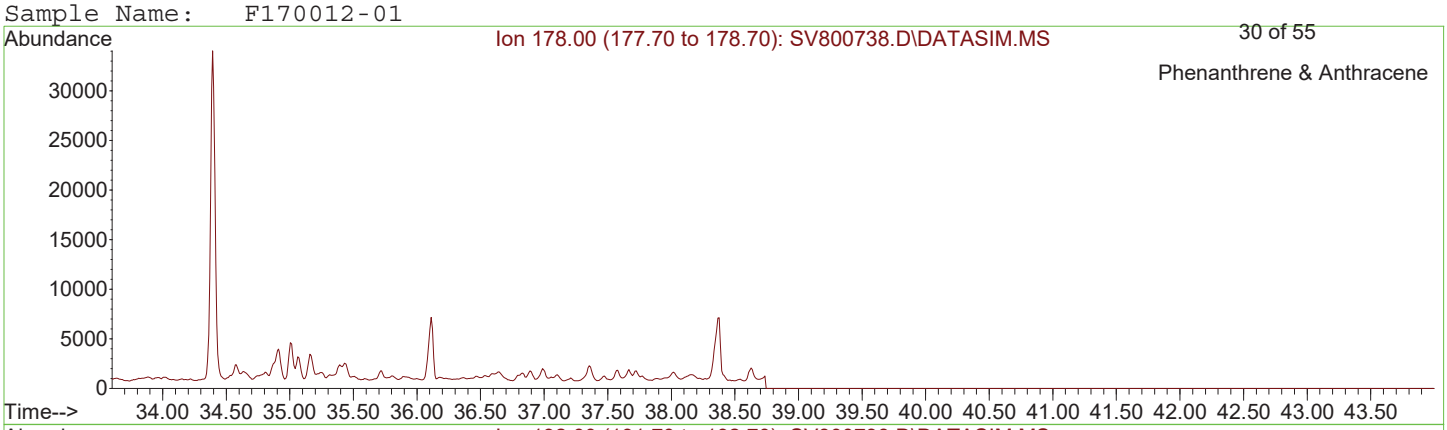

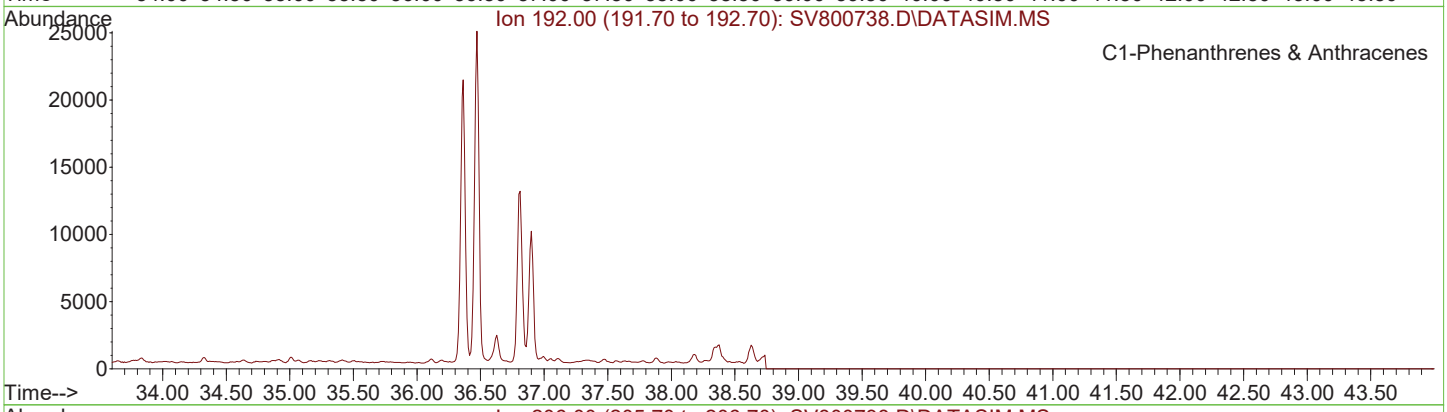

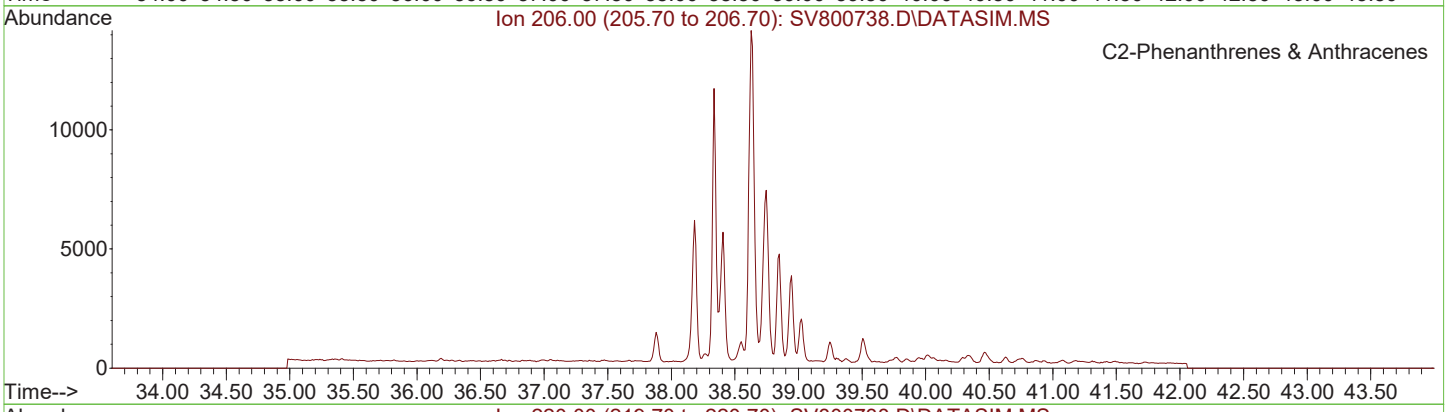

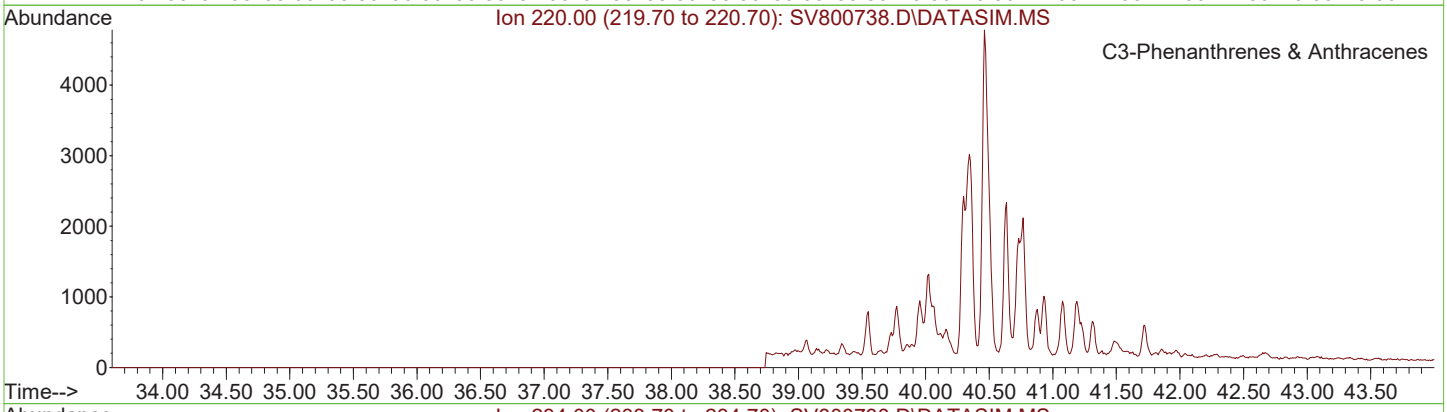

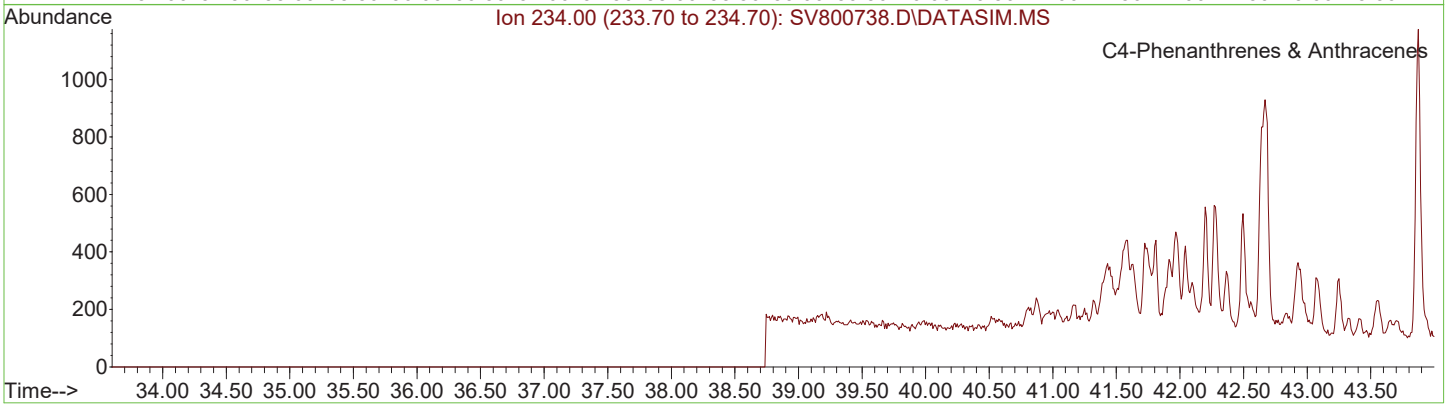

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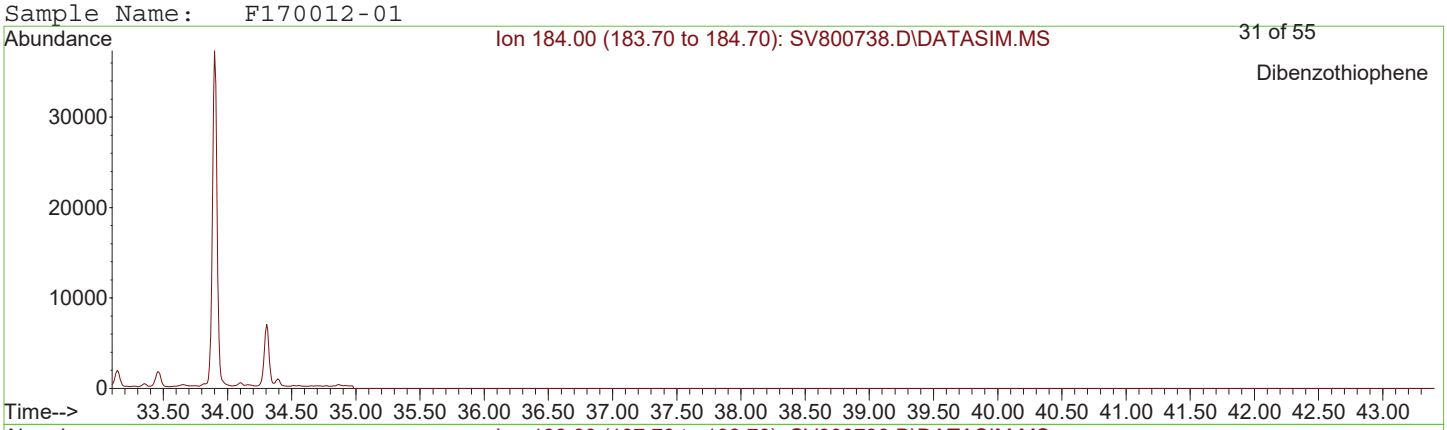

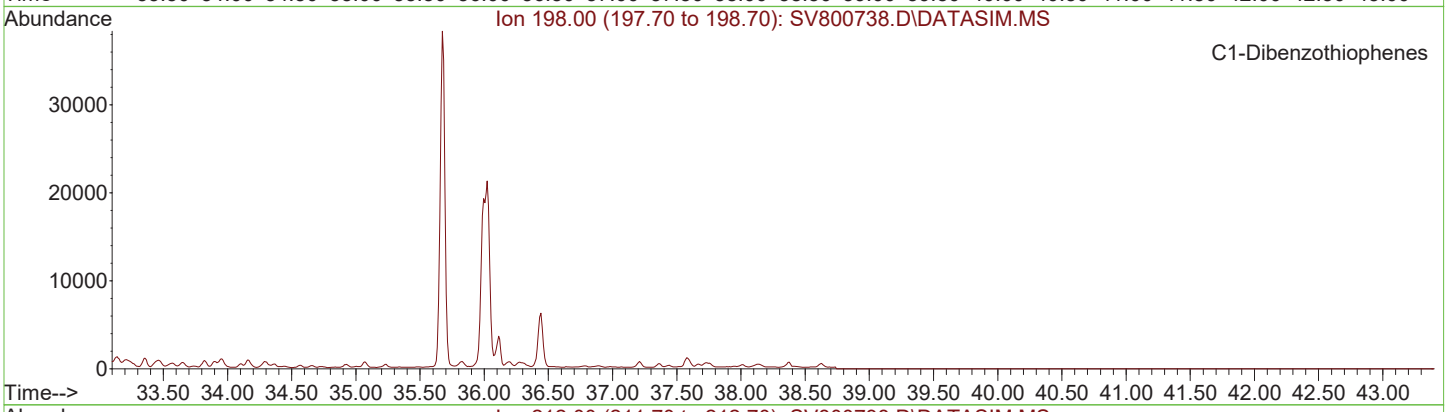

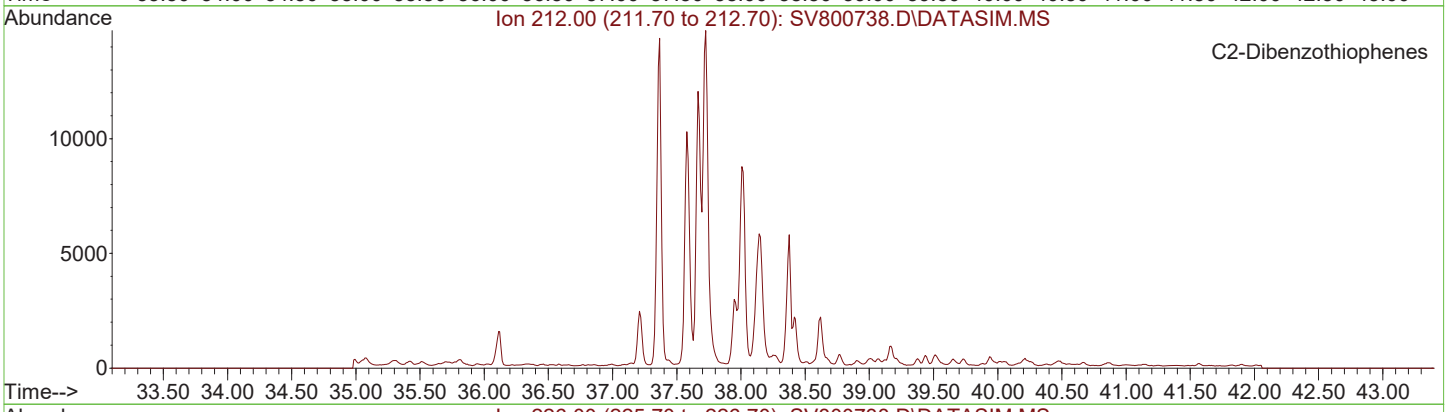

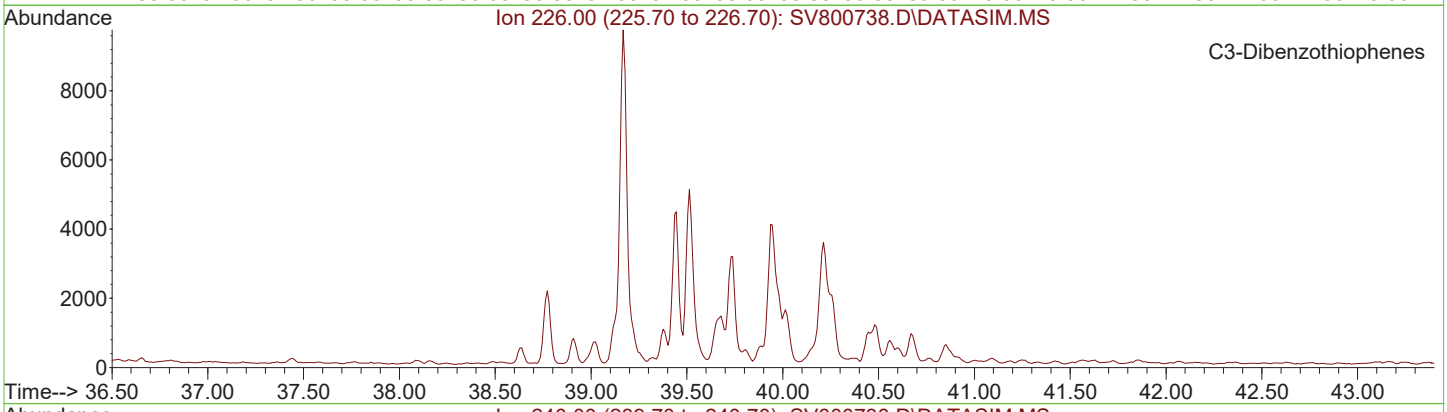

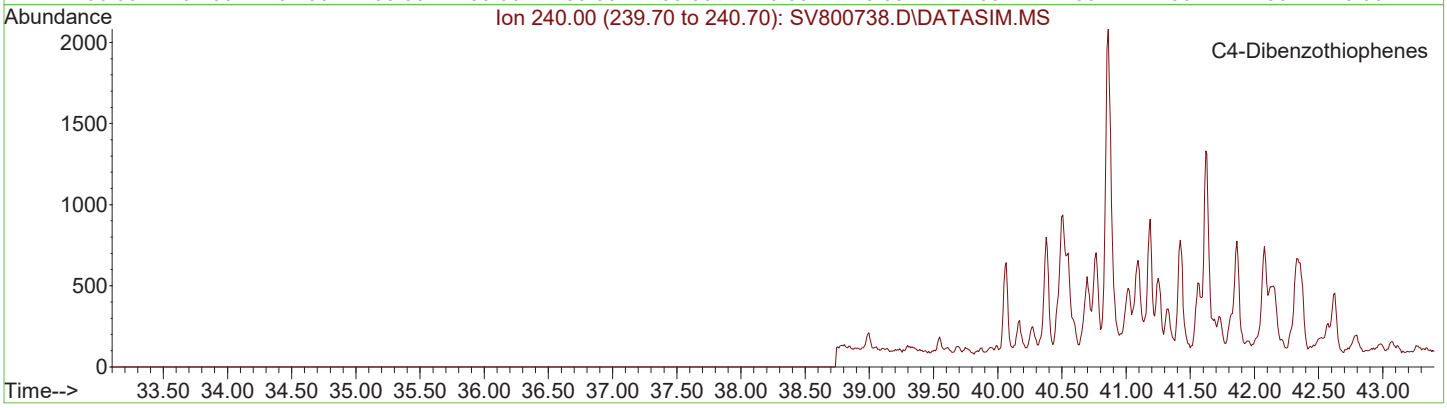

GC/MS EXTRACTED ION CHROMATOGRAM

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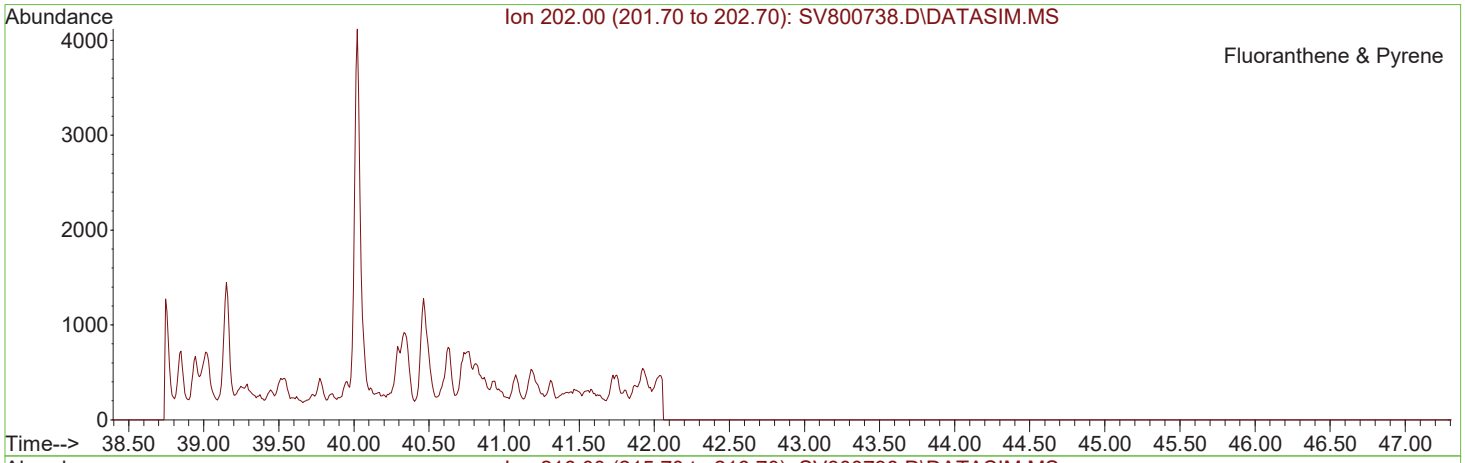

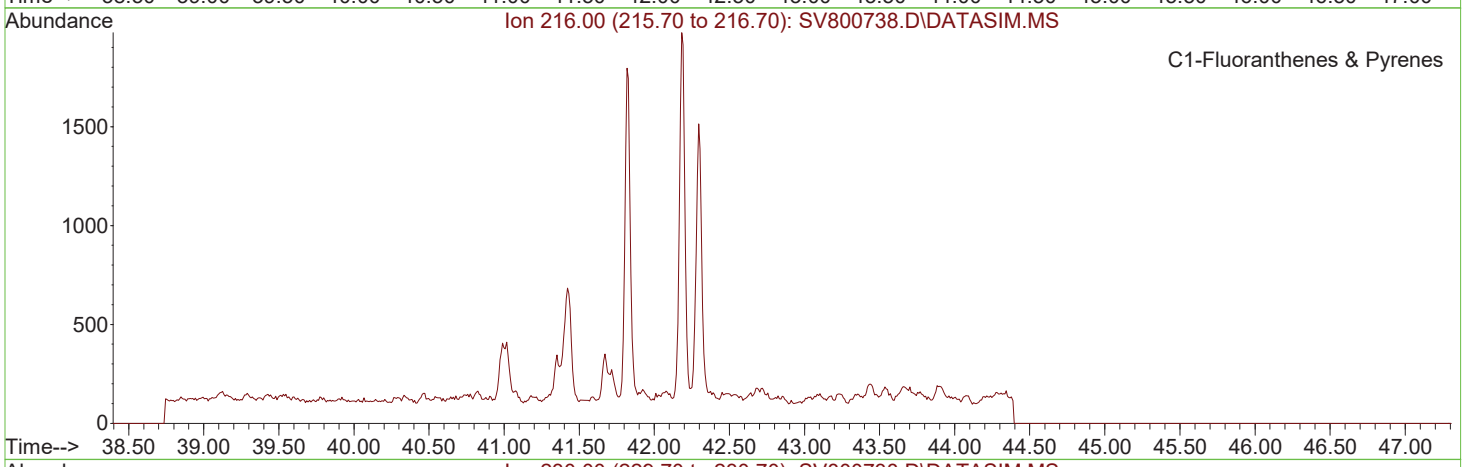

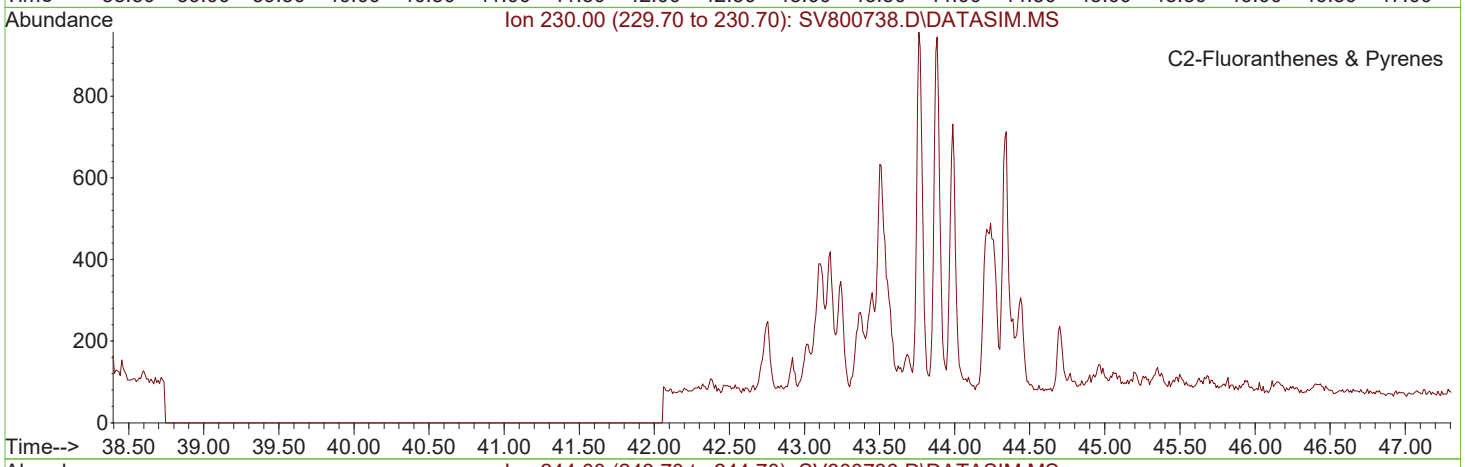

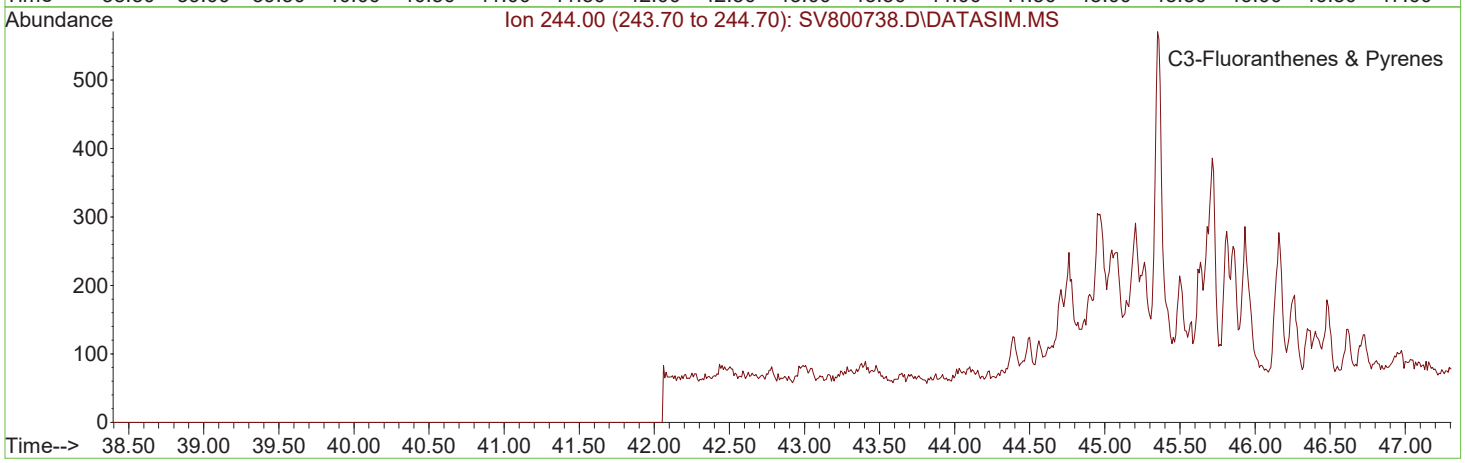

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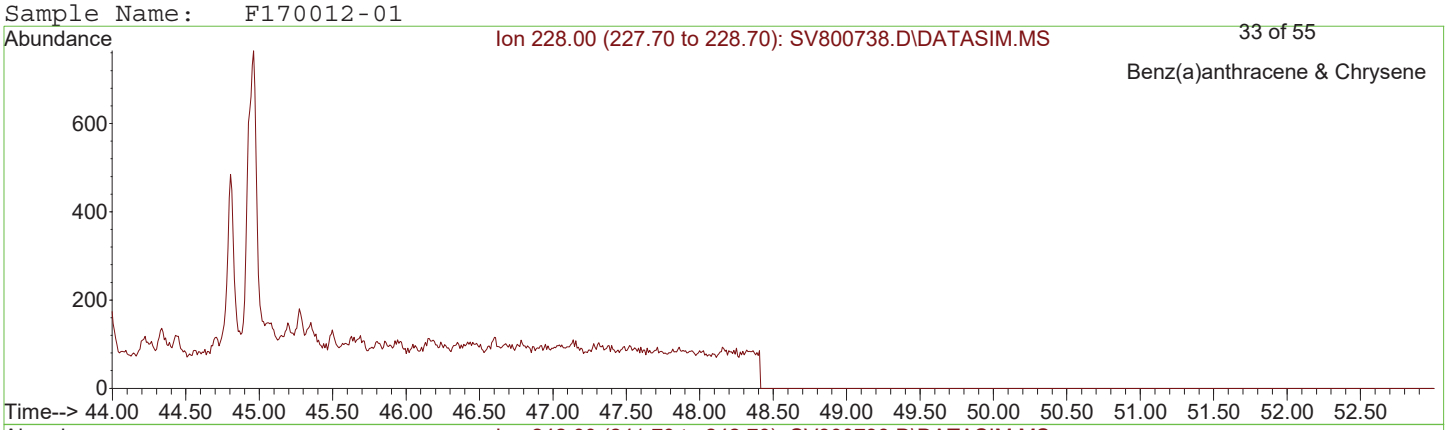
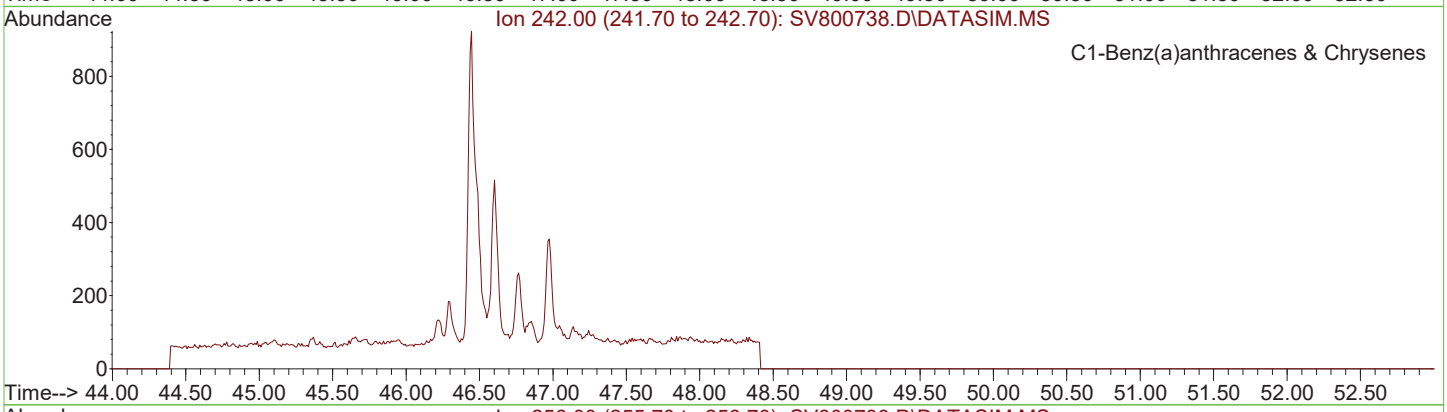
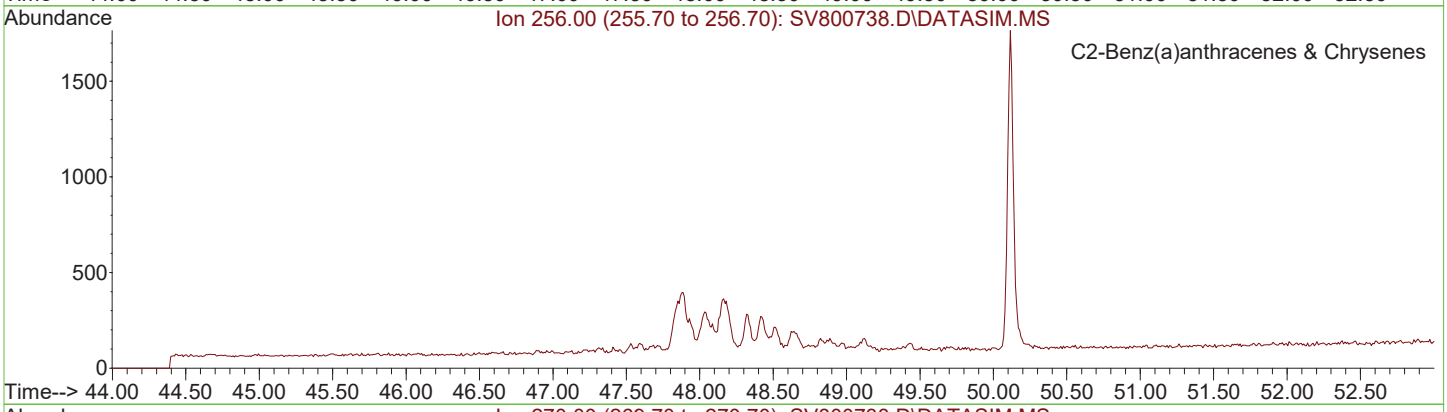
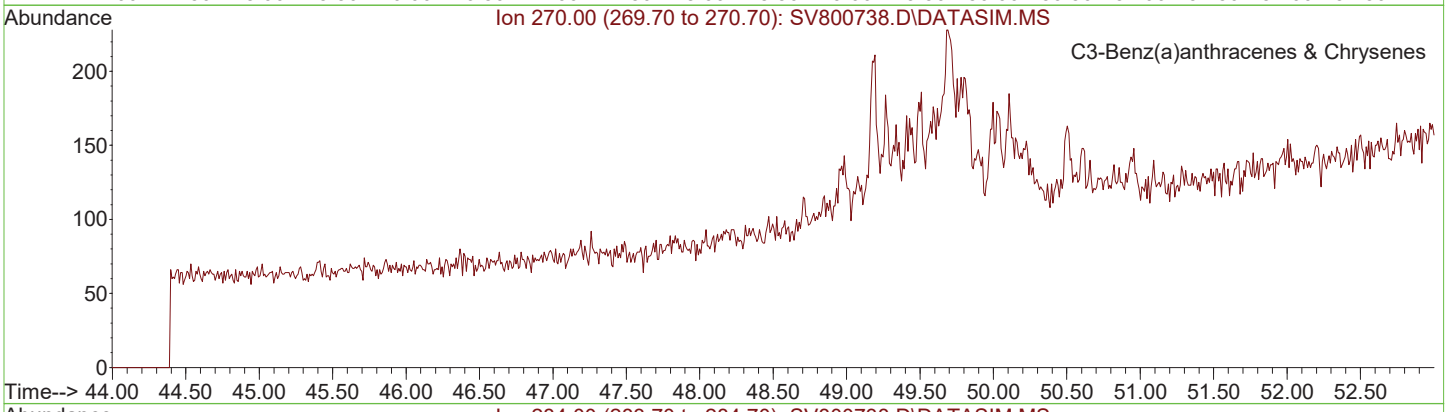
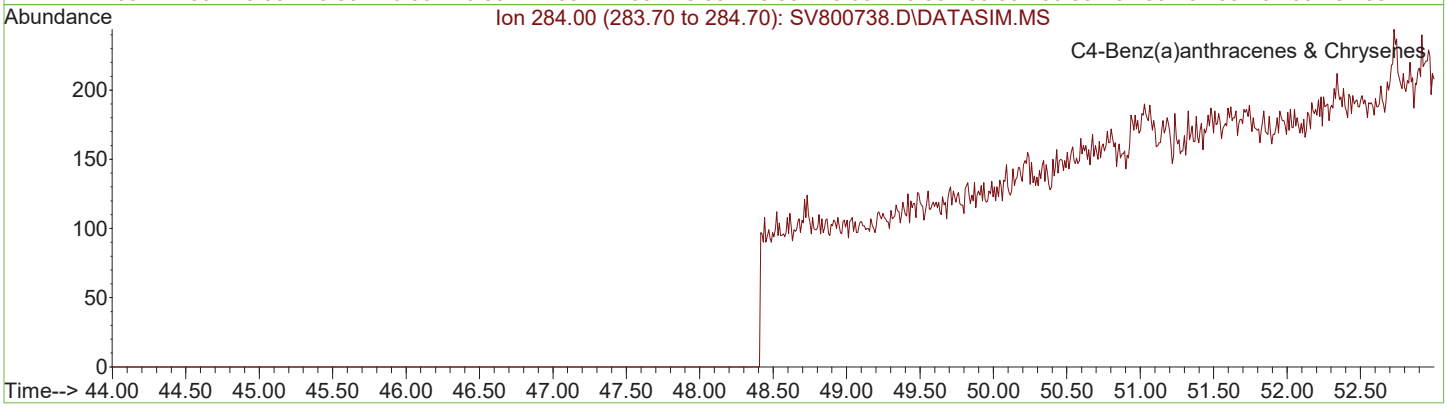
Sample Name: F170012-01











Appendix D

ESS Laboratory Report – F170012

ESS Laboratory
Division of Thielsch Engineering, Inc.

BAL Laboratory
The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

David Mauro
META Environmental, Inc.
1000 Turk Hill Road
Fairport, NY 14450

RE: MW-70 Fingerprinting (N/A)
ESS Laboratory Work Order Number: F170012

This signed Certificate of Analysis is our approved release of your analytical results. These results are only representative of sample aliquots received at the laboratory. ESS Laboratory expects its clients to follow all regulatory sampling guidelines. Beginning with this page, the entire report has been paginated. This report should not be copied except in full without the approval of the laboratory. Samples will be disposed of thirty days after the final report has been delivered. If you have any questions or concerns, please feel free to call our Customer Service Department.

Laurel Stoddard
Laboratory Director

REVIEWED
By ESS Laboratory at 1:48 pm, Aug 25, 2017

Analytical Summary
The project as described above has been analyzed in accordance with the ESS Quality Assurance Plan. This plan utilizes the following methodologies: US EPA SW-846, US EPA Methods for Chemical Analysis of Water and Wastes per 40 CFR Part 136, APHA Standard Methods for the Examination of Water and Wastewater, American Society for Testing and Materials (ASTM), and other recognized methodologies. The analyses with these noted observations are in conformance to the Quality Assurance Plan. In chromatographic analysis, manual integration is frequently used instead of automated integration because it produces more accurate results.

The test results present in this report are in compliance with TNI and relative state standards, and/or client Quality Assurance Project Plans (QAPP). The laboratory has reviewed the following: Sample Preservations, Hold Times, Initial Calibrations, Continuing Calibrations, Method Blanks, Blank Spikes, Blank Spike Duplicates, Duplicates, Matrix Spikes, Matrix Spike Duplicates, Surrogates and Internal Standards. Any results which were found to be outside of the recommended ranges stated in our SOPs will be noted in the Project Narrative.

ESS Laboratory
Division of Thielsch Engineering, Inc.

BAL Laboratory
The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting

ESS Laboratory Work Order: F170012

SAMPLE RECEIPT

The following samples were received on August 09, 2017 for the analyses specified on the enclosed Chain of Custody Record.

Lab Number	Sample Name	Matrix	Analysis
F170012-01	MW-70	Oil	8015 Mod, 8270 Mod

CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting ESS Laboratory Work Order: F170012

PROJECT NARRATIVE

Alkylated PAHs and Benzenes

F170012-01 **Surrogate recovery(ies) outside of criteria due to matrix (UCM/coelution/matrix is present) (SM).**
Toluene-D8 (203% @ 30-150%)

FH71001-DUP2 **Surrogate recovery(ies) outside of criteria due to matrix (UCM/coelution/matrix is present) (SM).**
Toluene-D8 (223% @ 30-150%)

No other observations noted.

End of Project Narrative.

DATA USABILITY LINKS

To ensure you are viewing the most current version of the documents below, please clear your internet cookies for www.ESSLaboratory.com. Consult your IT Support personnel for information on how to clear your internet cookies.

Definitions of Quality Control Parameters

Semivolatile Organics Internal Standard Information

Semivolatile Organics Surrogate Information

Volatile Organics Internal Standard Information

Volatile Organics Surrogate Information

EPH and VPH Alkane Lists

CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting

ESS Laboratory Work Order: F170012

CURRENT SW-846 METHODOLOGY VERSIONS

Analytical Methods

1010A - Flashpoint
6010C - ICP
6020A - ICP MS
7010 - Graphite Furnace
7196A - Hexavalent Chromium
7470A - Aqueous Mercury
7471B - Solid Mercury
8011 - EDB/DBCP/TCP
8015B Mod - TPH by GCFID
8015C - GRO/DRO
8081B - Pesticides
8082A - PCB
8100M - TPH
8151A - Herbicides
8260B - VOA
8270D - SVOA
8270D Mod - Alkylated PAHs and Benzenes
8270D SIM - SVOA Low Level
9014 - Cyanide
9038 - Sulfate
9040C - Aqueous pH
9045D - Solid pH (Corrosivity)
9050A - Specific Conductance
9056A - Anions (IC)
9060A - TOC
9095B - Paint Filter
MADEP 04-1.1 - EPH / VPH

Prep Methods

3005A - Aqueous ICP Digestion
3020A - Aqueous Graphite Furnace / ICP MS Digestion
3050B - Solid ICP / Graphite Furnace / ICP MS Digestion
3060A - Solid Hexavalent Chromium Digestion
3510C - Separatory Funnel Extraction
3511 - Microsolvent Extraction Aqueous
3520C - Liquid / Liquid Extraction
3540C - Manual Soxhlet Extraction
3541 - Automated Soxhlet Extraction
3546 - Microwave Extraction
3570 - Microsolvent Extraction Soild
3580A - Waste Dilution
5030B - Aqueous Purge and Trap
5030C - Aqueous Purge and Trap
5035 - Solid Purge and Trap

SW846 Reactivity Methods 7.3.3.2 (Reactive Cyanide) and 7.3.4.1 (Reactive Sulfide) have been withdrawn by EPA. These methods are reported per client request and are not NELAP accredited.

CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting
Client Sample ID: MW-70
Date Sampled: 08/02/17 10:30
Percent Solids: N/A
Initial Volume: 1
Final Volume: 1
Extraction Method: [CALC]

ESS Laboratory Work Order: F170012
ESS Laboratory Sample ID: F170012-01
Sample Matrix: Oil
Units: ratio
Analyst: IBM
Prepared: 8/10/17 8:30

Alkylated PAHs and Benzenes Ratios

Analyte	Results (RL)	EDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
BbF+BkF/BaP	**0.00** (N/A)		8270 Mod		1	IBM	08/10/17 15:35		[CALC]
BF/MP	**0.00** (N/A)		8270 Mod		1	IBM	08/10/17 15:35		[CALC]
Fl/Py	**0.314** (N/A)		8270 Mod		1	IBM	08/10/17 15:35		[CALC]
Ret/BaP	**0.00** (N/A)		8270 Mod		1	IBM	08/10/17 15:35		[CALC]

ESS Laboratory
Division of Thielsch Engineering, Inc.

BAL Laboratory
The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting
Client Sample ID: MW-70
Date Sampled: 08/02/17 10:30
Percent Solids: N/A
Initial Volume: 0.0102
Final Volume: 2
Extraction Method: 3580

ESS Laboratory Work Order: F170012
ESS Laboratory Sample ID: F170012-01
Sample Matrix: Oil
Units: mg/Kg
Analyst: IBM
Prepared: 8/10/17 8:30

Alkylated PAHs and Benzenes

Analyte	Results (RL)	EDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Benzene	**700** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C1-Benzene	**1550** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C2-Benzenes	**7250** (19.6)	9.80	8270 Mod		10	IBM	08/10/17 18:13	F7H0007	FH71001
C3-Benzenes	**8690** (19.6)	9.80	8270 Mod		10	IBM	08/10/17 18:13	F7H0007	FH71001
C4-Benzenes	**5480** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C5-Benzenes	**2720** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Toluene	**2240** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Ethylbenzene	**3330** (19.6)	9.80	8270 Mod		10	IBM	08/10/17 18:13	F7H0007	FH71001
m,p-Xylene	**11300** (19.6)	9.80	8270 Mod		10	IBM	08/10/17 18:13	F7H0007	FH71001
Styrene	ND (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
o-Xylene	**1650** (19.6)	9.80	8270 Mod		10	IBM	08/10/17 18:13	F7H0007	FH71001
Isopropylbenzene	**535** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
n-Propylbenzene	**1560** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
1,3,5-Trimethylbenzene	**2240** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
1,2,3-Trimethylbenzene	**2240** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
1,2,4-Trimethylbenzene	**7090** (19.6)	9.80	8270 Mod		10	IBM	08/10/17 18:13	F7H0007	FH71001
t-Butylbenzene	ND (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
sec-Butylbenzene	**430** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
p-Isopropyltoluene	**449** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
n-Butylbenzene	**1020** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
trans-Decalin	**836** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
cis-Decalin	**367** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Benzo(b)thiophene	**218** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Naphthalene	**1300** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
2-Methylnaphthalene	**2590** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
1-Methylnaphthalene	**1410** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C1-Naphthalenes	**2320** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C2-Naphthalenes	**1970** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C3-Naphthalenes	**935** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C4-Naphthalenes	**336** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Biphenyl	**169** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Acenaphthylene	ND (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001

ESS Laboratory
Division of Thielsch Engineering, Inc.

BAL Laboratory
The Microbiology Division of Thielsch Engineering, Inc.

CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting
Client Sample ID: MW-70
Date Sampled: 08/02/17 10:30
Percent Solids: N/A
Initial Volume: 0.0102
Final Volume: 2
Extraction Method: 3580

ESS Laboratory Work Order: F170012
ESS Laboratory Sample ID: F170012-01
Sample Matrix: Oil
Units: mg/Kg
Analyst: IBM
Prepared: 8/10/17 8:30

Alkylated PAHs and Benzenes

Analyte	Results (RL)	EDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
Acenaphthene	**23.2** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Dibenzofuran	**35.6** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Fluorene	**68.2** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C1-Fluorenes	**122** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C2-Fluorenes	**144** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C3-Fluorenes	**92.6** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Dibenzothiophene	**110** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C1-Dibenzothiophenes	**248** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C2-Dibenzothiophenes	**256** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C3-Dibenzothiophenes	**148** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C4-Dibenzothiophenes	**50.7** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Phenanthrene	**102** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Anthracene	**6.42** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C1-Phenanthrenes/Anthracenes	**215** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C2-Phenanthrenes/Anthracenes	**179** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C3-Phenanthrenes/Anthracenes	**81.1** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C4-Phenanthrenes/Anthracenes	**26.0** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Retene	ND (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Benzo(b)naphtho(2,1-d)thiophene	**3.39** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Fluoranthene	**3.63** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Pyrene	**11.6** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C1-Fluoranthenes/Pyrenes	**20.5** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C2-Fluoranthenes/Pyrenes	**21.3** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C3-Fluoranthenes/Pyrenes	**13.9** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Benzo(b)fluorene	ND (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Benzo(c)fluorene	ND (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
2-Methylpyrene	**4.69** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
4-Methylpyrene	**5.35** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
1-Methylpyrene	**4.11** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Benz(a)anthracene	**J 1.75** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Chrysene/triphenylene	**3.60** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C1-Benzo(a)anthracenes/Chrysenes	**8.94** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001

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CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting
Client Sample ID: MW-70
Date Sampled: 08/02/17 10:30
Percent Solids: N/A
Initial Volume: 0.0102
Final Volume: 2
Extraction Method: 3580

ESS Laboratory Work Order: F170012
ESS Laboratory Sample ID: F170012-01
Sample Matrix: Oil
Units: mg/Kg
Analyst: IBM
Prepared: 8/10/17 8:30

Alkylated PAHs and Benzenes

Analyte	Results (RL)	EDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C2-Benzo(a)anthracenes/Chrysenes	**10.0** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C3-Benzo(a)anthracenes/Chrysenes	**7.59** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
C4-Benzo(a)anthracenes/Chrysenes	ND (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Benzo(b)fluoranthene	ND (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Benzo(j/k)fluoranthene	ND (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Benzo(e)pyrene	**J 1.28** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Benzo(a)pyrene	**J 1.20** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Perylene	ND (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Indeno(1,2,3-cd)pyrene	**J 1.61** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Dibenzo(a,h)anthracene	**J 1.60** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Benzo(g,h,i)perylene	**J 1.13** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001
Coronene	**2.33** (1.96)	0.980	8270 Mod		1	IBM	08/10/17 15:35	F7H0007	FH71001

	%Recovery	*Qualifier*	*Limits*
Surrogate: Naphthalene-d8	*101 %*		*30-150*
Surrogate: Perylene-d12	*99 %*		*30-150*
Surrogate: Phenanthrene-d10	*97 %*		*30-150*
Surrogate: Toluene-D8	*203 %*	*SM*	*30-150*

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CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting
Client Sample ID: MW-70
Date Sampled: 08/02/17 10:30
Percent Solids: N/A
Initial Volume: 0.0102
Final Volume: 2
Extraction Method: 3580

ESS Laboratory Work Order: F170012
ESS Laboratory Sample ID: F170012-01
Sample Matrix: Oil
Units: mg/Kg
Analyst: NL
Prepared: 8/10/17 8:30

Saturated Hydrocarbons by GC/FID

Analyte	Results (RL)	EDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C-8	**11300** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-9	**9520** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-10	**13000** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-11	**4710** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-12	**5590** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-13	**3730** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
2,6,10-trimethyldodecane (1380)	**2700** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-14	**3740** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
2,6,10-trimethyltridecane (1470)	**2190** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-15	**2760** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-16	**2430** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
2,6,10-trimethylpentadecane (1650)	**1130** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-17	**2280** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
Pristane	**1270** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-18	**1780** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
Phytane	**1460** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-19	**1580** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-20	**1290** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-21	**945** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-22	**608** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-23	**371** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-24	**223** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-25	**J 128** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-26	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-27	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-28	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-29	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-30	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-31	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-32	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-33	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-34	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001

ESS Laboratory
Division of Thielsch Engineering, Inc.

BAL Laboratory
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CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting
Client Sample ID: MW-70
Date Sampled: 08/02/17 10:30
Percent Solids: N/A
Initial Volume: 0.0102
Final Volume: 2
Extraction Method: 3580

ESS Laboratory Work Order: F170012
ESS Laboratory Sample ID: F170012-01
Sample Matrix: Oil
Units: mg/Kg
Analyst: NL
Prepared: 8/10/17 8:30

Saturated Hydrocarbons by GC/FID

Analyte	Results (RL)	EDL	Method	Limit	DF	Analyst	Analyzed	Sequence	Batch
C-35	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-36	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-37	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-38	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-39	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
C-40	ND (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001
TPH (C8-C40)	**763000** (196)	98.0	8015 Mod		1	NL	08/17/17 1:10	F7H0009	FH71001

	%Recovery	Qualifier	Limits
Surrogate: o-Terphenyl	*84 %*		*30-150*

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CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting

ESS Laboratory Work Order: F170012

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Alkylated PAHs and Benzenes										
Batch FH71001 - 3580										
Blank										
1,2,3-Trimethylbenzene	ND	2.00	mg/Kg							
1,2,4-Trimethylbenzene	ND	2.00	mg/Kg							
1,3,5-Trimethylbenzene	ND	2.00	mg/Kg							
1-Methylnaphthalene	ND	2.00	mg/Kg							
1-Methylpyrene	ND	2.00	mg/Kg							
2-Methylnaphthalene	ND	2.00	mg/Kg							
2-Methylpyrene	ND	2.00	mg/Kg							
4-Methylpyrene	ND	2.00	mg/Kg							
Acenaphthene	ND	2.00	mg/Kg							
Acenaphthylene	ND	2.00	mg/Kg							
Anthracene	ND	2.00	mg/Kg							
Benz(a)anthracene	ND	2.00	mg/Kg							
Benzene	ND	2.00	mg/Kg							
Benzo(a)pyrene	ND	2.00	mg/Kg							
Benzo(b)fluoranthene	ND	2.00	mg/Kg							
Benzo(b)fluorene	ND	2.00	mg/Kg							
Benzo(b)naphtho(2,1-d)thiophene	ND	2.00	mg/Kg							
Benzo(b)thiophene	ND	2.00	mg/Kg							
Benzo(c)fluorene	ND	2.00	mg/Kg							
Benzo(e)pyrene	ND	2.00	mg/Kg							
Benzo(g,h,i)perylene	ND	2.00	mg/Kg							
Benzo(j/k)fluoranthene	ND	2.00	mg/Kg							
Biphenyl	ND	2.00	mg/Kg							
C1-Benzene	ND	2.00	mg/Kg							
C1-Benzo(a)anthracenes/Chrysenes	ND	2.00	mg/Kg							
C1-Dibenzothiophenes	ND	2.00	mg/Kg							
C1-Fluoranthenes/Pyrenes	ND	2.00	mg/Kg							
C1-Fluorenes	ND	2.00	mg/Kg							
C1-Naphthalenes	ND	2.00	mg/Kg							
C1-Phenanthrenes/Anthracenes	ND	2.00	mg/Kg							
C2-Benzenes	ND	2.00	mg/Kg							
C2-Benzo(a)anthracenes/Chrysenes	ND	2.00	mg/Kg							
C2-Dibenzothiophenes	ND	2.00	mg/Kg							
C2-Fluoranthenes/Pyrenes	ND	2.00	mg/Kg							
C2-Fluorenes	ND	2.00	mg/Kg							
C2-Naphthalenes	ND	2.00	mg/Kg							
C2-Phenanthrenes/Anthracenes	ND	2.00	mg/Kg							
C3-Benzenes	ND	2.00	mg/Kg							
C3-Benzo(a)anthracenes/Chrysenes	ND	2.00	mg/Kg							
C3-Dibenzothiophenes	ND	2.00	mg/Kg							
C3-Fluoranthenes/Pyrenes	ND	2.00	mg/Kg							
C3-Fluorenes	ND	2.00	mg/Kg							
C3-Naphthalenes	ND	2.00	mg/Kg							

CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting

ESS Laboratory Work Order: F170012

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Alkylated PAHs and Benzenes										
Batch FH71001 - 3580										
C3-Phenanthrenes/Anthracenes	ND	2.00	mg/Kg							
C4-Benzenes	ND	2.00	mg/Kg							
C4-Benzo(a)anthracenes/Chrysenes	ND	2.00	mg/Kg							
C4-Dibenzothiophenes	ND	2.00	mg/Kg							
C4-Naphthalenes	ND	2.00	mg/Kg							
C4-Phenanthrenes/Anthracenes	ND	2.00	mg/Kg							
C5-Benzenes	ND	2.00	mg/Kg							
Chrysene/triphenylene	ND	2.00	mg/Kg							
cis-Decalin	ND	2.00	mg/Kg							
Coronene	ND	2.00	mg/Kg							
Dibenzo(a,h)anthracene	ND	2.00	mg/Kg							
Dibenzofuran	ND	2.00	mg/Kg							
Dibenzothiophene	ND	2.00	mg/Kg							
Ethylbenzene	ND	2.00	mg/Kg							
Fluoranthene	ND	2.00	mg/Kg							
Fluorene	ND	2.00	mg/Kg							
Indeno(1,2,3-cd)pyrene	ND	2.00	mg/Kg							
Isopropylbenzene	ND	2.00	mg/Kg							
m,p-Xylene	ND	2.00	mg/Kg							
Naphthalene	ND	2.00	mg/Kg							
n-Butylbenzene	ND	2.00	mg/Kg							
n-Propylbenzene	ND	2.00	mg/Kg							
o-Xylene	ND	2.00	mg/Kg							
Perylene	ND	2.00	mg/Kg							
Phenanthrene	ND	2.00	mg/Kg							
p-Isopropyltoluene	ND	2.00	mg/Kg							
Pyrene	ND	2.00	mg/Kg							
Retene	ND	2.00	mg/Kg							
sec-Butylbenzene	ND	2.00	mg/Kg							
Styrene	ND	2.00	mg/Kg							
t-Butylbenzene	ND	2.00	mg/Kg							
Toluene	ND	2.00	mg/Kg							
trans-Decalin	ND	2.00	mg/Kg							
Surrogate: Naphthalene-d8	*190*		mg/Kg	*200.0*		*95*	*30-150*			
Surrogate: Perylene-d12	*182*		mg/Kg	*200.0*		*91*	*30-150*			
Surrogate: Phenanthrene-d10	*197*		mg/Kg	*200.0*		*98*	*30-150*			
Surrogate: Toluene-D8	*190*		mg/Kg	*200.0*		*95*	*30-150*			
LCS										
1,2,3-Trimethylbenzene	196	2.00	mg/Kg	200.0		98	40-140			
1,2,4-Trimethylbenzene	192	2.00	mg/Kg	200.0		96	40-140			
1,3,5-Trimethylbenzene	192	2.00	mg/Kg	200.0		96	40-140			
1-Methylnaphthalene	200	2.00	mg/Kg	200.0		100	40-140			
2-Methylnaphthalene	207	2.00	mg/Kg	200.0		103	40-140			
Acenaphthene	190	2.00	mg/Kg	200.0		95	40-140			

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CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting

ESS Laboratory Work Order: F170012

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Alkylated PAHs and Benzenes										
Batch FH71001 - 3580										
Acenaphthylene	203	2.00	mg/Kg	200.0		101	40-140			
Anthracene	203	2.00	mg/Kg	200.0		102	40-140			
Benz(a)anthracene	211	2.00	mg/Kg	200.0		105	40-140			
Benzene	190	2.00	mg/Kg	200.0		95	40-140			
Benzo(a)pyrene	186	2.00	mg/Kg	200.0		93	40-140			
Benzo(b)fluoranthene	205	2.00	mg/Kg	200.0		103	40-140			
Benzo(b)naphtho(2,1-d)thiophene	201	2.00	mg/Kg	200.0		100	40-140			
Benzo(b)thiophene	197	2.00	mg/Kg	200.0		99	40-140			
Benzo(e)pyrene	195	2.00	mg/Kg	200.0		98	40-140			
Benzo(g,h,i)perylene	196	2.00	mg/Kg	200.0		98	40-140			
Benzo(j/k)fluoranthene	181	2.00	mg/Kg	200.0		90	40-140			
Biphenyl	194	2.00	mg/Kg	200.0		97	40-140			
Chrysene/triphenylene	195	2.00	mg/Kg	200.0		97	40-140			
cis-Decalin	181	2.00	mg/Kg	200.0		90	40-140			
Coronene	188	2.00	mg/Kg	200.0		94	40-140			
Dibenzo(a,h)anthracene	185	2.00	mg/Kg	200.0		93	40-140			
Dibenzofuran	192	2.00	mg/Kg	200.0		96	40-140			
Dibenzothiophene	198	2.00	mg/Kg	200.0		99	40-140			
Ethylbenzene	181	2.00	mg/Kg	200.0		91	40-140			
Fluoranthene	205	2.00	mg/Kg	200.0		102	40-140			
Fluorene	196	2.00	mg/Kg	200.0		98	40-140			
Indeno(1,2,3-cd)pyrene	186	2.00	mg/Kg	200.0		93	40-140			
Isopropylbenzene	186	2.00	mg/Kg	200.0		93	40-140			
m,p-Xylene	182	2.00	mg/Kg	200.0		91	40-140			
Naphthalene	198	2.00	mg/Kg	200.0		99	40-140			
n-Butylbenzene	196	2.00	mg/Kg	200.0		98	40-140			
n-Propylbenzene	188	2.00	mg/Kg	200.0		94	40-140			
o-Xylene	184	2.00	mg/Kg	200.0		92	40-140			
Perylene	194	2.00	mg/Kg	200.0		97	40-140			
Phenanthrene	204	2.00	mg/Kg	200.0		102	40-140			
p-Isopropyltoluene	199	2.00	mg/Kg	200.0		100	40-140			
Pyrene	205	2.00	mg/Kg	200.0		102	40-140			
Retene	195	2.00	mg/Kg	200.0		97	40-140			
sec-Butylbenzene	191	2.00	mg/Kg	200.0		95	40-140			
Styrene	185	2.00	mg/Kg	200.0		92	40-140			
t-Butylbenzene	188	2.00	mg/Kg	200.0		94	40-140			
Toluene	174	2.00	mg/Kg	200.0		87	40-140			
trans-Decalin	184	2.00	mg/Kg	200.0		92	40-140			
Surrogate: Naphthalene-d8	*196*		mg/Kg	*200.0*		*98*	*30-150*			
Surrogate: Perylene-d12	*185*		mg/Kg	*200.0*		*92*	*30-150*			
Surrogate: Phenanthrene-d10	*203*		mg/Kg	*200.0*		*101*	*30-150*			
Surrogate: Toluene-D8	*176*		mg/Kg	*200.0*		*88*	*30-150*			
Duplicate **Source: F170012-01**										
1,2,3-Trimethylbenzene	2320	1.79	mg/Kg		2240			4	30	

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CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting

ESS Laboratory Work Order: F170012

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Alkylated PAHs and Benzenes										
Batch FH71001 - 3580										
1,2,4-Trimethylbenzene	7240	17.9	mg/Kg		7090			2	30	
1,3,5-Trimethylbenzene	2310	1.79	mg/Kg		2240			3	30	
1-Methylnaphthalene	1460	1.79	mg/Kg		1410			3	30	
1-Methylpyrene	4.20	1.79	mg/Kg		4.11			2	30	
2-Methylnaphthalene	2660	1.79	mg/Kg		2590			3	30	
2-Methylpyrene	4.87	1.79	mg/Kg		4.69			4	30	
4-Methylpyrene	5.45	1.79	mg/Kg		5.35			2	30	
Acenaphthene	23.4	1.79	mg/Kg		23.2			1	30	
Acenaphthylene	ND	1.79	mg/Kg		ND				30	
Anthracene	5.21	1.79	mg/Kg		6.42			21	30	
Benz(a)anthracene	1.65	1.79	mg/Kg		1.75			6	30	J
Benzene	767	1.79	mg/Kg		700			9	30	
Benzo(a)pyrene	0.918	1.79	mg/Kg		1.20			27	30	J
Benzo(b)fluoranthene	ND	1.79	mg/Kg		0.951				30	
Benzo(b)fluorene	ND	1.79	mg/Kg		ND				30	
Benzo(b)naphtho(2,1-d)thiophene	3.68	1.79	mg/Kg		3.39			8	30	
Benzo(b)thiophene	224	1.79	mg/Kg		218			3	30	
Benzo(c)fluorene	ND	1.79	mg/Kg		ND				30	
Benzo(e)pyrene	1.11	1.79	mg/Kg		1.28			15	30	J
Benzo(g,h,i)perylene	ND	1.79	mg/Kg		1.13				30	
Benzo(j/k)fluoranthene	ND	1.79	mg/Kg		ND				30	
Biphenyl	176	1.79	mg/Kg		169			4	30	
C1-Benzene	1630	1.79	mg/Kg		1550			5	30	
C1-Benzo(a)anthracenes/Chrysenes	9.02	1.79	mg/Kg		8.94			0.9	30	
C1-Dibenzothiophenes	260	1.79	mg/Kg		248			5	30	
C1-Fluoranthenes/Pyrenes	20.9	1.79	mg/Kg		20.5			2	30	
C1-Fluorenes	127	1.79	mg/Kg		122			5	30	
C1-Naphthalenes	2400	1.79	mg/Kg		2320			3	30	
C1-Phenanthrenes/Anthracenes	224	1.79	mg/Kg		215			4	30	
C2-Benzenes	7410	17.9	mg/Kg		7250			2	30	
C2-Benzo(a)anthracenes/Chrysenes	10.7	1.79	mg/Kg		10.0			7	30	
C2-Dibenzothiophenes	267	1.79	mg/Kg		256			4	30	
C2-Fluoranthenes/Pyrenes	22.1	1.79	mg/Kg		21.3			4	30	
C2-Fluorenes	148	1.79	mg/Kg		144			3	30	
C2-Naphthalenes	2030	1.79	mg/Kg		1970			3	30	
C2-Phenanthrenes/Anthracenes	189	1.79	mg/Kg		179			5	30	
C3-Benzenes	8880	17.9	mg/Kg		8690			2	30	
C3-Benzo(a)anthracenes/Chrysenes	7.93	1.79	mg/Kg		7.59			4	30	
C3-Dibenzothiophenes	155	1.79	mg/Kg		148			5	30	
C3-Fluoranthenes/Pyrenes	14.9	1.79	mg/Kg		13.9			7	30	
C3-Fluorenes	101	1.79	mg/Kg		92.6			8	30	
C3-Naphthalenes	975	1.79	mg/Kg		935			4	30	
C3-Phenanthrenes/Anthracenes	83.0	1.79	mg/Kg		81.1			2	30	
C4-Benzenes	5650	1.79	mg/Kg		5480			3	30	

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CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting

ESS Laboratory Work Order: F170012

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Alkylated PAHs and Benzenes										
Batch FH71001 - 3580										
C4-Benzo(a)anthracenes/Chrysenes	ND	1.79	mg/Kg		ND				30	
C4-Dibenzothiophenes	52.2	1.79	mg/Kg		50.7			3	30	
C4-Naphthalenes	352	1.79	mg/Kg		336			5	30	
C4-Phenanthrenes/Anthracenes	27.8	1.79	mg/Kg		26.0			7	30	
C5-Benzenes	2800	1.79	mg/Kg		2720			3	30	
Chrysene/triphenylene	3.85	1.79	mg/Kg		3.60			7	30	
cis-Decalin	369	1.79	mg/Kg		367			0.7	30	
Coronene	ND	1.79	mg/Kg		2.33				30	
Dibenzo(a,h)anthracene	ND	1.79	mg/Kg		1.60				30	
Dibenzofuran	36.9	1.79	mg/Kg		35.6			4	30	
Dibenzothiophene	116	1.79	mg/Kg		110			5	30	
Ethylbenzene	3440	17.9	mg/Kg		3330			3	30	
Fluoranthene	3.65	1.79	mg/Kg		3.63			0.6	30	
Fluorene	70.3	1.79	mg/Kg		68.2			3	30	
Indeno(1,2,3-cd)pyrene	ND	1.79	mg/Kg		1.61				30	
Isopropylbenzene	553	1.79	mg/Kg		535			3	30	
m,p-Xylene	11600	17.9	mg/Kg		11300			2	30	
Naphthalene	1350	1.79	mg/Kg		1300			3	30	
n-Butylbenzene	1060	1.79	mg/Kg		1020			4	30	
n-Propylbenzene	1610	1.79	mg/Kg		1560			3	30	
o-Xylene	1690	17.9	mg/Kg		1650			2	30	
Perylene	ND	1.79	mg/Kg		ND				30	
Phenanthrene	106	1.79	mg/Kg		102			4	30	
p-Isopropyltoluene	477	1.79	mg/Kg		449			6	30	
Pyrene	12.0	1.79	mg/Kg		11.6			4	30	
Retene	ND	1.79	mg/Kg		ND				30	
sec-Butylbenzene	445	1.79	mg/Kg		430			4	30	
Styrene	ND	1.79	mg/Kg		ND				30	
t-Butylbenzene	ND	1.79	mg/Kg		ND				30	
Toluene	2370	1.79	mg/Kg		2240			5	30	
trans-Decalin	870	1.79	mg/Kg		836			4	30	
Surrogate: Naphthalene-d8	*185*		mg/Kg	*178.6*		*104*	*30-150*			
Surrogate: Perylene-d12	*187*		mg/Kg	*178.6*		*105*	*30-150*			
Surrogate: Phenanthrene-d10	*179*		mg/Kg	*178.6*		*100*	*30-150*			
Surrogate: Toluene-D8	*398*		mg/Kg	*178.6*		*223*	*30-150*			*SM*
Saturated Hydrocarbons by GC/FID										
Batch FH71001 - 3580										
Blank										
2,6,10-trimethyldodecane (1380)	ND	200	mg/Kg							
2,6,10-trimethylpentadecane (1650)	ND	200	mg/Kg							
2,6,10-trimethyltridecane (1470)	ND	200	mg/Kg							
C-10	ND	200	mg/Kg							
C-11	ND	200	mg/Kg							

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ESS Laboratory Work Order: F170012

Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Saturated Hydrocarbons by GC/FID										
Batch FH71001 - 3580										
C-12	ND	200	mg/Kg							
C-13	ND	200	mg/Kg							
C-14	ND	200	mg/Kg							
C-15	ND	200	mg/Kg							
C-16	ND	200	mg/Kg							
C-17	ND	200	mg/Kg							
C-18	ND	200	mg/Kg							
C-19	ND	200	mg/Kg							
C-20	ND	200	mg/Kg							
C-21	ND	200	mg/Kg							
C-22	ND	200	mg/Kg							
C-23	ND	200	mg/Kg							
C-24	ND	200	mg/Kg							
C-25	ND	200	mg/Kg							
C-26	ND	200	mg/Kg							
C-27	ND	200	mg/Kg							
C-28	ND	200	mg/Kg							
C-29	ND	200	mg/Kg							
C-30	ND	200	mg/Kg							
C-31	ND	200	mg/Kg							
C-32	ND	200	mg/Kg							
C-33	ND	200	mg/Kg							
C-34	ND	200	mg/Kg							
C-35	ND	200	mg/Kg							
C-36	ND	200	mg/Kg							
C-37	ND	200	mg/Kg							
C-38	ND	200	mg/Kg							
C-39	ND	200	mg/Kg							
C-40	ND	200	mg/Kg							
C-8	ND	200	mg/Kg							
C-9	ND	200	mg/Kg							
Phytane	ND	200	mg/Kg							
Pristane	ND	200	mg/Kg							
TPH (C8-C40)	ND	200	mg/Kg							
Surrogate: o-Terphenyl	*4470*		mg/Kg	*5000*		*89*	*30-150*			
LCS										
C-10	4320	200	mg/Kg	5000		86	40-140			
C-11	4510	200	mg/Kg	5000		90	40-140			
C-12	4770	200	mg/Kg	5000		95	40-140			
C-13	4640	200	mg/Kg	5000		93	40-140			
C-14	4580	200	mg/Kg	5000		92	40-140			
C-15	4520	200	mg/Kg	5000		90	40-140			
C-16	4550	200	mg/Kg	5000		91	40-140			

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Saturated Hydrocarbons by GC/FID										
Batch FH71001 - 3580										
C-17	4490	200	mg/Kg	5000		90	40-140			
C-18	4430	200	mg/Kg	5000		89	40-140			
C-19	4520	200	mg/Kg	5000		90	40-140			
C-20	4520	200	mg/Kg	5000		90	40-140			
C-21	4500	200	mg/Kg	5000		90	40-140			
C-22	4490	200	mg/Kg	5000		90	40-140			
C-23	4480	200	mg/Kg	5000		90	40-140			
C-24	4470	200	mg/Kg	5000		89	40-140			
C-25	4490	200	mg/Kg	5000		90	40-140			
C-26	4490	200	mg/Kg	5000		90	40-140			
C-27	4480	200	mg/Kg	5000		90	40-140			
C-28	4290	200	mg/Kg	5000		86	40-140			
C-29	4460	200	mg/Kg	5000		89	40-140			
C-30	4460	200	mg/Kg	5000		89	40-140			
C-31	4470	200	mg/Kg	5000		89	40-140			
C-32	4490	200	mg/Kg	5000		90	40-140			
C-33	4500	200	mg/Kg	5000		90	40-140			
C-34	4520	200	mg/Kg	5000		90	40-140			
C-35	4540	200	mg/Kg	5000		91	40-140			
C-36	4570	200	mg/Kg	5000		91	40-140			
C-37	4580	200	mg/Kg	5000		92	40-140			
C-38	4630	200	mg/Kg	5000		93	40-140			
C-39	4670	200	mg/Kg	5000		93	40-140			
C-40	4680	200	mg/Kg	5000		94	40-140			
C-8	4520	200	mg/Kg	5000		90	40-140			
C-9	4210	200	mg/Kg	5000		84	40-140			
Phytane	4540	200	mg/Kg	5000		91	40-140			
Pristane	4610	200	mg/Kg	5000		92	40-140			
Surrogate: o-Terphenyl	*4420*		mg/Kg	*5000*		*88*	*30-150*			
Duplicate **Source: F170012-01**										
2,6,10-trimethyldodecane (1380)	2710	179	mg/Kg		2700			0.4	30	
2,6,10-trimethylpentadecane (1650)	1200	179	mg/Kg		1130			6	30	
2,6,10-trimethyltridecane (1470)	2310	179	mg/Kg		2190			5	30	
C-10	13400	179	mg/Kg		13000			3	30	
C-11	4760	179	mg/Kg		4710			1	30	
C-12	5780	179	mg/Kg		5590			3	30	
C-13	3890	179	mg/Kg		3730			4	30	
C-14	3940	179	mg/Kg		3740			5	30	
C-15	2860	179	mg/Kg		2760			4	30	
C-16	2490	179	mg/Kg		2430			2	30	
C-17	2330	179	mg/Kg		2280			2	30	
C-18	1830	179	mg/Kg		1780			3	30	
C-19	1620	179	mg/Kg		1580			3	30	

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Quality Control Data

Analyte	Result	MRL	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qualifier
Saturated Hydrocarbons by GC/FID										
Batch FH71001 - 3580										
C-20	1320	179	mg/Kg		1290			2	30	
C-21	978	179	mg/Kg		945			3	30	
C-22	619	179	mg/Kg		608			2	30	
C-23	373	179	mg/Kg		371			0.7	30	
C-24	234	179	mg/Kg		223			5	30	
C-25	134	179	mg/Kg		128			5	30	J
C-26	ND	179	mg/Kg		ND				30	
C-27	ND	179	mg/Kg		ND				30	
C-28	ND	179	mg/Kg		ND				30	
C-29	ND	179	mg/Kg		ND				30	
C-30	ND	179	mg/Kg		ND				30	
C-31	ND	179	mg/Kg		ND				30	
C-32	ND	179	mg/Kg		ND				30	
C-33	ND	179	mg/Kg		ND				30	
C-34	ND	179	mg/Kg		ND				30	
C-35	ND	179	mg/Kg		ND				30	
C-36	ND	179	mg/Kg		ND				30	
C-37	ND	179	mg/Kg		ND				30	
C-38	ND	179	mg/Kg		ND				30	
C-39	ND	179	mg/Kg		ND				30	
C-40	ND	179	mg/Kg		ND				30	
C-8	11800	179	mg/Kg		11300			4	30	
C-9	9680	179	mg/Kg		9520			2	30	
Phytane	1500	179	mg/Kg		1460			3	30	
Pristane	1310	179	mg/Kg		1270			3	30	
TPH (C8-C40)	679000	179	mg/Kg		763000			12	30	
Surrogate: o-Terphenyl	*3930*		mg/Kg	*4464*		*88*	*30-150*			

CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting ESS Laboratory Work Order: F170012

Notes and Definitions

U	Analyte included in the analysis, but not detected
SM	Surrogate recovery(ies) outside of criteria due to matrix (UCM/coelution/matrix is present) (SM).
J	Reported between MDL and MRL
D	Diluted.
ND	Analyte NOT DETECTED at or above the MRL (LOQ), LOD for DoD Reports, MDL for J-Flagged Analytes
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
MDL	Method Detection Limit
MRL	Method Reporting Limit
LOD	Limit of Detection
LOQ	Limit of Quantitation
DL	Detection Limit
I/V	Initial Volume
F/V	Final Volume
§	Subcontracted analysis; see attached report
1	Range result excludes concentrations of surrogates and/or internal standards eluting in that range.
2	Range result excludes concentrations of target analytes eluting in that range.
3	Range result excludes the concentration of the C9-C10 aromatic range.
Avg	Results reported as a mathematical average.
NR	No Recovery
[CALC]	Calculated Analyte
SUB	Subcontracted analysis; see attached report
RL	Reporting Limit
EDL	Estimated Detection Limit

CERTIFICATE OF ANALYSIS

Client Name: META Environmental, Inc.
Client Project ID: MW-70 Fingerprinting

ESS Laboratory Work Order: F170012

ESS LABORATORY CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

Rhode Island Potable and Non Potable Water: LAI00179
http://www.health.ri.gov/find/labs/analytical/ESS.pdf

Connecticut Potable and Non Potable Water, Solid and Hazardous Waste: PH-0750
http://www.ct.gov/dph/lib/dph/environmental_health/environmental_laboratories/pdf/OutofStateCommercialLaboratories.pdf

Maine Potable and Non Potable Water, and Solid and Hazardous Waste: RI00002
http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/partners/labCert.shtml

Massachusetts Potable and Non Potable Water: M-RI002
http://public.dep.state.ma.us/Labcert/Labcert.aspx

New Hampshire (NELAP accredited) Potable and Non Potable Water, Solid and Hazardous Waste: 2424
http://des.nh.gov/organization/divisions/water/dwgb/nhelap/index.htm

New York (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: 11313
http://www.wadsworth.org/labcert/elap/comm.html

New Jersey (NELAP accredited) Non Potable Water, Solid and Hazardous Waste: RI006
http://datamine2.state.nj.us/DEP_OPRA/OpraMain/pi_main?mode=pi_by_site&sort_order=PI_NAMEA&Select+a+Site:=58715

United States Department of Agriculture Soil Permit: P330-12-00139

Pennsylvania: 68-01752
http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx

CHAIN OF CUSTODY RECORD

PROJECT MW-70 Fingerprinting
CONTACT Maurice Frey
COMPANY Calumet Montana Refining, LLC
ADDRESS 1900 10th St NE
Great Falls, MT, 59404
EMAIL maurice.frey@clmt.com
PHONE 406-454-9891 **FAX** 406-761-0777
SAMPLED BY
Print Name TriHydro Sign

Turn Around Time
Standard ☐
If Authorized *
1 Week ☒
Other ☐ ____

META Environmental, Inc.
1000 Turk Hill Road, Bldg 2M Fairport NY 14450
DO NOT SEND SAMPLES TO META'S FAIRPORT ADDRESS

Samp #	Date	Time	Field Sample ID	Container Size	Container G/P	Grab	Composite	# of Containers	Matrix	Preserv.	Parameters: GC FID Fingerprint	(8015M)	Forensic PAHs	(8270M)	Comments
1	8-2-17	10:30	MW-70	30ml					Oil	No		X		X	

Relinquished by	Date & Time	Relinquished by	Date & Time	Relinquished by	Date & Time
Maurice Frey	8-7-17 4:00 PM	Fed Ex	8/9/17 4:05		
Received by	**Date & Time**	**Received by**	**Date & Time**	**Received by**	**Date & Time**
Fed Ex	8-7-17	Norma	8/9/17 4:05		

Shipping Info

Remarks

Temp °C Ambient

* Surcharges may apply

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_2HDMaAISSM5:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

TR 5/26/19

Summary by Group

Group	%Wgt	%Vol	Avg MW	Avg SG
Paraffin	0.157	2.307	32.303	0.217
I-Paraffins	3.285	47.467	675.843	4.532
Aromatics	0.103	1.193	21.206	0.142
Mono-Aromatics	0.103	1.193	21.206	0.142
Naphthenes	3.483	45.066	716.637	4.806
Mono-Naphthenes	3.483	45.066	716.637	4.806
Unidentified	0.307	3.966	63.125	0.423
	7.335	**100.000**	**1509.113**	**10.120**

Recovery = 7.335

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_24DMay19SM5:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Carbon

C#	%Wgt	%Vol
C4	0.002	0.040
C5	0.100	1.612
C6	0.628	9.227
C7	1.428	19.665
C8	2.042	27.423
C9	2.803	37.712
C10	0.025	0.354

Recovery = 7.335

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_24-May-19_15:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Composite by Carbon

Group	C#	%Wgt	%Vol
Paraffin	C4	0.002	0.034
	C5	0.018	0.288
	C6	0.012	0.191
	C7	0.027	0.399
	C8	0.051	0.735
	C9	0.047	0.661
I-Paraffins	C4	0.000	0.007
	C5	0.077	1.262
	C6	0.432	6.628
	C7	0.459	6.748
	C8	0.629	9.044
	C9	1.661	23.424
	C10	0.025	0.354
Mono-Aromatics	C6	0.001	0.009
	C7	0.003	0.032
	C8	0.099	1.151
Mono-Naphthenes	C5	0.005	0.063
	C6	0.183	2.399
	C7	0.939	12.485
	C8	1.263	16.493
	C9	1.094	13.627

Recovery = 7.335

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_24DMayA15SM5:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Carbon Tabular(%Wgt)

Carbon	Paraffin	I-Paraffins	Aromatics	Naphthenes	Olefins	Oxygenates	Plus	Total
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--
4	0.002	0.000	--	--	--	--	--	0.002
5	0.018	0.077	--	0.005	--	--	--	0.100
6	0.012	0.432	0.001	0.183	--	--	--	0.628
7	0.027	0.459	0.003	0.939	--	--	--	1.428
8	0.051	0.629	0.099	1.263	--	--	--	2.042
9	0.047	1.661	--	1.094	--	--	--	2.803
10	--	0.025	--	--	--	--	--	0.025
Total	0.157	3.285	0.103	3.483	--	--	--	7.028

Unknowns 0.307
Grand Total 7.335

Summary by Carbon Tabular(%Vol)

Carbon	Paraffin	I-Paraffins	Aromatics	Naphthenes	Olefins	Oxygenates	Plus	Total
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--
4	0.034	0.007	--	--	--	--	--	0.040
5	0.288	1.262	--	0.063	--	--	--	1.612
6	0.191	6.628	0.009	2.399	--	--	--	9.227
7	0.399	6.748	0.032	12.485	--	--	--	19.665
8	0.735	9.044	1.151	16.493	--	--	--	27.423
9	0.661	23.424	--	13.627	--	--	--	37.712
10	--	0.354	--	--	--	--	--	0.354
Total	2.307	47.467	1.193	45.066	--	--	--	96.034

Unknowns 3.966
Grand Total 100.000

Recovery = 7.335

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_24HDMayA15SM5:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Calculated Boiling Point

%Off	WBP(F)
IBP	145.03
1%	194.18
2%	212.98
3%	243.22
4%	255.66
5%	272.37
6%	288.32
7%	291.92
8%	
9%	
10%	
11%	
12%	
13%	
14%	
15%	
16%	
17%	
18%	
19%	
20%	
21%	
22%	
23%	
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26%	
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31%	
32%	
33%	
34%	
35%	
36%	
37%	
38%	
39%	
40%	
41%	
42%	
43%	
44%	
45%	
46%	

Recovery = 7.335

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_24DMayA15SM5:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Calculated Boiling Point

%Off	WBP(F)
47%	
48%	
49%	
50%	
51%	
52%	
53%	
54%	
55%	
56%	
57%	
58%	
59%	
60%	
61%	
62%	
63%	
64%	
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80%	
81%	
82%	
83%	
84%	
85%	
86%	
87%	
88%	
89%	
90%	
91%	
92%	
93%	

Recovery = 7.335

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_24DMayA15SM5:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Calculated Boiling Point

%Off	WBP(F)
94%	
95%	
96%	
97%	
98%	
99%	
FBP	

Recovery = 7.335

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_24MayA.SSM 5:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
1	5.537	346.93	4	i-Butane	0.000	0.007
2	5.707	383.85	?	Unidentified	0.000	0.006
3	5.783	400.00	4	n-Butane	0.002	0.034
4	5.905	409.78	5	2,2-Dimethylpropane	0.000	0.006
5	6.679	467.32	5	i-Pentane	0.077	1.256
6	7.162	500.00	5	n-Pentane	0.018	0.288
7	7.631	517.08	?	Unidentified	0.000	0.006
8	8.087	532.76	6	2,2-Dimethylbutane	0.008	0.128
9	8.724	553.19	?	Unidentified	0.000	0.005
10	8.778	554.87	?	Unidentified	0.004	0.051
11	8.987	561.20	5	Cyclopentane	0.005	0.063
12	9.029	562.47	6	2,3-Dimethylbutane	0.051	0.778
13	9.158	566.29	6	2-Methylpentane	0.140	2.175
14	9.678	581.19	6	3-Methylpentane	0.233	3.547
15	10.331	598.80	?	Unidentified	0.004	0.058
16	10.377	600.00	6	n-Hexane	0.012	0.191
17	10.454	601.49	?	Unidentified	0.002	0.029
18	10.513	602.61	?	Unidentified	0.001	0.009
19	11.334	617.77	?	Unidentified	0.001	0.013
20	11.561	621.75	7	2,2-Dimethylpentane	0.010	0.146
21	11.704	624.23	6	Methylcyclopentane	0.047	0.633
22	11.885	627.33	7	2,4-Dimethylpentane	0.029	0.434
23	12.205	632.67	7	2,2,3-Trimethylbutane	0.002	0.032
24	12.832	642.76	?	Unidentified	0.000	0.005
25	12.999	645.37	6	Benzene	0.001	0.009
26	13.367	650.99	?	Unidentified	0.001	0.010
27	13.425	651.86	7	3,3-Dimethylpentane	0.010	0.148
28	13.690	655.79	6	Cyclohexane	0.136	1.766
29	14.017	660.55	?	Unidentified	0.002	0.028
30	14.181	662.89	?	Unidentified	0.001	0.021
31	14.288	664.41	7	2-Methylhexane	0.054	0.799
32	14.424	666.31	7	2,3-Dimethylpentane	0.134	1.948
33	14.649	669.44	7	1,1-Dimethylcyclopentane	0.030	0.406
34	14.824	671.82	?	Unidentified	0.000	0.006
35	14.947	673.48	7	3-Methylhexane	0.176	2.599
36	15.216	677.08	?	Unidentified	0.000	0.006
37	15.472	680.44	7	1c,3-Dimethylcyclopentane	0.081	1.105
38	15.703	683.42	7	1t,3-Dimethylcyclopentane	0.075	1.013
39	15.784	684.46	7	3-Ethylpentane	0.044	0.641
40	15.931	686.32	7	1t,2-Dimethylcyclopentane	0.151	2.034
41	16.055	687.89	8	2,2,4-Trimethylpentane	0.009	0.132
42	16.546	693.96	?	Unidentified	0.001	0.015
43	16.917	698.42	?	Unidentified	0.003	0.046
44	17.050	700.00	7	n-Heptane	0.027	0.399
45	17.238	702.12	?	Unidentified	0.004	0.060
46	17.328	703.14	?	Unidentified	0.002	0.023
47	17.674	706.98	?	Unidentified	0.001	0.015
48	17.989	710.40	?	Unidentified	0.001	0.017
49	18.026	710.80	?	Unidentified	0.004	0.051

Recovery = 7.335

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_2-HDMaAISM5:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
50	18.397	714.76	?	Unidentified	0.002	0.028
51	18.981	720.82	7	1c,2-Dimethylcyclopentane	0.021	0.293
52	19.067	721.70	7	Methylcyclohexane	0.510	6.708
53	19.340	724.45	8	2,2-Dimethylhexane	0.004	0.062
54	19.396	725.02	8	1,1,3-Trimethylcyclopentane	0.039	0.524
55	20.317	734.02	7	Ethylcyclopentane	0.070	0.927
56	20.447	735.26	8	2,5-Dimethylhexane	0.059	0.865
57	20.661	737.27	8	2,4-Dimethylhexane	0.074	1.076
58	20.830	738.86	?	Unidentified	0.001	0.012
59	21.281	743.01	8	1c,2t,4-Trimethylcyclopentane	0.067	0.886
60	21.434	744.41	8	3,3-Dimethylhexane	0.018	0.261
61	22.102	750.36	8	1t,2c,3-Trimethylcyclopentane	0.103	1.353
62	22.430	753.22	8	2,3,4-Trimethylpentane	0.008	0.111
63	22.490	753.74	?	Unidentified	0.009	0.133
64	22.490	753.74	?	Unidentified	0.009	0.131
65	22.645	755.07	?	Unidentified	0.001	0.013
66	22.645	755.07	?	Unidentified	0.001	0.013
67	22.908	757.31	7	Toluene	0.003	0.032
68	22.908	757.31	8	2,3,3-Trimethylpentane	0.000	0.000
69	23.035	758.39	?	Unidentified	0.002	0.030
70	23.178	759.59	?	Unidentified	0.001	0.020
71	23.365	761.15	?	Unidentified	0.001	0.017
72	23.709	763.98	8	2,3-Dimethylhexane	0.097	1.384
73	23.846	765.10	8	2-Methyl-3-ethylpentane	0.053	0.751
74	24.102	767.17	?	Unidentified	0.005	0.070
75	24.427	769.77	8	2-Methylheptane	0.139	2.010
76	24.599	771.13	8	4-Methylheptane	0.055	0.790
77	24.722	772.10	8	1c,2c,4-Trimethylcyclopentane	0.017	0.220
78	24.785	772.59	8	3-Methyl-3-ethylpentane	0.020	0.288
79	25.088	774.95	8	1c,3-Dimethylcyclohexane	0.011	0.151
80	25.313	776.68	8	3-Methylheptane	0.092	1.314
81	25.451	777.74	8	1c,2t,3-Trimethylcyclopentane	0.267	3.513
82	25.546	778.46	8	trans-1,3-dimethylcyclohexane	0.022	0.226
83	25.680	779.48	8	1t,4-Dimethylcyclohexane	0.090	1.194
84	26.325	784.29	8	1,1-Dimethylcyclohexane	0.057	0.733
85	26.608	786.37	9	2,2,5-Trimethylhexane	0.005	0.074
86	26.761	787.47	8	3c-Ethylmethylcyclopentane	0.074	0.979
87	27.015	789.31	8	3t-Ethylmethylcyclopentane	0.063	0.826
88	27.167	790.40	8	2t-Ethylmethylcyclopentane	0.126	1.659
89	27.414	792.15	8	1,1-Methylethylcyclopentane	0.012	0.157
90	27.742	794.46	8	1t,2-Dimethylcyclohexane	0.132	1.726
91	28.128	797.15	8	1c,2c,3-Trimethylcyclopentane	0.003	0.035
92	28.189	797.57	?	Unidentified	0.002	0.028
93	28.428	799.20	?	Unidentified	0.002	0.031
94	28.545	800.00	8	n-Octane	0.051	0.735
95	28.626	800.67	8	1c,4-Dimethylcyclohexane	0.059	0.760
96	29.074	804.37	8	C8 - MonoNaph - 3	0.001	0.014
97	29.235	805.68	?	Unidentified	0.009	0.119
98	29.484	807.70	8	i-Propylcyclopentane	0.023	0.298

Recovery = 7.335

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_24May19_SSM5:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
99	29.537	808.12	9	2,4,4-Trimethylhexane	0.010	0.132
100	29.728	809.65	9	2,2,3,4-Tetramethylpentane	0.001	0.012
101	30.327	814.40	?	Unidentified	0.014	0.182
102	30.647	816.89	9	Cyclopentane, 1,1,3,4-tetramet	0.014	0.190
103	30.878	818.68	9	2,3,4-Trimethylhexane	0.022	0.301
104	31.140	820.69	8	C8 - MonoNaph - 4	0.012	0.158
105	31.431	822.90	?	Unidentified	0.002	0.026
106	31.717	825.05	8	Cycloheptane, methyl-	0.073	0.925
107	31.832	825.92	8	1c,2-Dimethylcyclohexane	0.012	0.155
108	31.979	827.01	9	C9 - IsoParaffin - 0	0.008	0.110
109	32.117	828.03	?	Unidentified	0.002	0.033
110	32.461	830.56	9	1,1,4-Trimethylcyclohexane	0.325	4.258
111	32.701	832.32	9	2,2,3-Trimethylhexane	0.316	4.477
112	32.967	834.24	9	2,4-Dimethylheptane	0.008	0.109
113	33.108	835.26	?	Unidentified	0.003	0.048
114	33.273	836.44	9	4,4-Dimethylheptane	0.350	4.953
115	33.693	839.42	9	2,6-Dimethylheptane	0.167	2.387
116	33.880	840.74	9	C9 - MonoNaph - 2a	0.030	0.400
117	34.077	842.12	9	1,1,3-Trimethylcyclohexane	0.025	0.318
118	34.272	843.48	9	C9 - MonoNaph - 3a	0.036	0.477
119	34.526	845.23	9	2,5-Dimethylheptane	0.027	0.379
120	35.181	849.69	8	Ethylbenzene	0.025	0.296
121	35.425	851.34	?	Unidentified	0.099	1.161
122	35.705	853.21	9	1c,2t,4t-Trimethylcyclohexane	0.071	0.926
123	36.023	855.32	?	Unidentified	0.014	0.177
124	36.201	856.49	?	Unidentified	0.002	0.021
125	36.376	857.64	9	C9 - MonoNaph - 4a	0.004	0.057
126	36.835	860.62	8	m-Xylene	0.005	0.062
127	37.018	861.80	8	p-Xylene	0.006	0.067
128	37.138	862.57	9	2,3-Dimethylheptane	0.132	1.838
129	37.467	864.67	9	3,5-Dimethylheptane	0.015	0.217
130	37.643	865.78	9	3,4-Dimethylheptane	0.045	0.621
131	37.989	867.96	9	C9 - MonoNapth - 5a	0.058	0.762
132	38.133	868.85	9	4-Ethylheptane	0.019	0.266
133	38.301	869.90	?	Unidentified	0.003	0.029
134	38.301	869.90	?	Unidentified	0.003	0.037
135	38.517	871.23	9	4-Methyloctane	0.097	1.362
136	38.693	872.32	9	2-Methyloctane	0.150	2.122
137	38.919	873.70	?	Unidentified	0.012	0.170
138	39.050	874.50	?	Unidentified	0.023	0.323
139	39.497	877.21	9	Heptane, 3-ethyl-	0.099	1.384
140	39.720	878.55	9	3-Methyloctane	0.191	2.679
141	39.915	879.71	?	Unidentified	0.009	0.127
142	40.005	880.25	?	Unidentified	0.005	0.055
143	40.122	880.94	?	Unidentified	0.009	0.108
144	40.249	881.69	?	Unidentified	0.008	0.097
145	40.381	882.47	8	o-Xylene	0.063	0.727
146	40.540	883.41	9	Cyclohexane, 1,2,4-trimethyl-,	0.008	0.102
147	40.624	883.90	?	Unidentified	0.006	0.085

Recovery = 7.335

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-001.D\DP19-05542-001_24-May-19_15_05:38:03
Sample: dp19-05542.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
148	40.789	884.86	10	C10 - IsoParaffin - 1	0.004	0.049
149	40.902	885.52	10	C10 - Isoparaffin - 2	0.009	0.120
150	41.235	887.45	9	Cyclopentane, 1-methyl-2-propy	0.161	1.856
151	41.367	888.21	9	trans-1,3-Diethylcyclopentane	0.158	1.814
152	41.663	889.91	9	1-Ethyl-3-methylcyclohexane (c,t)	0.092	1.061
153	41.910	891.31	9	Cyclohexane, 1-ethyl-4-methyl-	0.003	0.045
154	42.041	892.05	9	1,1,2-Trimethylcyclohexane	0.029	0.364
155	42.232	893.13	9	i-Butylcyclopentane	0.038	0.493
156	42.317	893.61	9	C9 MonoNaph - 4b	0.021	0.265
157	42.728	895.91	?	Unidentified	0.004	0.052
158	42.894	896.82	9	C9 MonoNaph - 5b	0.019	0.240
159	43.173	898.37	?	Unidentified	0.005	0.067
160	43.223	898.64	10	3,3,5-TrimethylHeptane	0.013	0.185
161	43.353	899.36	?	Unidentified	0.003	0.046
162	43.470	900.00	9	n-Nonane	0.047	0.661

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002_2-HDMayA.SSM 7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

5/26/19

Summary by Group

Group	%Wgt	%Vol	Avg MW	Avg SG
Paraffin	3.565	13.790	41.348	0.315
I-Paraffins	11.420	42.790	132.446	1.008
Aromatics	6.122	17.853	71.000	0.540
Mono-Aromatics	6.122	17.853	71.000	0.540
Naphthenes	5.747	19.013	66.647	0.507
Mono-Naphthenes	5.747	19.013	66.647	0.507
Unidentified	1.825	6.542	21.164	0.161
	28.681	**100.000**	**332.633**	**2.531**

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002_24DMay19SM7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Carbon

C#	%Wgt	%Vol
C1	0.000	0.004
C2	0.000	0.002
C3	0.002	0.012
C4	0.391	1.715
C5	2.967	12.010
C6	4.785	17.594
C7	8.596	29.098
C8	7.405	23.773
C9	2.618	8.931
C10	0.091	0.318

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002_24DMayA19SM7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Composite by Carbon

Group	C#	%Wgt	%Vol
Paraffin	C1	0.000	0.004
	C2	0.000	0.002
	C4	0.346	1.512
	C5	1.021	4.127
	C6	0.911	3.498
	C7	0.491	1.817
	C8	0.321	1.156
	C9	0.475	1.675
I-Paraffins	C4	0.045	0.203
	C5	1.845	7.541
	C6	2.480	9.543
	C7	3.193	11.784
	C8	2.418	8.646
	C9	1.347	4.754
	C10	0.091	0.318
Mono-Aromatics	C6	0.241	0.694
	C7	2.299	6.711
	C8	3.582	10.448
Mono-Naphthenes	C5	0.101	0.342
	C6	1.153	3.859
	C7	2.613	8.786
	C8	1.084	3.524
	C9	0.796	2.502
n-Olefins	C3	0.002	0.012

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002.24-May-19 17:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Carbon Tabular(%Wgt)

Carbon	Paraffin	I-Paraffins	Aromatics	Naphthenes	Olefins	Oxygenates	Plus	Total
1	0.000	--	--	--	--	--	--	0.000
2	0.000	--	--	--	--	--	--	0.000
3	--	--	--	--	0.002	--	--	0.002
4	0.346	0.045	--	--	--	--	--	0.391
5	1.021	1.845	--	0.101	--	--	--	2.967
6	0.911	2.480	0.241	1.153	--	--	--	4.785
7	0.491	3.193	2.299	2.613	--	--	--	8.596
8	0.321	2.418	3.582	1.084	--	--	--	7.405
9	0.475	1.347	--	0.796	--	--	--	2.618
10	--	0.091	--	--	--	--	--	0.091
Total	3.565	11.420	6.122	5.747	0.002	--	--	26.856
							Unknowns	1.825
							Grand Total	28.681

Summary by Carbon Tabular(%Vol)

Carbon	Paraffin	I-Paraffins	Aromatics	Naphthenes	Olefins	Oxygenates	Plus	Total
1	0.004	--	--	--	--	--	--	0.004
2	0.002	--	--	--	--	--	--	0.002
3	--	--	--	--	0.012	--	--	0.012
4	1.512	0.203	--	--	--	--	--	1.715
5	4.127	7.541	--	0.342	--	--	--	12.010
6	3.498	9.543	0.694	3.859	--	--	--	17.594
7	1.817	11.784	6.711	8.786	--	--	--	29.098
8	1.156	8.646	10.448	3.524	--	--	--	23.773
9	1.675	4.754	--	2.502	--	--	--	8.931
10	--	0.318	--	--	--	--	--	0.318
Total	13.790	42.790	17.853	19.013	0.012	--	--	93.458
							Unknowns	6.542
							Grand Total	100.000

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002_24DMayA19SM7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Calculated Boiling Point

%Off	WBP(F)
IBP	82.04
1%	82.04
2%	82.04
3%	96.98
4%	121.46
5%	138.16
6%	142.73
7%	151.69
8%	159.43
9%	176.57
10%	190.86
11%	194.18
12%	197.42
13%	197.42
14%	197.42
15%	209.12
16%	228.41
17%	230.82
18%	230.98
19%	234.82
20%	242.72
21%	246.92
22%	258.26
23%	277.16
24%	281.12
25%	282.38
26%	288.32
27%	291.92
28%	298.44
29%	
30%	
31%	
32%	
33%	
34%	
35%	
36%	
37%	
38%	
39%	
40%	
41%	
42%	
43%	
44%	
45%	
46%	

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002_24DMayA19SM7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Calculated Boiling Point

%Off	WBP(F)
47%	
48%	
49%	
50%	
51%	
52%	
53%	
54%	
55%	
56%	
57%	
58%	
59%	
60%	
61%	
62%	
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80%	
81%	
82%	
83%	
84%	
85%	
86%	
87%	
88%	
89%	
90%	
91%	
92%	
93%	

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002_24DMayA19SM7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Calculated Boiling Point

%Off	WBP(F)
94%	
95%	
96%	
97%	
98%	
99%	
FBP	

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002_24DMay19SM7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
1	4.995	100.00	1	Methane	0.000	0.004
2	5.076	200.00	2	Ethane	0.000	0.002
3	5.252	269.89	3	Propene	0.002	0.012
4	5.537	346.84	4	i-Butane	0.045	0.203
5	5.704	383.30	?	Unidentified	0.012	0.051
6	5.782	400.00	4	n-Butane	0.346	1.512
7	5.866	406.77	5	2,2-Dimethylpropane	0.027	0.116
8	5.906	409.90	?	Unidentified	0.004	0.015
9	6.006	417.77	?	Unidentified	0.024	0.103
10	6.400	447.46	?	Unidentified	0.010	0.041
11	6.677	467.27	5	i-Pentane	1.818	7.425
12	6.930	484.71	?	Unidentified	0.039	0.156
13	7.062	493.51	?	Unidentified	0.082	0.331
14	7.161	500.00	5	n-Pentane	1.021	4.127
15	7.319	505.91	?	Unidentified	0.128	0.518
16	7.507	512.72	?	Unidentified	0.070	0.284
17	7.629	517.09	?	Unidentified	0.190	0.740
18	8.085	532.73	6	2,2-Dimethylbutane	0.118	0.459
19	8.629	550.28	?	Unidentified	0.028	0.094
20	8.724	553.23	?	Unidentified	0.009	0.031
21	8.776	554.85	?	Unidentified	0.017	0.059
22	8.986	561.21	5	Cyclopentane	0.101	0.342
23	9.027	562.45	6	2,3-Dimethylbutane	0.396	1.514
24	9.092	564.37	?	Unidentified	0.009	0.035
25	9.157	566.30	6	2-Methylpentane	1.192	4.618
26	9.678	581.21	6	3-Methylpentane	0.775	2.952
27	10.377	600.00	6	n-Hexane	0.911	3.498
28	10.454	601.49	?	Unidentified	0.037	0.141
29	10.511	602.59	?	Unidentified	0.014	0.054
30	11.330	617.71	?	Unidentified	0.076	0.285
31	11.560	621.75	7	2,2-Dimethylpentane	0.048	0.180
32	11.702	624.20	6	Methylcyclopentane	0.855	2.889
33	11.883	627.30	7	2,4-Dimethylpentane	0.505	1.900
34	12.102	630.97	?	Unidentified	0.001	0.003
35	12.204	632.67	7	2,2,3-Trimethylbutane	0.014	0.050
36	12.311	634.42	?	Unidentified	0.000	0.001
37	12.571	638.64	?	Unidentified	0.001	0.004
38	12.653	639.94	?	Unidentified	0.002	0.005
39	12.832	642.77	?	Unidentified	0.006	0.018
40	12.932	644.34	?	Unidentified	0.004	0.010
41	12.997	645.35	?	Unidentified	0.067	0.193
42	13.065	646.40	6	Benzene	0.241	0.694
43	13.195	648.39	?	Unidentified	0.006	0.017
44	13.366	650.97	?	Unidentified	0.011	0.039
45	13.423	651.84	7	3,3-Dimethylpentane	0.043	0.155
46	13.508	653.11	?	Unidentified	0.003	0.012
47	13.688	655.77	6	Cyclohexane	0.298	0.970
48	13.908	658.99	?	Unidentified	0.002	0.006
49	13.957	659.70	?	Unidentified	0.001	0.004

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002 2 HDMay19 SM7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
50	14.023	660.64	?	Unidentified	0.008	0.029
51	14.179	662.87	?	Unidentified	0.023	0.085
52	14.289	664.43	7	2-Methylhexane	0.664	2.476
53	14.426	666.34	7	2,3-Dimethylpentane	1.127	4.102
54	14.650	669.45	7	1,1-Dimethylcyclopentane	0.024	0.081
55	14.820	671.78	?	Unidentified	0.010	0.037
56	14.949	673.51	7	3-Methylhexane	0.718	2.644
57	15.218	677.11	?	Unidentified	0.009	0.032
58	15.472	680.44	7	1c,3-Dimethylcyclopentane	0.150	0.508
59	15.703	683.43	7	1t,3-Dimethylcyclopentane	0.134	0.454
60	15.782	684.43	7	3-Ethylpentane	0.076	0.275
61	15.932	686.34	?	Unidentified	0.111	0.373
62	16.059	687.94	7	1t,2-Dimethylcyclopentane	1.836	6.186
63	16.545	693.95	?	Unidentified	0.014	0.050
64	16.608	694.71	?	Unidentified	0.001	0.003
65	16.856	697.70	?	Unidentified	0.025	0.092
66	16.909	698.33	?	Unidentified	0.027	0.101
67	17.050	700.00	7	n-Heptane	0.491	1.817
68	17.230	702.04	?	Unidentified	0.062	0.229
69	17.332	703.18	?	Unidentified	0.024	0.089
70	17.507	705.13	?	Unidentified	0.024	0.088
71	17.670	706.93	?	Unidentified	0.014	0.053
72	17.978	710.29	?	Unidentified	0.052	0.194
73	18.337	714.14	?	Unidentified	0.014	0.048
74	18.390	714.70	?	Unidentified	0.014	0.049
75	18.490	715.75	?	Unidentified	0.002	0.006
76	18.776	718.73	?	Unidentified	0.005	0.016
77	18.977	720.80	7	1c,2-Dimethylcyclopentane	0.084	0.289
78	19.068	721.73	7	Methylcyclohexane	0.288	0.949
79	19.350	724.58	8	2,2-Dimethylhexane	0.014	0.050
80	19.397	725.05	8	1,1,3-Trimethylcyclopentane	0.034	0.115
81	19.767	728.72	?	Unidentified	0.002	0.008
82	20.003	731.02	?	Unidentified	0.002	0.007
83	20.319	734.07	7	Ethylcyclopentane	0.097	0.319
84	20.449	735.31	8	2,5-Dimethylhexane	0.199	0.727
85	20.569	736.45	8	2,2,3-Trimethylpentane	0.048	0.171
86	20.661	737.32	8	2,4-Dimethylhexane	0.292	1.055
87	20.842	739.00	?	Unidentified	0.002	0.008
88	21.283	743.07	8	1c,2t,4-Trimethylcyclopentane	0.062	0.207
89	21.436	744.47	8	3,3-Dimethylhexane	0.019	0.069
90	21.837	748.07	8	Cyclopentane, 1,2,3-trimethyl-, (1à,2à	0.002	0.007
91	21.952	749.08	?	Unidentified	0.005	0.015
92	21.997	749.49	?	Unidentified	0.006	0.018
93	22.108	750.46	8	1t,2c,3-Trimethylcyclopentane	0.039	0.127
94	22.427	753.24	8	2,3,4-Trimethylpentane	0.690	2.431
95	22.655	755.21	?	Unidentified	0.014	0.050
96	22.857	756.93	7	Toluene	2.299	6.711
97	22.857	756.93	8	2,3,3-Trimethylpentane	0.025	0.087
98	23.033	758.42	?	Unidentified	0.019	0.068

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002_24DMayA.SSM 7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
99	23.174	759.61	?	Unidentified	0.009	0.030
100	23.329	760.91	?	Unidentified	0.004	0.016
101	23.371	761.25	?	Unidentified	0.008	0.030
102	23.706	764.02	8	2,3-Dimethylhexane	0.279	0.993
103	23.849	765.19	8	2-Methyl-3-ethylpentane	0.024	0.084
104	23.947	765.99	8	1,1,2-Trimethylcyclopentane	0.014	0.045
105	24.101	767.23	?	Unidentified	0.019	0.062
106	24.430	769.86	8	2-Methylheptane	0.333	1.207
107	24.602	771.23	8	4-Methylheptane	0.129	0.462
108	24.724	772.19	8	1c,2c,4-Trimethylcyclopentane	0.032	0.107
109	24.790	772.70	8	3-Methyl-3-ethylpentane	0.034	0.122
110	25.092	775.06	8	1c,3-Dimethylcyclohexane	0.045	0.148
111	25.314	776.76	8	3-Methylheptane	0.331	1.187
112	25.451	777.81	8	1c,2t,3-Trimethylcyclopentane	0.167	0.550
113	25.552	778.58	8	trans-1,3-dimethylcyclohexane	0.038	0.096
114	25.683	779.58	8	1t,4-Dimethylcyclohexane	0.052	0.174
115	25.908	781.27	8	C8 MonoNaph - 1	0.003	0.010
116	26.098	782.69	?	Unidentified	0.003	0.009
117	26.323	784.36	8	1,1-Dimethylcyclohexane	0.012	0.040
118	26.608	786.45	9	2,2,5-Trimethylhexane	0.182	0.653
119	26.762	787.57	8	3c-Ethylmethylcyclopentane	0.085	0.279
120	27.014	789.39	8	3t-Ethylmethylcyclopentane	0.063	0.209
121	27.168	790.49	8	2t-Ethylmethylcyclopentane	0.053	0.174
122	27.440	792.43	8	1,1-Methylethylcyclopentane	0.018	0.058
123	27.743	794.56	8	1t,2-Dimethylcyclohexane	0.069	0.226
124	27.822	795.12	?	Unidentified	0.008	0.025
125	27.954	796.04	?	Unidentified	0.001	0.004
126	28.140	797.32	8	1t,3-Dimethylcyclohexane	0.009	0.028
127	28.190	797.67	8	1c,2c,3-Trimethylcyclopentane	0.026	0.085
128	28.435	799.35	?	Unidentified	0.011	0.039
129	28.530	800.00	8	n-Octane	0.321	1.156
130	28.628	800.81	8	1c,4-Dimethylcyclohexane	0.104	0.335
131	28.997	803.84	?	Unidentified	0.010	0.031
132	29.068	804.42	?	Unidentified	0.003	0.011
133	29.233	805.76	8	C8 - MonoNaph - 3	0.027	0.089
134	29.412	807.21	?	Unidentified	0.015	0.049
135	29.478	807.74	8	i-Propylcyclopentane	0.021	0.069
136	29.531	808.16	9	2,4,4-Trimethylhexane	0.010	0.033
137	29.724	809.71	?	Unidentified	0.002	0.007
138	29.863	810.81	9	2,2,3,4-Tetramethylpentane	0.002	0.006
139	30.033	812.15	?	Unidentified	0.008	0.027
140	30.239	813.77	?	Unidentified	0.003	0.010
141	30.332	814.50	?	Unidentified	0.005	0.018
142	30.646	816.94	9	Cyclopentane, 1,1,3,4-tetramet	0.035	0.115
143	30.877	818.72	9	2,3,4-Trimethylhexane	0.037	0.126
144	31.136	820.69	8	C8 - MonoNaph - 4	0.012	0.040
145	31.435	822.96	?	Unidentified	0.005	0.016
146	31.713	825.05	8	Cycloheptane, methyl-	0.088	0.279
147	31.830	825.92	8	1c,2-Dimethylcyclohexane	0.009	0.027

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002_24DMay19SM7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
148	31.977	827.01	9	C9 - IsoParaffin - 0	0.004	0.013
149	32.121	828.07	?	Unidentified	0.004	0.014
150	32.243	828.97	?	Unidentified	0.002	0.005
151	32.462	830.57	9	1,1,4-Trimethylcyclohexane	0.185	0.606
152	32.697	832.28	9	2,2,3-Trimethylhexane	0.074	0.261
153	32.967	834.23	9	2,4-Dimethylheptane	0.017	0.059
154	33.114	835.28	?	Unidentified	0.007	0.024
155	33.273	836.42	9	4,4-Dimethylheptane	0.070	0.248
156	33.481	837.89	9	Cyclopentane, 1,1,3,4-tetramethyl-, tr	0.002	0.005
157	33.693	839.39	9	2,6-Dimethylheptane	0.136	0.485
158	33.875	840.66	9	C9 - MonoNaph - 2a	0.026	0.086
159	34.081	842.10	9	1,1,3-Trimethylcyclohexane	0.020	0.065
160	34.273	843.43	9	C9 - MonoNaph - 3a	0.033	0.109
161	34.530	845.20	9	2,5-Dimethylheptane	0.025	0.089
162	34.827	847.23	?	Unidentified	0.002	0.006
163	34.955	848.10	?	Unidentified	0.004	0.010
164	35.249	850.08	8	Ethylbenzene	0.530	1.547
165	35.422	851.24	?	Unidentified	0.050	0.145
166	35.706	853.13	9	1c,2t,4t-Trimethylcyclohexane	0.063	0.205
167	36.012	855.15	?	Unidentified	0.014	0.046
168	36.211	856.45	?	Unidentified	0.001	0.004
169	36.376	857.53	9	C9 - MonoNaph - 4a	0.019	0.063
170	36.766	860.06	8	m-Xylene	1.562	4.574
171	36.946	861.22	8	p-Xylene	0.648	1.905
172	37.136	862.43	9	2,3-Dimethylheptane	0.087	0.303
173	37.470	864.55	9	3,5-Dimethylheptane	0.020	0.069
174	37.639	865.61	9	3,4-Dimethylheptane	0.033	0.113
175	37.958	867.62	9	C9 - MonoNapth - 5a	0.020	0.065
176	37.998	867.87	?	Unidentified	0.022	0.074
177	38.139	868.74	9	4-Ethylheptane	0.014	0.049
178	38.292	869.69	?	Unidentified	0.002	0.006
179	38.292	869.69	?	Unidentified	0.002	0.008
180	38.518	871.08	9	4-Methyloctane	0.140	0.490
181	38.694	872.17	9	2-Methyloctane	0.189	0.670
182	38.904	873.45	?	Unidentified	0.007	0.025
183	39.049	874.33	?	Unidentified	0.019	0.063
184	39.493	877.00	9	Heptane, 3-ethyl-	0.070	0.244
185	39.726	878.40	9	3-Methyloctane	0.240	0.842
186	39.907	879.47	?	Unidentified	0.015	0.053
187	40.136	880.83	?	Unidentified	0.036	0.103
188	40.321	881.92	8	o-Xylene	0.842	2.422
189	40.542	883.21	9	Cyclohexane, 1,2,4-trimethyl-,	0.038	0.125
190	40.792	884.67	10	C10 - IsoParaffin - 1	0.013	0.045
191	40.899	885.29	10	C10 - Isoparaffin - 2	0.056	0.194
192	41.221	887.14	9	Cyclopentane, 1-methyl-2-propy	0.083	0.239
193	41.368	887.99	9	trans-1,3-Diethylcyclopentane	0.125	0.360
194	41.663	889.67	9	1-Ethyl-3-methylcyclohexane (c,t)	0.062	0.178
195	41.788	890.38	?	Unidentified	0.095	0.272
196	41.875	890.88	?	Unidentified	0.006	0.017

Recovery = 28.681

File: N:\3\DATA\2019\052419\052419 2019-05-24 14-11-58\DP19-05542-002.D\DP19-05542-002_24DMayA1SM7:01:18
Sample: dp19-05542.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
197	42.039	891.80	9	1,1,2-Trimethylcyclohexane	0.015	0.049
198	42.230	892.87	9	C9-MonoNaph-1b	0.030	0.106
199	42.320	893.38	9	C9 - MonoNaph - 2b	0.015	0.053
200	42.392	893.78	9	i-Butylcyclopentane	0.003	0.011
201	42.710	895.55	?	Unidentified	0.011	0.035
202	42.963	896.95	9	C9 MonoNaph - 5b	0.020	0.064
203	43.167	898.07	?	Unidentified	0.009	0.030
204	43.231	898.42	10	3,3,5-TrimethylHeptane	0.023	0.080
205	43.351	899.08	?	Unidentified	0.064	0.221
206	43.520	900.00	9	n-Nonane	0.475	1.675

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 12-27-42\DP19-07608-001.D\DP19-07608-001_FID2A.SSM
Sample: dp19-07608.001
Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

7/12 R

Summary by Group

Group	%Wgt	%Vol	Avg MW	Avg SG
Paraffin	0.533	0.630	15.686	0.102
I-Paraffins	1.181	1.396	34.725	0.225
Aromatics	0.206	0.199	6.068	0.039
Mono-Aromatics	0.206	0.199	6.068	0.039
Naphthenes	1.862	1.970	54.765	0.354
Mono-Naphthenes	1.862	1.970	54.765	0.354
Unidentified	0.193	0.204	5.675	0.037
	3.976	**4.400**	**116.918**	**0.757**

Recovery = 3.976

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 12-27-42\DP19-07608-001.D\DP19-07608-001.H 12_A.SSM
Sample: dp19-07608.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Carbon

C#	%Wgt	%Vol
C4	0.017	0.026
C5	0.021	0.027
C6	0.103	0.121
C7	0.303	0.343
C8	1.211	1.319
C9	2.090	2.314
C10	0.039	0.045

Recovery = 3.976

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 12-27-42\DP19-07608-001.D\DP19-07608-001.F 12-29-33 SSM
Sample: dp19-07608.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Composite by Carbon

Group	C#	%Wgt	%Vol
Paraffin	C4	0.001	0.002
	C5	0.008	0.010
	C6	0.017	0.021
	C7	0.030	0.037
	C8	0.114	0.136
	C9	0.363	0.424
I-Paraffins	C4	0.016	0.024
	C5	0.011	0.015
	C6	0.033	0.042
	C7	0.078	0.095
	C8	0.213	0.254
	C9	0.791	0.921
	C10	0.039	0.045
Mono-Aromatics	C6	0.001	0.001
	C7	0.024	0.023
	C8	0.182	0.175
Mono-Naphthenes	C5	0.002	0.002
	C6	0.052	0.057
	C7	0.171	0.188
	C8	0.702	0.754
	C9	0.935	0.969

Recovery = 3.976

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 12-27-42\DP19-07608-001.D\DP19-07608-001.F Rev: A.03.SSM
Sample: dp19-07608.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Carbon Tabular(%Wgt)

Carbon	Paraffin	I-Paraffins	Aromatics	Naphthenes	Olefins	Oxygenates	Plus	Total
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--
4	0.001	0.016	--	--	--	--	--	0.017
5	0.008	0.011	--	0.002	--	--	--	0.021
6	0.017	0.033	0.001	0.052	--	--	--	0.103
7	0.030	0.078	0.024	0.171	--	--	--	0.303
8	0.114	0.213	0.182	0.702	--	--	--	1.211
9	0.363	0.791	--	0.935	--	--	--	2.090
10	--	0.039	--	--	--	--	--	0.039
Total	0.533	1.181	0.206	1.862	--	--	--	3.783

Unknowns 0.193
Grand Total 3.976

Summary by Carbon Tabular(%Vol)

Carbon	Paraffin	I-Paraffins	Aromatics	Naphthenes	Olefins	Oxygenates	Plus	Total
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--
4	0.002	0.024	--	--	--	--	--	0.026
5	0.010	0.015	--	0.002	--	--	--	0.027
6	0.021	0.042	0.001	0.057	--	--	--	0.121
7	0.037	0.095	0.023	0.188	--	--	--	0.343
8	0.136	0.254	0.175	0.754	--	--	--	1.319
9	0.424	0.921	--	0.969	--	--	--	2.314
10	--	0.045	--	--	--	--	--	0.045
Total	0.630	1.396	0.199	1.970	--	--	--	4.196

Unknowns 0.204
Grand Total 4.400

Recovery = 3.976

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 12-27-42\DP19-07608-001.D\DP19-07608-001.F1221.ASSM
Sample: dp19-07608.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Calculated Boiling Point

%Off	WBP(F)
IBP	230.97
1%	250.04
2%	275.00
3%	291.49
4%	

Recovery = 3.976

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 12-27-42\DP19-07608-001.D\DP19-07608-001.D, FID2A.SSM
Sample: dp19-07608.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
1	5.542	346.93	4	i-Butane	0.016	0.024
2	5.787	400.00	4	n-Butane	0.001	0.002
3	6.681	467.26	5	i-Pentane	0.011	0.015
4	7.165	500.00	5	n-Pentane	0.008	0.010
5	8.089	532.75	6	2,2-Dimethylbutane	0.001	0.001
6	8.785	555.04	?	Unidentified	0.000	0.000
7	8.986	561.16	5	Cyclopentane	0.002	0.002
8	9.032	562.53	6	2,3-Dimethylbutane	0.003	0.004
9	9.159	566.30	6	2-Methylpentane	0.017	0.022
10	9.678	581.18	6	3-Methylpentane	0.012	0.015
11	10.377	600.00	6	n-Hexane	0.017	0.021
12	10.454	601.48	?	Unidentified	0.001	0.001
13	11.329	617.70	?	Unidentified	0.001	0.001
14	11.558	621.73	7	2,2-Dimethylpentane	0.001	0.001
15	11.702	624.22	6	Methylcyclopentane	0.021	0.023
16	11.883	627.32	7	2,4-Dimethylpentane	0.006	0.008
17	13.069	646.51	6	Benzene	0.001	0.001
18	13.421	651.87	7	3,3-Dimethylpentane	0.000	0.000
19	13.688	655.83	6	Cyclohexane	0.031	0.034
20	14.282	664.40	7	2-Methylhexane	0.023	0.028
21	14.419	666.32	7	2,3-Dimethylpentane	0.018	0.022
22	14.645	669.46	7	1,1-Dimethylcyclopentane	0.002	0.002
23	14.939	673.48	7	3-Methylhexane	0.027	0.033
24	15.467	680.47	7	1c,3-Dimethylcyclopentane	0.013	0.015
25	15.699	683.47	7	1t,3-Dimethylcyclopentane	0.011	0.012
26	15.774	684.44	7	3-Ethylpentane	0.003	0.003
27	15.925	686.36	7	1t,2-Dimethylcyclopentane	0.014	0.016
28	16.046	687.89	8	2,2,4-Trimethylpentane	0.023	0.028
29	17.040	700.00	7	n-Heptane	0.030	0.037
30	18.968	720.82	7	1c,2-Dimethylcyclopentane	0.010	0.011
31	19.060	721.77	7	Methylcyclohexane	0.100	0.109
32	19.387	725.07	8	1,1,3-Trimethylcyclopentane	0.008	0.009
33	20.307	734.08	7	Ethylcyclopentane	0.021	0.023
34	20.435	735.30	8	2,5-Dimethylhexane	0.010	0.012
35	20.651	737.34	8	2,4-Dimethylhexane	0.010	0.012
36	21.270	743.08	8	1c,2t,4-Trimethylcyclopentane	0.014	0.015
37	21.429	744.53	8	3,3-Dimethylhexane	0.001	0.001
38	22.095	750.47	8	1t,2c,3-Trimethylcyclopentane	0.011	0.012
39	22.414	753.25	8	2,3,4-Trimethylpentane	0.010	0.012
40	22.833	756.85	7	Toluene	0.024	0.023
41	22.833	756.85	8	2,3,3-Trimethylpentane	0.000	0.000
42	23.694	764.05	8	2,3-Dimethylhexane	0.016	0.019
43	23.838	765.22	8	2-Methyl-3-ethylpentane	0.003	0.004

Recovery = 3.976

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 12-27-42\DP19-07608-001.D\DP19-07608-001_FID2A.SSM
Sample: dp19-07608.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
44	24.412	769.84	8	2-Methylheptane	0.062	0.074
45	24.587	771.23	8	4-Methylheptane	0.019	0.022
46	24.770	772.67	8	3-Methyl-3-ethylpentane	0.007	0.009
47	25.079	775.08	8	1c,3-Dimethylcyclohexane	0.013	0.014
48	25.295	776.75	8	3-Methylheptane	0.051	0.060
49	25.438	777.85	8	1c,2t,3-Trimethylcyclopentane	0.115	0.125
50	25.529	778.54	8	trans-1,3-dimethylcyclohexane	0.013	0.011
51	25.664	779.57	8	1t,4-Dimethylcyclohexane	0.046	0.051
52	26.307	784.37	8	1,1-Dimethylcyclohexane	0.012	0.013
53	26.593	786.47	9	2,2,5-Trimethylhexane	0.007	0.008
54	26.743	787.56	8	3c-Ethylmethylcyclopentane	0.054	0.059
55	26.997	789.40	8	3t-Ethylmethylcyclopentane	0.043	0.047
56	27.151	790.51	8	2t-Ethylmethylcyclopentane	0.038	0.042
57	27.395	792.24	8	1,1-Methylethylcyclopentane	0.005	0.005
58	27.727	794.59	8	1t,2-Dimethylcyclohexane	0.063	0.068
59	28.413	799.33	?	Unidentified	0.007	0.008
60	28.511	800.00	8	n-Octane	0.114	0.136
61	28.607	800.80	8	1c,4-Dimethylcyclohexane	0.145	0.155
62	29.465	807.79	8	i-Propylcyclopentane	0.021	0.022
63	29.518	808.21	9	2,4,4-Trimethylhexane	0.009	0.010
64	30.010	812.13	?	Unidentified	0.002	0.002
65	30.314	814.51	?	Unidentified	0.003	0.004
66	30.626	816.94	9	Cyclopentane, 1,1,3,4-tetramet	0.006	0.006
67	30.856	818.71	9	2,3,4-Trimethylhexane	0.035	0.039
68	31.117	820.71	8	C8 - MonoNaph - 4	0.004	0.004
69	31.687	825.00	8	Cycloheptane, methyl-	0.084	0.088
70	31.813	825.94	8	1c,2-Dimethylcyclohexane	0.013	0.014
71	31.955	827.00	9	C9 - IsoParaffin - 0	0.003	0.003
72	32.100	828.07	?	Unidentified	0.004	0.005
73	32.440	830.56	9	1,1,4-Trimethylcyclohexane	0.270	0.293
74	32.673	832.26	9	2,2-Dimethylheptane	0.062	0.073
75	32.940	834.18	9	2,4-Dimethylheptane	0.017	0.020
76	33.248	836.39	9	4,4-Dimethylheptane	0.076	0.089
77	33.662	839.32	9	2,6-Dimethylheptane	0.085	0.101
78	33.857	840.68	9	C9 - MonoNaph - 2a	0.011	0.012
79	34.053	842.05	9	1,1,3-Trimethylcyclohexane	0.021	0.022
80	34.250	843.41	9	C9 - MonoNaph - 3a	0.038	0.041
81	34.503	845.15	9	2,5-Dimethylheptane	0.026	0.031
82	35.222	850.04	8	Ethylbenzene	0.086	0.083
83	35.398	851.22	?	Unidentified	0.038	0.037
84	35.676	853.07	9	1c,2t,4t-Trimethylcyclohexane	0.084	0.090
85	36.001	855.22	?	Unidentified	0.011	0.012
86	36.344	857.46	9	C9 - MonoNaph - 4a	0.028	0.030

Recovery = 3.976

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 12-27-42\DP19-07608-001.D\DP19-07608-001.FID2_A.SSM
Sample: dp19-07608.001 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
87	36.933	861.27	8	m-Xylene	0.007	0.007
88	37.109	862.39	8	p-Xylene	0.042	0.041
89	37.440	864.49	9	3,5-Dimethylheptane	0.008	0.009
90	37.623	865.65	9	3,4-Dimethylheptane	0.021	0.024
91	37.886	867.30	9	C9 - MonoNapth - 5a	0.035	0.038
92	38.105	868.66	9	3,3-Diethylpentane	0.018	0.020
93	38.488	871.03	9	4-Methyloctane	0.076	0.089
94	38.666	872.12	9	2-Methyloctane	0.110	0.129
95	38.935	873.76	?	Unidentified	0.002	0.003
96	39.025	874.31	?	Unidentified	0.025	0.027
97	39.456	876.91	9	Heptane, 3-ethyl-	0.065	0.075
98	39.696	878.34	9	3-Methyloctane	0.174	0.202
99	39.891	879.50	?	Unidentified	0.017	0.020
100	40.106	880.78	8	o-Xylene	0.047	0.045
101	40.222	881.46	9	Cyclohexane, 1,2,4-trimethyl-,	0.015	0.016
102	40.357	882.25	?	Unidentified	0.021	0.020
103	40.513	883.17	?	Unidentified	0.039	0.042
104	40.768	884.65	10	C10 - IsoParaffin - 1	0.003	0.004
105	40.876	885.28	10	C10 - Isoparaffin - 2	0.009	0.011
106	41.201	887.15	9	Cyclopentane, 1-methyl-2-propy	0.092	0.088
107	41.344	887.98	9	trans-1,3-Diethylcyclopentane	0.166	0.158
108	41.640	889.66	9	1-Ethyl-3-methylcyclohexane (c,t)	0.081	0.077
109	41.727	890.15	?	Unidentified	0.007	0.007
110	41.905	891.16	9	Cyclohexane, 1-ethyl-4-methyl-	0.008	0.009
111	42.021	891.82	9	1,1,2-Trimethylcyclohexane	0.014	0.015
112	42.208	892.87	9	C9-MonoNaph-1b	0.037	0.043
113	42.297	893.37	9	i-Butylcyclopentane	0.017	0.019
114	42.372	893.79	9	C9 MonoNaph - 4b	0.004	0.005
115	42.877	896.59	9	C9 MonoNaph - 5b	0.008	0.009
116	42.960	897.05	?	Unidentified	0.006	0.007
117	43.123	897.94	?	Unidentified	0.004	0.005
118	43.209	898.42	10	3,3,5-TrimethylHeptane	0.026	0.030
119	43.365	899.27	?	Unidentified	0.004	0.004
120	43.499	900.00	9	n-Nonane	0.363	0.424

Recovery = 3.976

File: N:\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-002.D\DP19-07608-002_FID1_A.ISM 16:59:37
Sample: dp19-07608.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

BR 7/14/19

Summary by Group

Group	%Wgt	%Vol	Avg MW	Avg SG
Paraffin	0.417	0.494	421.662	0.103
I-Paraffins	1.059	1.253	1071.683	0.262
Aromatics	0.120	0.116	120.912	0.030
Mono-Aromatics	0.120	0.116	120.912	0.030
Naphthenes	1.652	1.760	1671.560	0.408
Mono-Naphthenes	1.652	1.760	1671.560	0.408
Unidentified	0.165	0.171	166.710	0.041
	3.413	**3.795**	**3452.528**	**0.843**

Recovery = 3.413

File: N:\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-002.D\DP19-07608-002_FID1_JuA.SSM 6:59:37
Sample: dp19-07608.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Carbon

C#	%Wgt	%Vol
C5	0.007	0.009
C6	0.081	0.095
C7	0.277	0.317
C8	0.989	1.089
C9	1.860	2.074
C10	0.034	0.039

Recovery = 3.413

File: N:\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-002.D\DP19-07608-002_FID1U.SSM 6:59:37
Sample: dp19-07608.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Composite by Carbon

Group	C#	%Wgt	%Vol
Paraffin	C5	0.002	0.003
	C6	0.009	0.011
	C7	0.022	0.027
	C8	0.082	0.099
	C9	0.301	0.353
I-Paraffins	C5	0.003	0.005
	C6	0.022	0.029
	C7	0.072	0.089
	C8	0.193	0.232
	C9	0.734	0.860
	C10	0.034	0.039
Mono-Aromatics	C6	0.002	0.002
	C7	0.002	0.002
	C8	0.115	0.112
Mono-Naphthenes	C5	0.001	0.001
	C6	0.048	0.053
	C7	0.180	0.199
	C8	0.598	0.647
	C9	0.825	0.860

Recovery = 3.413

File: N:\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-002.D\DP19-07608-002_FID1_A.SSM 6:59:37
Sample: dp19-07608.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Carbon Tabular(%Wgt)

Carbon	Paraffin	I-Paraffins	Aromatics	Naphthenes	Olefins	Oxygenates	Plus	Total
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--
5	0.002	0.003	--	0.001	--	--	--	0.007
6	0.009	0.022	0.002	0.048	--	--	--	0.081
7	0.022	0.072	0.002	0.180	--	--	--	0.277
8	0.082	0.193	0.115	0.598	--	--	--	0.989
9	0.301	0.734	--	0.825	--	--	--	1.860
10	--	0.034	--	--	--	--	--	0.034
Total	0.417	1.059	0.120	1.652	--	--	--	3.248

Unknowns 0.165
Grand Total 3.413

Summary by Carbon Tabular(%Vol)

Carbon	Paraffin	I-Paraffins	Aromatics	Naphthenes	Olefins	Oxygenates	Plus	Total
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--
4	--	--	--	--	--	--	--	--
5	0.003	0.005	--	0.001	--	--	--	0.009
6	0.011	0.029	0.002	0.053	--	--	--	0.095
7	0.027	0.089	0.002	0.199	--	--	--	0.317
8	0.099	0.232	0.112	0.647	--	--	--	1.089
9	0.353	0.860	--	0.860	--	--	--	2.074
10	--	0.039	--	--	--	--	--	0.039
Total	0.494	1.253	0.116	1.760	--	--	--	3.624

Unknowns 0.171
Grand Total 3.795

Recovery = 3.413

File: N:\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-002.D\DP19-07608-002_FID1A.SSM 12-Jul-19 16:59:37
Sample: dp19-07608.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
1	6.676	467.25	5	i-Pentane	0.003	0.005
2	7.161	500.00	5	n-Pentane	0.002	0.003
3	8.087	532.83	6	2,2-Dimethylbutane	0.001	0.001
4	8.985	561.23	5	Cyclopentane	0.001	0.001
5	9.029	562.53	6	2,3-Dimethylbutane	0.002	0.003
6	9.157	566.33	6	2-Methylpentane	0.011	0.014
7	9.677	581.23	6	3-Methylpentane	0.009	0.011
8	10.374	600.00	6	n-Hexane	0.009	0.011
9	10.450	601.47	?	Unidentified	0.000	0.001
10	11.327	617.71	?	Unidentified	0.001	0.001
11	11.557	621.77	7	2,2-Dimethylpentane	0.001	0.001
12	11.699	624.22	6	Methylcyclopentane	0.019	0.021
13	11.878	627.29	7	2,4-Dimethylpentane	0.004	0.005
14	12.984	645.24	?	Unidentified	0.000	0.000
15	13.064	646.47	6	Benzene	0.002	0.002
16	13.422	651.92	7	3,3-Dimethylpentane	0.001	0.001
17	13.683	655.80	6	Cyclohexane	0.029	0.032
18	14.004	660.48	?	Unidentified	0.000	0.000
19	14.173	662.90	?	Unidentified	0.000	0.000
20	14.281	664.42	7	2-Methylhexane	0.022	0.027
21	14.417	666.34	7	2,3-Dimethylpentane	0.014	0.017
22	14.641	669.44	7	1,1-Dimethylcyclopentane	0.003	0.003
23	14.938	673.49	7	3-Methylhexane	0.028	0.034
24	15.465	680.48	7	1c,3-Dimethylcyclopentane	0.014	0.016
25	15.693	683.42	7	1t,3-Dimethylcyclopentane	0.012	0.013
26	15.776	684.49	7	3-Ethylpentane	0.003	0.003
27	15.923	686.36	7	1t,2-Dimethylcyclopentane	0.016	0.018
28	16.047	687.92	8	2,2,4-Trimethylpentane	0.013	0.016
29	17.038	700.00	7	n-Heptane	0.022	0.027
30	18.965	720.82	7	1c,2-Dimethylcyclopentane	0.010	0.012
31	19.054	721.73	7	Methylcyclohexane	0.102	0.112
32	19.329	724.51	8	2,2-Dimethylhexane	0.001	0.001
33	19.377	724.99	8	1,1,3-Trimethylcyclopentane	0.007	0.008
34	20.304	734.07	7	Ethylcyclopentane	0.023	0.026
35	20.433	735.30	8	2,5-Dimethylhexane	0.010	0.012
36	20.579	736.68	?	Unidentified	0.001	0.001
37	20.648	737.33	8	2,4-Dimethylhexane	0.012	0.014
38	21.268	743.08	8	1c,2t,4-Trimethylcyclopentane	0.015	0.016
39	21.418	744.44	8	3,3-Dimethylhexane	0.002	0.002
40	22.088	750.42	8	1t,2c,3-Trimethylcyclopentane	0.012	0.013
41	22.410	753.24	8	2,3,4-Trimethylpentane	0.008	0.009
42	22.891	757.36	7	Toluene	0.002	0.002
43	22.891	757.36	8	2,3,3-Trimethylpentane	0.002	0.003
44	23.690	764.03	8	2,3-Dimethylhexane	0.016	0.019
45	23.828	765.15	8	2-Methyl-3-ethylpentane	0.004	0.005
46	24.411	769.85	8	2-Methylheptane	0.054	0.065
47	24.585	771.23	8	4-Methylheptane	0.019	0.023
48	24.706	772.18	8	1c,2c,4-Trimethylcyclopentane	0.003	0.004
49	24.770	772.69	8	3-Methyl-3-ethylpentane	0.004	0.005

Recovery = 3.413

File: N:\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-002.D\DP19-07608-002_FID1_JuA.SSM 6:59:37
Sample: dp19-07608.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
50	25.077	775.08	8	1c,3-Dimethylcyclohexane	0.012	0.013
51	25.294	776.76	8	3-Methylheptane	0.048	0.057
52	25.438	777.85	8	1c,2t,3-Trimethylcyclopentane	0.099	0.108
53	25.526	778.53	8	trans-1,3-dimethylcyclohexane	0.012	0.010
54	25.662	779.56	8	1t,4-Dimethylcyclohexane	0.039	0.043
55	26.311	784.41	8	1,1-Dimethylcyclohexane	0.011	0.012
56	26.595	786.49	9	2,2,5-Trimethylhexane	0.004	0.004
57	26.741	787.56	8	3c-Ethylmethylcyclopentane	0.045	0.049
58	26.995	789.40	8	3t-Ethylmethylcyclopentane	0.035	0.039
59	27.147	790.49	8	2t-Ethylmethylcyclopentane	0.034	0.038
60	27.395	792.26	8	1,1-Methylethylcyclopentane	0.005	0.005
61	27.725	794.58	8	1t,2-Dimethylcyclohexane	0.053	0.057
62	28.410	799.32	?	Unidentified	0.005	0.006
63	28.510	800.00	8	n-Octane	0.082	0.099
64	28.605	800.79	8	1c,4-Dimethylcyclohexane	0.116	0.125
65	29.465	807.80	8	i-Propylcyclopentane	0.018	0.019
66	29.518	808.23	9	2,4,4-Trimethylhexane	0.007	0.008
67	30.013	812.16	?	Unidentified	0.002	0.002
68	30.305	814.46	?	Unidentified	0.003	0.004
69	30.628	816.96	9	Cyclopentane, 1,1,3,4-tetramet	0.005	0.006
70	30.855	818.71	9	2,3,4-Trimethylhexane	0.028	0.032
71	31.118	820.72	8	C8 - MonoNaph - 4	0.004	0.004
72	31.204	821.37	9	Pentane, 3-ethyl-2,2-dimethyl-	0.000	0.000
73	31.685	824.99	8	Cycloheptane, methyl-	0.068	0.072
74	31.812	825.94	8	1c,2-Dimethylcyclohexane	0.011	0.011
75	31.953	826.99	9	C9 - IsoParaffin - 0	0.002	0.002
76	32.101	828.08	?	Unidentified	0.004	0.005
77	32.436	830.54	9	1,1,4-Trimethylcyclohexane	0.224	0.244
78	32.671	832.25	9	2,2,3-Trimethylhexane	0.055	0.065
79	32.936	834.16	9	2,4-Dimethylheptane	0.015	0.018
80	33.245	836.37	9	4,4-Dimethylheptane	0.070	0.083
81	33.663	839.33	9	2,6-Dimethylheptane	0.075	0.089
82	33.856	840.68	9	C9 - MonoNaph - 2a	0.010	0.011
83	34.047	842.02	9	1,1,3-Trimethylcyclohexane	0.019	0.020
84	34.242	843.37	9	C9 - MonoNaph - 3a	0.032	0.035
85	34.499	845.14	9	2,5-Dimethylheptane	0.023	0.027
86	35.218	850.02	8	Ethylbenzene	0.081	0.079
87	35.395	851.21	?	Unidentified	0.036	0.035
88	35.673	853.06	9	1c,2t,4t-Trimethylcyclohexane	0.073	0.078
89	35.997	855.20	?	Unidentified	0.011	0.012
90	36.182	856.41	?	Unidentified	0.001	0.001
91	36.337	857.42	9	C9 - MonoNaph - 4a	0.025	0.027
92	36.713	859.86	8	m-Xylene	0.001	0.001
93	36.920	861.19	8	p-Xylene	0.014	0.013
94	37.104	862.37	9	2,3-Dimethylheptane	0.041	0.048
95	37.433	864.46	9	3,5-Dimethylheptane	0.008	0.009
96	37.615	865.60	9	3,4-Dimethylheptane	0.019	0.022
97	37.879	867.26	9	C9 - MonoNapth - 5a	0.030	0.033
98	38.100	868.63	9	4-Ethylheptane	0.015	0.018

Recovery = 3.413

File: N:\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-002.D\DP19-07608-002_FID1_uA.ISM 6:59:37
Sample: dp19-07608.002 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
99	38.489	871.04	9	4-Methyloctane	0.069	0.080
100	38.666	872.13	9	2-Methyloctane	0.095	0.112
101	38.905	873.59	?	Unidentified	0.003	0.003
102	39.020	874.28	?	Unidentified	0.023	0.025
103	39.455	876.91	9	Heptane, 3-ethyl-	0.056	0.065
104	39.691	878.32	9	3-Methyloctane	0.152	0.178
105	39.884	879.47	?	Unidentified	0.014	0.016
106	40.103	880.77	?	Unidentified	0.039	0.037
107	40.219	881.45	?	Unidentified	0.011	0.010
108	40.357	882.26	8	o-Xylene	0.020	0.019
109	40.509	883.15	9	Cyclohexane, 1,2,4-trimethyl-,	0.035	0.038
110	40.767	884.65	10	C10 - IsoParaffin - 1	0.003	0.003
111	40.877	885.29	10	C10 - Isoparaffin - 2	0.007	0.008
112	41.196	887.13	9	Cyclopentane, 1-methyl-2-propy	0.082	0.078
113	41.343	887.97	9	trans-1,3-Diethylcyclopentane	0.142	0.136
114	41.638	889.65	9	1-Ethyl-3-methylcyclohexane (c,t)	0.074	0.071
115	41.905	891.17	9	Cyclohexane, 1-ethyl-4-methyl-	0.006	0.007
116	42.017	891.80	9	1,1,2-Trimethylcyclohexane	0.012	0.013
117	42.202	892.84	9	C9-MonoNaph-1b	0.032	0.036
118	42.296	893.37	9	i-Butylcyclopentane	0.017	0.018
119	42.881	896.62	?	Unidentified	0.007	0.007
120	42.964	897.07	9	C9 MonoNaph - 5b	0.007	0.008
121	43.116	897.91	?	Unidentified	0.004	0.005
122	43.206	898.40	10	3,3,5-TrimethylHeptane	0.024	0.028
123	43.283	898.83	?	Unidentified	0.000	0.000
124	43.498	900.00	9	n-Nonane	0.301	0.353

Recovery = 3.413

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-003.D\DP19-07608-003.FID2A.SSM
Sample: dp19-07608.003 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Group

Group	%Wgt	%Vol	Avg MW	Avg SG
Paraffin	1.590	2.025	13.602	0.095
I-Paraffins	5.510	6.884	47.139	0.328
Aromatics	1.023	1.019	8.756	0.061
Mono-Aromatics	1.023	1.019	8.756	0.061
Naphthenes	3.114	3.464	26.647	0.185
Mono-Naphthenes	3.114	3.464	26.647	0.185
Unidentified	0.974	1.127	8.334	0.058
	12.211	**14.518**	**104.478**	**0.726**

7/15 R

Recovery = 12.211

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-003.D\DP19-07608-003, FID2A.SSM
Sample: dp19-07608.003 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Carbon

C#	%Wgt	%Vol
C4	0.050	0.075
C5	0.508	0.698
C6	1.547	1.933
C7	2.485	2.998
C8	4.153	4.793
C9	2.429	2.817
C10	0.066	0.078

Recovery = 12.211

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-003.D\DP19-07608-003.FID2A.SSM
Sample: dp19-07608.003 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Composite by Carbon

Group	C#	%Wgt	%Vol
Paraffin	C4	0.044	0.066
	C5	0.196	0.271
	C6	0.327	0.428
	C7	0.354	0.448
	C8	0.346	0.425
	C9	0.322	0.387
I-Paraffins	C4	0.006	0.009
	C5	0.283	0.394
	C6	0.718	0.943
	C7	1.221	1.538
	C8	1.931	2.377
	C9	1.284	1.545
	C10	0.066	0.078
Mono-Aromatics	C6	0.056	0.055
	C7	0.156	0.156
	C8	0.812	0.809
Mono-Naphthenes	C5	0.028	0.033
	C6	0.446	0.507
	C7	0.753	0.857
	C8	1.064	1.182
	C9	0.823	0.885

Recovery = 12.211

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-003.D\DP19-07608-003.FID22A.SSM
Sample: dp19-07608.003 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Summary by Carbon Tabular(%Wgt)

Carbon	Paraffin	I-Paraffins	Aromatics	Naphthenes	Olefins	Oxygenates	Plus	Total
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--
4	0.044	0.006	--	--	--	--	--	0.050
5	0.196	0.283	--	0.028	--	--	--	0.508
6	0.327	0.718	0.056	0.446	--	--	--	1.547
7	0.354	1.221	0.156	0.753	--	--	--	2.485
8	0.346	1.931	0.812	1.064	--	--	--	4.153
9	0.322	1.284	--	0.823	--	--	--	2.429
10	--	0.066	--	--	--	--	--	0.066
Total	1.590	5.510	1.023	3.114	--	--	--	11.237
							Unknowns	0.974
							Grand Total	12.211

Summary by Carbon Tabular(%Vol)

Carbon	Paraffin	I-Paraffins	Aromatics	Naphthenes	Olefins	Oxygenates	Plus	Total
1	--	--	--	--	--	--	--	--
2	--	--	--	--	--	--	--	--
3	--	--	--	--	--	--	--	--
4	0.066	0.009	--	--	--	--	--	0.075
5	0.271	0.394	--	0.033	--	--	--	0.698
6	0.428	0.943	0.055	0.507	--	--	--	1.933
7	0.448	1.538	0.156	0.857	--	--	--	2.998
8	0.425	2.377	0.809	1.182	--	--	--	4.793
9	0.387	1.545	--	0.885	--	--	--	2.817
10	--	0.078	--	--	--	--	--	0.078
Total	2.025	6.884	1.019	3.464	--	--	--	13.392
							Unknowns	1.127
							Grand Total	14.518

Recovery = 12.211

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-003.D\DP19-07608-003, FID2A.SSM
Sample: dp19-07608.003 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Calculated Boiling Point

%Off	WBP(F)
IBP	96.98
1%	139.52
2%	174.56
3%	194.18
4%	209.12
5%	211.10
6%	236.30
7%	243.68
8%	254.54
9%	271.22
10%	281.12
11%	290.28
12%	301.93
13%	
14%	

Recovery = 12.211

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-003.D\DP19-07608-003_FID2A.SSM
Sample: dp19-07608.003 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
1	5.540	346.93	4	i-Butane	0.006	0.009
2	5.699	381.79	?	Unidentified	0.000	0.000
3	5.784	400.00	4	n-Butane	0.044	0.066
4	5.869	406.80	?	Unidentified	0.001	0.001
5	5.909	410.01	5	2,2-Dimethylpropane	0.001	0.001
6	6.010	417.88	?	Unidentified	0.000	0.001
7	6.402	447.50	?	Unidentified	0.000	0.001
8	6.679	467.30	5	i-Pentane	0.282	0.393
9	6.937	485.02	?	Unidentified	0.000	0.001
10	7.064	493.51	?	Unidentified	0.009	0.012
11	7.162	500.00	5	n-Pentane	0.196	0.271
12	7.321	505.92	?	Unidentified	0.009	0.013
13	7.509	512.75	?	Unidentified	0.005	0.007
14	7.630	517.08	?	Unidentified	0.026	0.034
15	8.086	532.75	6	2,2-Dimethylbutane	0.021	0.028
16	8.628	550.27	?	Unidentified	0.004	0.004
17	8.723	553.23	?	Unidentified	0.003	0.003
18	8.776	554.85	?	Unidentified	0.003	0.004
19	8.985	561.21	5	Cyclopentane	0.028	0.033
20	9.027	562.48	6	2,3-Dimethylbutane	0.100	0.131
21	9.091	564.37	?	Unidentified	0.002	0.003
22	9.156	566.30	6	2-Methylpentane	0.343	0.454
23	9.676	581.22	6	3-Methylpentane	0.254	0.330
24	10.373	600.00	6	n-Hexane	0.327	0.428
25	10.452	601.53	?	Unidentified	0.007	0.009
26	10.507	602.59	?	Unidentified	0.003	0.003
27	11.326	617.72	?	Unidentified	0.027	0.035
28	11.556	621.77	7	2,2-Dimethylpentane	0.015	0.019
29	11.587	622.30	?	Unidentified	0.003	0.004
30	11.697	624.21	6	Methylcyclopentane	0.287	0.331
31	11.878	627.31	7	2,4-Dimethylpentane	0.152	0.195
32	12.096	630.98	?	Unidentified	0.001	0.001
33	12.200	632.70	7	2,2,3-Trimethylbutane	0.005	0.006
34	12.565	638.64	?	Unidentified	0.001	0.001
35	12.649	639.98	?	Unidentified	0.001	0.001
36	12.823	642.73	?	Unidentified	0.008	0.008
37	12.923	644.31	?	Unidentified	0.001	0.001
38	12.991	645.36	?	Unidentified	0.027	0.027
39	13.059	646.42	6	Benzene	0.056	0.055
40	13.185	648.35	?	Unidentified	0.001	0.001
41	13.355	650.94	?	Unidentified	0.018	0.022
42	13.415	651.83	7	3,3-Dimethylpentane	0.016	0.019
43	13.500	653.11	?	Unidentified	0.001	0.001

Recovery = 12.211

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-003.D\DP19-07608-003.D_FID2A.SSM
Sample: dp19-07608.003 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
44	13.631	655.05	?	Unidentified	0.006	0.007
45	13.681	655.79	6	Cyclohexane	0.159	0.176
46	13.894	658.91	?	Unidentified	0.001	0.001
47	14.011	660.60	?	Unidentified	0.007	0.009
48	14.171	662.89	?	Unidentified	0.014	0.018
49	14.278	664.41	7	2-Methylhexane	0.289	0.367
50	14.414	666.32	7	2,3-Dimethylpentane	0.355	0.441
51	14.638	669.43	7	1,1-Dimethylcyclopentane	0.018	0.021
52	14.805	671.71	?	Unidentified	0.007	0.009
53	14.937	673.49	7	3-Methylhexane	0.348	0.437
54	15.202	677.04	?	Unidentified	0.008	0.010
55	15.460	680.43	7	1c,3-Dimethylcyclopentane	0.085	0.098
56	15.693	683.44	7	1t,3-Dimethylcyclopentane	0.076	0.088
57	15.769	684.42	7	3-Ethylpentane	0.042	0.053
58	15.918	686.32	7	1t,2-Dimethylcyclopentane	0.116	0.134
59	16.041	687.87	8	2,2,4-Trimethylpentane	0.606	0.756
60	16.533	693.96	?	Unidentified	0.010	0.012
61	16.856	697.86	?	Unidentified	0.004	0.006
62	16.901	698.39	?	Unidentified	0.018	0.023
63	17.036	700.00	7	n-Heptane	0.354	0.448
64	17.219	702.08	?	Unidentified	0.040	0.051
65	17.316	703.17	?	Unidentified	0.017	0.021
66	17.486	705.07	?	Unidentified	0.001	0.001
67	17.657	706.96	?	Unidentified	0.009	0.012
68	17.968	710.34	?	Unidentified	0.021	0.026
69	18.002	710.72	?	Unidentified	0.017	0.021
70	18.382	714.77	?	Unidentified	0.040	0.047
71	18.455	715.54	?	Unidentified	0.002	0.002
72	18.777	718.90	?	Unidentified	0.006	0.007
73	18.962	720.80	7	1c,2-Dimethylcyclopentane	0.044	0.052
74	19.052	721.73	7	Methylcyclohexane	0.337	0.378
75	19.331	724.54	8	2,2-Dimethylhexane	0.007	0.009
76	19.382	725.06	8	1,1,3-Trimethylcyclopentane	0.030	0.034
77	19.747	728.69	?	Unidentified	0.002	0.002
78	19.954	730.71	?	Unidentified	0.001	0.001
79	19.983	730.99	?	Unidentified	0.002	0.002
80	20.301	734.06	7	Ethylcyclopentane	0.075	0.085
81	20.433	735.31	8	2,5-Dimethylhexane	0.097	0.120
82	20.555	736.47	?	Unidentified	0.018	0.022
83	20.642	737.29	8	2,4-Dimethylhexane	0.150	0.185
84	20.823	738.98	?	Unidentified	0.005	0.006
85	21.266	743.08	8	1c,2t,4-Trimethylcyclopentane	0.055	0.063
86	21.418	744.46	8	3,3-Dimethylhexane	0.013	0.016

Recovery = 12.211

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-003.D\DP19-07608-003.FID22A.SSM
Sample: dp19-07608.003 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
87	21.854	748.37	8	Cyclopentane, 1,2,3-trimethyl-, (1à,2à,3à)-	0.003	0.003
88	21.947	749.20	?	Unidentified	0.009	0.010
89	21.981	749.50	?	Unidentified	0.011	0.012
90	22.087	750.43	8	1t,2c,3-Trimethylcyclopentane	0.051	0.057
91	22.211	751.52	?	Unidentified	0.004	0.005
92	22.256	751.91	?	Unidentified	0.002	0.002
93	22.405	753.21	8	2,3,4-Trimethylpentane	0.272	0.326
94	22.631	755.16	?	Unidentified	0.014	0.017
95	22.631	755.16	?	Unidentified	0.014	0.017
96	22.879	757.27	7	Toluene	0.156	0.156
97	22.879	757.27	8	2,3,3-Trimethylpentane	0.002	0.002
98	23.014	758.42	?	Unidentified	0.008	0.010
99	23.154	759.60	?	Unidentified	0.005	0.006
100	23.291	760.74	?	Unidentified	0.007	0.008
101	23.339	761.14	?	Unidentified	0.003	0.004
102	23.397	761.62	?	Unidentified	0.002	0.002
103	23.614	763.42	?	Unidentified	0.005	0.006
104	23.688	764.02	8	2,3-Dimethylhexane	0.138	0.168
105	23.831	765.20	8	2-Methyl-3-ethylpentane	0.023	0.027
106	23.921	765.93	?	Unidentified	0.027	0.030
107	24.083	767.24	?	Unidentified	0.017	0.020
108	24.411	769.86	8	2-Methylheptane	0.288	0.357
109	24.582	771.22	8	4-Methylheptane	0.092	0.113
110	24.705	772.19	8	1c,2c,4-Trimethylcyclopentane	0.020	0.022
111	24.768	772.69	8	3-Methyl-3-ethylpentane	0.020	0.025
112	25.043	774.83	8	1c,3-Dimethylcyclohexane	0.013	0.014
113	25.088	775.18	?	Unidentified	0.023	0.026
114	25.294	776.77	8	3-Methylheptane	0.224	0.274
115	25.433	777.83	8	1c,2t,3-Trimethylcyclopentane	0.190	0.213
116	25.529	778.57	8	trans-1,3-dimethylcyclohexane	0.029	0.025
117	25.662	779.57	8	1t,4-Dimethylcyclohexane	0.066	0.074
118	25.886	781.26	8	C8 MonoNaph - 1	0.002	0.002
119	26.074	782.67	?	Unidentified	0.014	0.016
120	26.307	784.39	8	1,1-Dimethylcyclohexane	0.023	0.025
121	26.588	786.46	9	2,2,5-Trimethylhexane	0.129	0.157
122	26.742	787.58	8	3c-Ethylmethylcyclopentane	0.077	0.087
123	26.833	788.24	?	Unidentified	0.002	0.002
124	26.994	789.40	8	3t-Ethylmethylcyclopentane	0.059	0.067
125	27.147	790.50	8	2t-Ethylmethylcyclopentane	0.072	0.081
126	27.406	792.34	8	1,1-Methylethylcyclopentane	0.017	0.019
127	27.721	794.56	8	1t,2-Dimethylcyclohexane	0.095	0.106
128	28.108	797.26	8	1c,2c,3-Trimethylcyclopentane	0.010	0.012
129	28.171	797.69	?	Unidentified	0.011	0.012

Recovery = 12.211

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-003.D\DP19-07608-003.FID22A.SSM
Sample: dp19-07608.003 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
130	28.436	799.51	?	Unidentified	0.008	0.010
131	28.508	800.00	8	n-Octane	0.346	0.425
132	28.605	800.80	8	1c,4-Dimethylcyclohexane	0.119	0.131
133	29.052	804.47	8	C8 - MonoNaph - 3	0.003	0.004
134	29.212	805.77	?	Unidentified	0.024	0.027
135	29.394	807.24	?	Unidentified	0.009	0.010
136	29.457	807.75	8	i-Propylcyclopentane	0.025	0.028
137	29.517	808.24	9	2,4,4-Trimethylhexane	0.008	0.009
138	29.703	809.72	?	Unidentified	0.001	0.002
139	29.849	810.88	9	2,2,3,4-Tetramethylpentane	0.003	0.003
140	30.010	812.15	?	Unidentified	0.001	0.002
141	30.317	814.56	?	Unidentified	0.009	0.010
142	30.620	816.92	9	Cyclopentane, 1,1,3,4-tetramet	0.029	0.033
143	30.854	818.72	9	2,3,4-Trimethylhexane	0.036	0.042
144	31.080	820.44	8	C8 - MonoNaph - 4	0.015	0.016
145	31.409	822.94	?	Unidentified	0.007	0.008
146	31.690	825.05	8	Cycloheptane, methyl-	0.081	0.088
147	31.805	825.91	8	1c,2-Dimethylcyclohexane	0.009	0.009
148	31.952	827.00	9	C9 - IsoParaffin - 0	0.002	0.002
149	32.098	828.07	?	Unidentified	0.004	0.005
150	32.433	830.53	9	1,1,4-Trimethylcyclohexane	0.235	0.263
151	32.573	831.55	?	Unidentified	0.000	0.000
152	32.671	832.26	9	2,2,3-Trimethylhexane	0.112	0.135
153	32.784	833.08	9	1c,3c,5-Trimethylcyclohexane	0.000	0.000
154	32.944	834.23	9	2,4-Dimethylheptane	0.017	0.021
155	33.080	835.21	?	Unidentified	0.008	0.010
156	33.245	836.39	9	4,4-Dimethylheptane	0.119	0.143
157	33.461	837.92	9	Cyclopentane, 1,1,3,4-tetramethyl-, trans-	0.002	0.002
158	33.662	839.34	9	2,6-Dimethylheptane	0.124	0.151
159	33.842	840.60	9	C9 - MonoNaph - 2a	0.024	0.026
160	34.053	842.07	9	1,1,3-Trimethylcyclohexane	0.021	0.023
161	34.247	843.41	9	C9 - MonoNaph - 3a	0.033	0.037
162	34.500	845.15	9	2,5-Dimethylheptane	0.025	0.031
163	34.629	846.04	?	Unidentified	0.004	0.005
164	34.854	847.57	?	Unidentified	0.002	0.003
165	34.921	848.03	?	Unidentified	0.005	0.005
166	35.217	850.03	8	Ethylbenzene	0.204	0.203
167	35.393	851.20	?	Unidentified	0.060	0.059
168	35.671	853.06	9	1c,2t,4t-Trimethylcyclohexane	0.073	0.081
169	35.982	855.11	?	Unidentified	0.016	0.018
170	36.176	856.38	?	Unidentified	0.001	0.001
171	36.337	857.43	9	C9 - MonoNaph - 4a	0.018	0.020
172	36.709	859.84	8	m-Xylene	0.264	0.264

Recovery = 12.211

File: C:\Chem32\3\DATA\2019\071219\031819 2019-07-12 16-57-46\DP19-07608-003.D\DP19-07608-003.FID2A.SSM
Sample: dp19-07608.003 Operator: br
Parameter: C:\SeparationSystems\HCE5\Templates\D7900-092018.HCDX
LIMS Id:

Component List

Pk#	Time	RI	C#	Component	%Wgt	%Vol
173	36.900	861.07	8	p-Xylene	0.219	0.220
174	37.105	862.39	9	2,3-Dimethylheptane	0.079	0.094
175	37.273	863.46	?	Unidentified	0.000	0.000
176	37.440	864.52	9	3,5-Dimethylheptane	0.019	0.023
177	37.606	865.56	9	3,4-Dimethylheptane	0.031	0.037
178	37.900	867.40	9	C9 - MonoNapth - 5a	0.015	0.017
179	37.965	867.81	?	Unidentified	0.024	0.027
180	38.099	868.64	9	3,3-Diethylpentane	0.014	0.016
181	38.272	869.72	8	C8-MonoAromatic	0.002	0.002
182	38.272	869.72	9	C9-MonoNaph-6	0.002	0.003
183	38.487	871.04	9	4-Methyloctane	0.118	0.141
184	38.662	872.12	9	2-Methyloctane	0.165	0.199
185	38.860	873.32	?	Unidentified	0.013	0.016
186	39.021	874.30	?	Unidentified	0.020	0.022
187	39.463	876.97	9	Heptane, 3-ethyl-	0.063	0.075
188	39.691	878.33	9	3-Methyloctane	0.221	0.265
189	39.872	879.41	?	Unidentified	0.014	0.017
190	40.105	880.79	?	Unidentified	0.029	0.029
191	40.287	881.86	8	o-Xylene	0.122	0.120
192	40.511	883.17	9	Cyclohexane, 1,2,4-trimethyl-,	0.030	0.034
193	40.811	884.92	10	C10 - IsoParaffin - 1	0.008	0.009
194	40.873	885.28	10	C10 - Isoparaffin - 2	0.033	0.040
195	41.203	887.18	9	Cyclopentane, 1-methyl-2-propy	0.081	0.080
196	41.340	887.97	9	trans-1,3-Diethylcyclopentane	0.125	0.123
197	41.637	889.66	9	1-Ethyl-3-methylcyclohexane (c,t)	0.059	0.058
198	41.761	890.37	?	Unidentified	0.054	0.053
199	41.892	891.11	9	Cyclohexane, 1-ethyl-4-methyl-	0.007	0.007
200	42.016	891.81	9	1,1,2-Trimethylcyclohexane	0.014	0.015
201	42.206	892.88	9	C9-MonoNaph-1b	0.031	0.036
202	42.293	893.36	9	C9 - MonoNaph - 2b	0.013	0.016
203	42.417	894.05	9	C9 MonoNaph - 4b	0.005	0.006
204	42.697	895.61	?	Unidentified	0.011	0.012
205	42.877	896.61	?	Unidentified	0.008	0.009
206	42.956	897.04	9	C9 MonoNaph - 5b	0.005	0.006
207	43.036	897.48	?	Unidentified	0.005	0.006
208	43.205	898.41	10	3,3,5-TrimethylHeptane	0.024	0.029
209	43.329	899.09	?	Unidentified	0.037	0.044
210	43.496	900.00	9	n-Nonane	0.322	0.387

Recovery = 12.211

APPENDIX D
Boring Logs

Ramboll
1999 Broadway Suite 2225
Denver, CO 80202
Telephone: 303-382-5460

WELL ID: **MW-79S/D**
BORING NUMBER: **EB-01**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/7/19 **COMPLETED** 6/8/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3338.1 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197996.931 **EASTING** 1525905.834
DRILLER James Richardson
TOTAL BORING DEPTH 25 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH Not Measured **SCREEN INTERVAL** 5-15 ft/18.5-25
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		216.8	CMR-EB01-0.5-1.0			(CL) **SILTY CLAY**, sub-rounded to sub-angular gravel, brown, soft, plastic, moist, slight hydrocarbon odor.		Cement seal
	5	4175						
						2.5	3335.6	
		4135				(SW) **GRAVELLY SAND**, black, sub-rounded to sub-angular gravel, loose, moist, strong hydrocarbon odor, staining.		Bentonite seal
						3.5	3334.6	
5			CMR-EB01-4.0-5.0			(CL) **CLAY**, black, trace sub-angular gravel, trace silt, soft, plastic, moist, strong hydrocarbon odor, staining. (CL) **AS ABOVE**, light gray, some black staining.		
						5.5	3332.6	
		4360				(CL) **SILTY CLAY**, light gray, some mottling, very stiff, slightly moist, strong hydrocarbon odor.		
	5	4359						
		4322				(CL) **AS ABOVE**, dark gray, red and yellow mottling.		
						9.0	3329.1	
10		3539				(CL) **SILTY CLAY**, dusky-red, laminated silts and clays, medium stiff, slightly moist to dry, hydrocarbon odor. (CL) **AS ABOVE**, moist.		Filter sand Sch. 40 PVC screen (MW-79S)
		258.4						
	4.5	380.5						
						14.0	3324.1	
15		800	CMR-EB01-14.0-15.0			(CL) **SILTY CLAY**, light dusky red to light brown, laminated silts and clays, stiff, moist, hydrocarbon odor.		
						15.0	3323.1	
		176.1				(CL) **SILTY CLAY**, dusky-red, 3-4" diameter very fine sandstone cobbles at 15 ft bgs, very dense, cemented, angular to sub-rounded, cross-bedded, carbonate precipate, very stiff, moist, hydrocarbon odor.		Bentonite seal
	5	107.9						
						18.0	3320.1	
20		132.5				(CL) **SILTY CLAY**, light gray, yellow and dusky-red mottling, laminated, moist, hydrocarbon odor.		
						20.0	3318.1	
		17.1				(CL) **SILTY CLAY**, light gray, some yellow mottling, slightly laminated, soft to medium stiff, dry to moist, no odor. (CL) **AS ABOVE**, wet seam.		Filter sand
		11.1				(CL) **AS ABOVE**, wet seam.		Sch. 40 PVC screen (MW-79D)
						23.0	3315.1	
		4.5				(CL) **SILTY CLAY**, dusky-red, laminations, medium stiff, dry, no odor.		
25						25.0	3313.1	

Bottom of borehole at 25.0 feet.

Ramboll
1560 Broadway Suite 1905
Denver, CO 80202
Telephone: 303-382-5482

BORING NUMBER: EB-02

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 5/21/19 **COMPLETED** 5/21/19
LOGGED BY Josh Myers **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3340.123 ft
DRILLING EQUIPMENT Not Applicable
NORTHING 1198073.669 **EASTING** 1526053.238
DRILLER Josh Myers
TOTAL BORING DEPTH 6 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Hand Auger **SAMPLING METHOD** Grab
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	GRAPHIC LOG		SAMPLE DESCRIPTION	
0					0.3	(GP) **GRAVEL**, surface cover.	3339.9
1			CMR-EB02-0.5-1.0		1.0	(CL) **SANDY CLAY**, dark yellowish brown (10YR 3/4), very find sand, soft, slightly plastic, moist, no odor.	3339.1
2		4.3				(GW) **WELL GRADED GRAVEL WITH COBBLES**, light olive brown (10YR 5/4), sub-rounded to sub-angular gravel, well-graded, some to little coarse sand, wet (stormwater runoff), slight hydrocarbon odor.	
3		330.1			3.5		3336.6
4						(CL) **SILTY CLAY**, very dark gray (2.5Y 3/1), little very fine sand, soft, plastic, moist to wet, mesh lines.	
5							
6			CMR-EB02-5.5-6.0		6.0	(CL) **AS ABOVE**, sandy clay.	3334.1

Bottom of borehole at 6.0 feet.

Ramboll
1560 Broadway Suite 1905
Denver, CO 80202
Telephone: 303-382-5482

WELL ID:
BORING NUMBER:**EB-03D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/12/19 **COMPLETED** 6/12/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3342.77 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1198127.621 **EASTING** 1526066.238
DRILLER James Richardson
TOTAL BORING DEPTH 20 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 20 ft bgs **SCREEN INTERVAL** 15-20 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		0	CMR-EB03-0.0-1.0			(GW) **SANDY GRAVEL**, light brown to tan, sub-rounded to sub-angular, well-graded, loose, moist. [FILL]		
		0						
	4.5	0				2.5	3340.3	
		13.8				(CL) **SILTY CLAY**, dark brown, trace fine to medium subrounded gravel, stiff, plastic, moist. [FILL]		Open borehole
5		770	CMR-EB03-4.0-4.5			5.0	3337.8	7-inch drill steel casing
		3491	CMR-EB03-5.0-6.0			(CL) **CLAY**, black, visible hydrocarbon globules, black 40 ml plastic liner at 5 ft bgs, some poorly-sorted medium to coarse gravel, fine gray sand, wet, strong hydrocarbon odor. [FILL]	3336.8	
						6.0	3336.3	
		3875				6.5 (GC) **GRAVELY SANDY CLAY**, gray, soft, plastic, wet, thin metal fragment. [FILL]	3335.8	
						COBBLES. [FILL]		Sch. 40 PVC riser
		3367				(CL) **SILTY CLAY**, gray to dusky red, with yellow mottling, soft to stiff, wet.		
10		3181	CMR-EB03-9.0-10			(CL) **AS ABOVE**, stiff, dry, hydrocarbon odor.		
						(CL) **AS ABOVE**, greenish gray (GLEY1 5/1) to grayish green (GLEY1 5/2) from 8.5 to 19 ft bgs.		
		978				(CL) **AS ABOVE**, no mottling, slight moist at 10 feet.		
		12.3				(CL) **AS ABOVE**, some yellow and deep red mottling, laminated, slight hydrocarbon odor.		
		152.3						
15						(CL) **AS ABOVE**, little to no yellow mottling, hydrocarbon odor.		
		384.7						
		1424						Sch. 40 PVC screen
		635				19.0	3323.8	
20						**SANDSTONE**, dusky red to reddish gray, very fine to fine grain, strongly cemented, sub-rounded, dry. 20.0	3322.8	

Bottom of borehole at 20.0 feet.

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WELL ID: **MW-101**
BORING NUMBER: **EB-03S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/12/19 **COMPLETED** 6/12/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 8 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 8 ft bgs **SCREEN INTERVAL** 3-8 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See EB-03D for lithologic descriptions.**	Bentonite seal Sch. 40 PVC riser Filter sand Sch. 40 PVC screen
5							

Bottom of borehole at 8.0 feet.

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WELL ID:
BORING NUMBER: **EB-04D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/12/19 **COMPLETED** 6/12/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3344.59 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1198178.994 **EASTING** 1526312.884
DRILLER James Richardson
TOTAL BORING DEPTH 20 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 20 ft bgs **SCREEN INTERVAL** 15-20 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0		73.5	CMR-EB04-0.0-1.0			(GW) **WELL GRADED SANDY GRAVEL**, light brown to tan, silt, loose, moist, sub-rounded to sub-angular.	3343.6	
						(CL) **SILTY CLAY**, dark brown, black staining, sub-angular to angular gravel, one cobble, slightly plastic, moist.		
	5	38.5					3342.1	
						SANDSTONE, dark gray, medium grain, very dense, strongly cemented, dry.	3341.6 / 3341.1	Open borehole.
		18.4				(CL-ML) **CLAYEY SILT**, some well-sorted sand, soft, slightly plastic, moist.		
5		442	CMR-EB04-4.0-5.0			(SC) **CLAYEY SAND**, dark brown, black staining, fine to medium grain, slightly plastic, loose, moist, strong hydrocarbon odor, hydrocarbon globules near 5 ft.		7-inch drill steel casing
		176				(SC) **AS ABOVE**, light gray, sheen.		
		255				(SC) **AS ABOVE**, clay rich seams at 6.5 ft.	3337.6	
	4.5	317				(CL) **SANDY CLAY**, light gray, soft to medium stiff, slightly plastic, wet, strong hydrocarbon odor.	3336.6	Sch. 40 PVC riser
		510	CMR-EB04-8.0-8.5			(SP) **POORLY-GRADED SAND**, light gray, loose, wet, strong hydrocarbon odor.	3336.1 / 3335.3	
10						(CL-ML) **CLAYEY SILT**, light gray, medium stiff, slightly plastic, silty sand layer from 9 to 9.25 ft bgs, wet, strong hydrocarbon odor.	3334.6	
		412				(CL-ML) **SILTY CLAY**, dusky red, some yellow mottling, very stiff, plastic, dry.		
		257				(CL-ML) **SILTY CLAY**, light gray, some yellow mottling, weakly laminated, very stiff, slightly plastic to plastic, moist, strong hydrocarbon odor, 1" sandstone seam at 10 ft, dark gray, fine to medium grain, strongly cemented, very dense.		
	5	66.7				(CL-ML) **AS ABOVE**, dark gray, no yellow mottling, slight hydrocarbon odor.		
15		122					3329.6	
		298				(CL-ML) **SILTY CLAY**, dusky red, very stiff, slightly plastic, slightly laminated, dry, slight hydrocarbon odor.		
						(CL-ML) **AS ABOVE**, moisture seam at 16.5 ft.		
		191						Sch. 40 PVC screen
		94.3						
20						(CL-ML) **AS ABOVE**, hard, strongly laminated.	3325.1	
						(ML) **SILTY SAND**, very fine grained, very dense, hard, strongly cemented, dry, hydrocarbon odor, moisture seam at 19.5 ft.	3324.6	

Bottom of borehole at 20.0 feet.

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WELL ID: **MW-100**
BORING NUMBER: **EB-04S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/13/19 **COMPLETED** 6/13/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 10 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 10 ft bgs **SCREEN INTERVAL** 4-10 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See EB-04D for lithologic descriptions.**	Bentonite seal; Sch. 40 PVC riser; Filter sand; Sch. 40 PVC screen
	5						
5							
	4.5						
10							

Bottom of borehole at 10.0 feet.

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BORING NUMBER: **EB-05D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/6/19 **COMPLETED** 6/10/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3340.99 ft
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1198088.993 **EASTING** 1526299.485
DRILLER James Richardson
TOTAL BORING DEPTH 34 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic **SAMPLING METHOD** Continuous **GROUNDWATER LEVEL AT TIME OF DRILLING** N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	GRAPHIC LOG	SAMPLE DESCRIPTION	
0						
1	4	0			(CL-ML) **SILTY CLAY**, dark brown, moist.	
				1.0		3340.0
2				1.5	(CL) **CLAY**, trace silt, soft, moderately plastic, moist.	3339.5
3					(ML) **SANDY SILT**, dark brown, black staining, trace subrounded gravel, poorly-sorted, soft, moist.	
				3.0		3338.0
4					(ML) **CLAYEY SILT**, brown, bentonite clay observed in borehole, soft, medium plasticity, moist.	
5		0		5.0		3336.0
6	4.5	132.7			(CL-ML) **SILTY CLAY**, light gray, soft, moderately plastic, wet, strong hydrocarbon odor.	
7					(CL-ML) **AS ABOVE**, angular gravel, stiff, dry.	
				7.0	(CL) **AS ABOVE**, no gravel, hard.	3334.0
8					(CL-ML) **SILTY CLAY**, gray, stiff to hard, non-plastic, dry, strong hydrocarbon odor.	
9		243.6				
10				10.0		3331.0
11	4.5				(CL-ML) **SILTY CLAY**, dusky red, yellow mottling, horizontal fracturing, non-plastic, dry, strong hydrocarbon odor.	
12						
13		512				
14						
15						
16	4.5				(CL-ML) **AS ABOVE**, reddish brown, gray laminations, shale observed near 20 ft bgs, moderate hydrocarbon odor.	
17		269.9				
18						
19						
20		69.9		20.0		3321.0
21	4.5				(CL-ML) **SILTY CLAY**, dusky red to gray, trace to some fine sand, clay nodules and laminations, stiff, non-plastic, dry, hydrocarbon odor.	
22		47.9				
23					(CL-ML) **AS ABOVE**, dusky red, slight hydrocarbon odor.	
24		0.7				
25				25.0		3316.0

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BORING NUMBER: **EB-05D**

CLIENT Calumet Montana Refining, LLC

PROJECT NAME RIAIM Investigation

PROJECT NUMBER 1690012344-005

PROJECT LOCATION Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	GRAPHIC LOG	SAMPLE DESCRIPTION	
25						
26	4.5	4.5			(CL-ML) **SILTY CLAY**, dark gray, fine sands increase with depth, stiff, dry, no hydrocarbon odor.	
27						
28						
29						
30					30.0	3311.0
31	4	0			(CL-ML) **SILTY CLAY**, light gray, stiff, non-plastic, dry, moist at 31 ft bgs and 33 ft bgs, no hydrocarbon odor.	
32						
33						
34					34.0 (CL-ML) **SILTY CLAY**, dusky red, some mottling, alternating silt and clay laminations, stiff to hard, dry, no hydrocarbon odor.	3307.0

Bottom of borehole at 34.0 feet.

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WELL ID:
BORING NUMBER: **EB-05S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 5/17/19 **COMPLETED** 5/17/19
LOGGED BY Josh Myers **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Geoprobe 3230DT
NORTHING Not Measured **EASTING** Not Measured
DRILLER Steven Eddins
TOTAL BORING DEPTH 19 ft bgs **BOREHOLE SIZE** 3.5 in
DRILLING METHOD Direct Push
TOTAL WELL DEPTH Not Measured **SCREEN INTERVAL** ft
SAMPLING METHOD Macrocore
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0							
	2.5	0.3 0.2 3.4				(GM) **SILTY GRAVEL**, dark brown (7.5YR 3/2) and light yellowish brown (2.5Y 6/3) mottling, some clay, poorly-sorted, dry, slight hydrocarbon odor.	
2.5						(SP-SM) **SAND**, brown (7.5Y 4/2), some silt, some clay, moderately to well-sorted, slightly cohesive, moist, slight hydrocarbon odor.	
5	4	87.4	CMR-EB05-6.0-7.0			(CL-ML) **SILTY CLAY**, very dark gray (7.5YR 3/1), very soft, cohesive, wet, very strong hydrocarbon odor, sheen.	
7.0						(GW) **WELL-GRADED SANDY GRAVEL**, light yellowish brown (10YR 6/4), dry, hydrocarbon odor.	
8.5		39.9 94.1				(ML) **SILT**, dark gray (10YR 4/1), trace clay, hard, dry, slight odor.	
10	5	530.1	CMR-EB05-11-12				
11.0		589.4				(ML) **SILT**, dusky-red (2.5YR 3/2), well-sorted, horizontal fracturing, dense, soft, dry, hydrocarbon odor.	
15		440 423.1					
19.0							

Refusal at 19.0 feet.
Bottom of borehole at 19.0 feet.

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WELL ID: **MW-81S/D**
BORING NUMBER: **EB-06D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/8/19 **COMPLETED** 6/8/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3337.85 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1198060.473 **EASTING** 1526223.724
DRILLER James Richardson
TOTAL BORING DEPTH 25 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH Not Measured **SCREEN INTERVAL** 5-17 ft/ 19-25 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0							
	5	21.9				(CL-ML) **SILTY CLAY**, medium gray to brown, trace fine-grained sand, trace sub-angular gravel, plastic, cohesive, moist, hydrocarbon odor.	Cement seal
		274.8				2.5 3335.4 (CL-ML) **SILTY CLAY**, gray, trace sub-angular to sub-rounded loose sand, plastic, cohesive, moist, strong hydrocarbon odor.	Bentonite seal
5		601				4.5 3333.4 5.0 (SM) **SILTY SAND**, dark gray, some clay, very fine grain, sub-angular, very dense, very stiff, dry, hydrocarbon odor. 3332.9	
	5	169.9				(CL-ML) **SILTY CLAY**, gray, trace sub-angular to sub-rounded sand, plastic, cohesive, moist, hydrocarbon odor.	
		1112				7.0 (CL-ML) **AS ABOVE**, light brown, strong hydrocarbon odor. 3330.9	
		654.2				8.0 **SANDSTONE**, dark gray, very fine grain, very dense, competent, dry. 3329.9 (CL-ML) **SILTY CLAY**, light gray, mottling, some black staining, very stiff, dry, hydrocarbon odor.	
10						(CL-ML) **AS ABOVE**, dusky-red, no staining.	Filter sand
	5	490.3				(CL-ML) **AS ABOVE**, weakly laminated.	Sch. 40 PVC screen (MW-81S)
		395				(CL-ML) **AS ABOVE**, rust red, stiff, strongly laminated.	
15		372				15.0 3322.9 (CL-ML) **SILTY CLAY**, light reddish brown, some dark gray laminated silt and very fine sand, stiff, dry, very slight hydrocarbon odor.	
		0					
		352.3				17.0 (CL-ML) **AS ABOVE**, some gray clay interbedded with red silt and clay, light yellow staining, slightly laminated, slightly moist. 3320.9	
	5					(CL-ML) **SILTY CLAY**, light reddish brown, interbedded with competent and dark gray laminated silts and very fine sands, soft, dry, slight hydrocarbon odor.	Bentonite seal
		4.3					
20						20.0 3317.9	
		0				(CL-ML) **SILTY CLAY**, dusky-red, some mottling, medium stiff, weakly laminated, moist, no odor.	
						22.0 3315.9	Filter sand
	4.5					(ML) **SANDY SILT**, light gray, some mottling, medium stiff, very fine sand, weakly laminated, dry to slightly moist, no odor.	Sch. 40 PVC screen (MW-81D)
		0					
25						25.0 3312.9	

Bottom of borehole at 25.0 feet.

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WELL ID:
BORING NUMBER: **EB-06S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 5/16/19 **COMPLETED** 5/16/19
LOGGED BY Josh Myers, A. Hardwich, B. Hacker **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3334.942 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Geoprobe 3230DT
NORTHING 1198035.252 **EASTING** 1526227.554
DRILLER Steven Eddins
TOTAL BORING DEPTH 14 ft bgs **BOREHOLE SIZE** 3.5 in
DRILLING METHOD Direct Push
TOTAL WELL DEPTH 7 ft bgs **SCREEN INTERVAL** 2-7 ft
SAMPLING METHOD Macrocore
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
	4	0				(ML) **SILT**, dark brown (7.5YR 3/3), some fine gravel, dry, slight hydrocarbon odor.		Sch. 40 PVC riser
						3.0	3331.9	
						(CL) **CLAY**, dark reddish brown (5YR 3/3), some trace gravel and silt, dense, stiff, slightly moist.		Open borehole
						4.0	3330.9	
						4.5 (SP) **SAND WITH CLAY**, dark gray (2.5Y 4/1), fine to very fine, medium dense, moist, hydrocarbon odor.	3330.4	
5		46.1	CMR-EB06-4.5-5.0			5.0	3329.9	Sch. 40 PVC screen
	4.5					(SW) **SAND WITH GRAVEL**, dark gray (2.5Y 4/1), very fine to very coarse, little clay, little silt.		
						6.3	3328.7	
			CMR-EB06-6.25-6.75			**GRAVEL AND COBBLES**, black staining, some coarse sand, horizontal fracturing, platy, wet, strong hydrocarbon odor.		
		75.6				(ML) **SILT**, black (10YR 2/1) to very dark gray (10YR 3/1), trace clay, moist, free product, strong hydrocarbon odor.		
						9.0	3325.9	
		1028				(ML) **SILT**, weak red (2.5YR 4/2), some clay, hard, dry.		
10						10.0	3324.9	
		257.8				(ML) **SANDY SILT**, very dusky-red (10R 3/2), trace clay, horizontal fractures, platy, dry, hydrocarbon odor.		
		176.8						
	4							
		148.1						
						13.0	3321.9	
		114.8				(SP) **SAND**, brownish yellow (10YR 6/6), some broken and fractured sandstone, fine to medium grain, dry, slight hydrocarbon odor.		
						14.0	3320.9	

Refusal at 14.0 feet.
Bottom of borehole at 14.0 feet.

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WELL ID:
BORING NUMBER: **EB-07D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/11/19 **COMPLETED** 6/11/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3338.033 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1198053.751 **EASTING** 1526172.894
DRILLER James Richardson
TOTAL BORING DEPTH 29 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 29 ft bgs **SCREEN INTERVAL** 19-29 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		49.3				(GM) **GRAVELLY SILTY CLAY**, dark brown, sub-rounded loose gravel, trace wood fragments, plastic, moist, slight hydrocarbon odor. [FILL]		
		40.3				2.0	3336.0	
	5					**FILL**, concrete, loose and poorly-sorted gravelly sand beneath concrete.		
						3.5	3334.5	Open borehole
		333.8				(CL) **CLAY**, dark gray, plastic, orange motttling, trace fine to medium sub-rounded gravel, trace silt, moist, strong hydrocarbon odor. [FILL]		
5		285				4.5	3333.5	
						5.0	3333.0	7-inch drill steel casing
		163.2				(CL-ML) **SILTY CLAY**, dark brown with some orange mottling, dark gray to black staining, trace sub-rounded gravel, trace wood fragments, plastic, moist, hydrocarbon odor. [FILL]		
						6.5	3331.5	
						(OH) **CLAY**, dusky-red, trace sub-rounded to rounded coarse gravel, plastic, cohesive, moist, hydrocarbon odor. [FILL]		
	5					7.0	3331.0	
		205				(SP) **SAND**, tan, gray layering, fine grain, strongly cemented, cross-bedding, very dense, dry. [FILL]		
		586				(CL-ML) **SILTY CLAY**, gray, some mottling, medium stiff, slightly plastic, laminated, moist, hydrocarbon odor.		
10		818				(CL-ML) **AS ABOVE**, dry.		Sch. 40 PVC riser
						10.0	3328.0	
		838				(ML) **CLAYEY SILT**, dusky-red, some fine and weakly cemented sand, medium stiff, laminated, dry, hydrocarbon odor.		
	5							
		650				14.0	3324.0	
15						(SP) **VERY FINE TO FINE SAND**, dark gray, some dusky-red slit and clay, some cemented sandstone fragments, medium dense, cemented, dry, hydrocarbon odor.		
		3.8				(SP-SM) **AS ABOVE**, sand content decreases with depth.		
	4	331	CMR-EB07-17.0-18.0GT			17.5	3320.5	
						18.0	3320.0	(ML) **SILT**, dusky-red, mottling, grayish-yellow laminations, some fine sand, little clay, slightly plastic, moist, hydrocarbon odor.
						19.0	3319.0	
		28.6				(SP) **VERY FINE SAND**, dark and dusky-red, medium dense, laminated, weakly cemented, stiff, dry.		
20						20.0	3318.0	
		2.6				(SP-SM) **SILTY VERY FINE SAND**, dark dusky red and dusky-red, medium dense, laminated, dry.		
		2.2				(CL-ML) **CLAYEY SILT**, light gray, some yellow mottling, slightly plastic, slightly laminated, moist.		
						22.0	3316.0	
	5					(CL-ML) **AS ABOVE**, dry.		
						(ML) **SILT**, dusky-red, some very fine sand, some yellow mottling between laminations, stiff, slightly moist.		
		2				(ML) **AS ABOVE**, light gray.		
						(ML) **AS ABOVE**, grayish red, moist.		Sch. 40 PVC screen
25		1.9				25.0	3313.0	

(Continued Next Page)

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WELL ID:
BORING NUMBER: **EB-07D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
25								
		7.3 2.3 2 2				(SM) **SILTY SAND**, dark red to greenish gray, rusty red fine to very fine-grained sand, laminated, strongly cemented, sands and silts are inter-laminated, predominately massive, well cemented and weathered sandstone, cross-beddings, platy layers, medium dense, dry.		
						28.5	3309.5	
						29.0 (CL-ML) **SILTY CLAY**, greenish gray (GLEY 1 5/1), mottling, laminated, stiff, non-plastic, moist.	3309.0	

Bottom of borehole at 29.0 feet.

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WELL ID:
BORING NUMBER: **EB-07S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 5/16/19 **COMPLETED** 5/16/19
LOGGED BY Josh Myers, A. Hardwick, B. Hacke **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Geoprobe 3230DT
NORTHING Not Measured **EASTING** Not Measured
DRILLER Steven Eddins
TOTAL BORING DEPTH 14 ft bgs **BOREHOLE SIZE** 3.5 in
DRILLING METHOD Direct Push
TOTAL WELL DEPTH 14 ft bgs **SCREEN INTERVAL** 4-14 ft
SAMPLING METHOD Macrocore
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0	3	16.5 14.4	CMR-EB07-0.0-1.0			(CL-ML) **CLAYEY SILT**, dark brown (7.5YR 3/2), coarse rounded to angular gravel, poorly-sorted, slightly moist. (CL-ML) **AS ABOVE**, dark gray (7.5YR 4/1), moist. (CL-ML) **AS ABOVE**, wet.	Sch. 40 PVC riser
						1.5 (CL-ML) **SILTY CLAY**, dark brown (7.5 YR 3/2), moist, hydrocarbon odor.	Open borehole
5		87.4				5.0	
	3	51.6	CMR-EB07-5.25-5.75			(CL) **CLAY**, very dark gray (7.5YR 6/3), trace silt, soft, plastic, cohesive, wet, hydrocarbon odor.	
		86.4 270.4	CMR-EB07-7.5-8.0			7.0 (SP) **CEMENTED SAND**, light brown (7.5YR 6/3) to very pale brown (10YR 7/3), fine sand, cobbles, dry.	
		440.1				8.0 (ML) **SILT**, very dark gray (10YR 3/1), trace clay, dense, dry, hydrocarbon odor.	Sch. 40 PVC screen
10		111.5				10.5 (ML) **SILT**, dusky-red (2.5YR 3/2), some horizontal fractures, soft, dry, slight hydrocarbon odor.	
	3.5	182.4				13.5	

Refusal at 14.0 feet.
Bottom of borehole at 14.0 feet.

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WELL ID:
BORING NUMBER:**EB-09D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/7/19 **COMPLETED** 6/11/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3336.893 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197986.222 **EASTING** 1526064.959
DRILLER James Richardson
TOTAL BORING DEPTH 30 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 30 ft bgs **SCREEN INTERVAL** 20-30 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
	4	153.7				(GP-GC) **GRAVEL**, gray, light brown clay, sub-rounded cobble, sub-rounded to sub-angular gravel, dry, slight hydrocarbon odor, trace plastic sheeting.		
						(GP-GC) **AS ABOVE**, light tan, some fine to medium grain sand.	3334.9	
						(CL) **CLAY**, dark brown, trace sub-rounded gravel, medium stiff, moist, slight hydrocarbon odor, plastic sheeting.	3333.4	Open borehole
5		103.1				(CL-ML) **CLAYEY SILT**, dark brown, trace sub-angular to sub-rounded gravel, soft, plastic, moist, slight hydrocarbon odor.	3331.9	
	5	3689				(CL-ML) **CLAYEY SILT**, gray, trace very fine sand, medium stiff, non-plastic, dry, strong hydrocarbon odor.		
10		3995				(CL-ML) **AS ABOVE**, deep dusky-red, some laminated silts and clays.		Sch. 40 PVC riser
	5	1744				(CL-ML) **AS ABOVE**, lighter dusky-red, yellow to green mottling, hydrocarbon odor.		
						(CL-ML) **AS ABOVE**, hard.		
		43.1				(CL-ML) **AS ABOVE**, deep dusky-red, stiff, loose, slight hydrocarbon odor.		
15							3321.9	
	3	373.3				(CL-ML) **SILTY CLAY**, light dusky-red, very stiff, laminated, dry, slight hydrocarbon odor.		
		1.6					3318.9	
						(CL-ML) **SILTY CLAY**, light gray, some mottling, medium stiff, slightly moist, no odor.		
		2.7				(CL-ML) **AS ABOVE**, moist.		
20							3316.9	
	2	0				(CL-ML) **SILTY CLAY**, dusky-red to trace gray, stiff, dry, no odor.		Sch. 40 PVC screen
		0.4						
25		15.6					3311.9	

(Continued Next Page)

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WELL ID:
BORING NUMBER:**EB-09D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
25							
	5	5.1				(CL) **CLAY**, light gray, trace silt, moderately plastic, dry to slightly moist, no odor.	
30						30.0 3306.9	

Bottom of borehole at 30.0 feet.

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BORING NUMBER: **EB-09S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 5/17/19 **COMPLETED** 5/17/19
LOGGED BY Josh Myers **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured
DRILLING EQUIPMENT Geoprobe 3230DT
NORTHING Not Measured **EASTING** Not Measured
DRILLER Steven Eddins
TOTAL BORING DEPTH 14 ft bgs **BOREHOLE SIZE** 3.5 in
DRILLING METHOD Direct Push **SAMPLING METHOD** Macrocore
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	GRAPHIC LOG	SAMPLE DESCRIPTION
0					
1	2.5	21.4			(GW) **GRAVEL WITH FINE SAND**, brown (10YR 4/3), some clay, poorly-sorted, dry, slight hydrocarbon odor.
2					
3		223			(CL-ML) **SILTY CLAY**, black (10YR 2/1) to very dark gray (10YR 3/1), staining, soft, plastic, moist, strong hydrocarbon odor.
4					
5					
6	4.5	376			(CL-ML) **AS ABOVE**, discoloration in clay.
7			CMR-EB04-6.0-7.0		(ML) **SILT**, dark gray (10YR 4/1), few clay, dense, dry, strong hydrocarbon odor.
8		481.6			
9		432.5			(ML) **AS ABOVE**, dusky-red (2.5YR 3/2).
10					
11	4	157.2			(ML) **AS ABOVE**, very dark gray (7.5YR 3/1).
12					
13		223.4			(ML) **AS ABOVE**, dusky-red (2.5YR 3/2).
14		122.7			(ML) **SILT WITH FINE SAND**, dark brown (10YR 3/3), well-sorted, loose, dry, strong hydrocarbon odor.

2.5
6.5
13.5
14.0

Bottom of borehole at 14.0 feet.

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WELL ID:
BORING NUMBER: **EB-10**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/6/19 **COMPLETED** 6/6/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3337.638 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197990.036 **EASTING** 1525868.439
DRILLER James Richardson
TOTAL BORING DEPTH 20 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 20 ft bgs **SCREEN INTERVAL** 15-20 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0							
	4	1860	CMR-EB10-0.5-1.0			0.5 (ML) **CLAYEY SILT**, dark brown to black, some subrounded to subangular gravel, stiff, moist, hydrocarbon odor. 3337.1	
						1.5 (GW) **SANDY GRAVEL**, black, sub-rounded to sub-angular, trace fines, loose, moist, hydrocarbon odor. 3336.1	
			CMR-EB10-2.5-5.0			(CL) **CLAY**, black, staining, trace to some silt, soft, plastic, moist, strong hydrocarbon odor.	Open borehole
5		4968				5.0 (CL) **AS ABOVE**, red mottling. 3332.6	7-inch drill steel casing
	4.5	4221				(CL-ML) **SILTY CLAY**, light gray, medium stiff, dry to moist, strong hydrocarbon odor.	
						7.0 3330.6	
			CMR-EB10-7.5-8.5			(CL-ML) **SILTY CLAY**, dusky red, slightly mottled, interbedded with gray clay, weakly laminated, stiff, non-plastic, dry.	Sch. 40 PVC riser
		4456					
10						10.0 3327.6	
	3	73.8				(SP) **SILTY FINE SAND**, light tan, interbedded with clay, well-sorted, medium dense, slight hydrocarbon odor, dry.	
						12.8 3324.9	
		32.8				(CL-ML) **SILTY CLAY**, black to dark gray to dusky-red, hard, interbedded, dry to moist, slight hydrocarbon odor.	
		2061					
15	4						
		28.1				18.0 (CL-ML) **AS ABOVE**, moist. 3319.6	Sch. 40 PVC screen
	2					(CL-ML) **SILTY CLAY**, dark gray, laminations, stiff, slightly moist at 18 ft bgs, very slight hydrocarbon odor.	
		120.2					
20						20.0 3317.6	

Bottom of borehole at 20.0 feet.

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WELL ID:
BORING NUMBER: **EB-11D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/11/19 **COMPLETED** 6/12/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3337.342 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197975.397 **EASTING** 1525791.696
DRILLER James Richardson
TOTAL BORING DEPTH 30 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 30 ft bgs **SCREEN INTERVAL** 20-30 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0		17.8				(GM) **SILTY GRAVEL**, brown, well-graded, loose, moist.	
						1.0 — 3336.3	
		35.9				(CL-ML) **SILTY CLAY**, red, orange mottling, black staining, stiff, non-plastic, moist.	
						1.5 — 3335.8; 2.0 — 3335.3	
	4.75	46.5				(SM) **SANDY SILT**, brown, fine to medium-grained sand, loose, moist.	
						3.0 — 3334.3	
		53.6				(CL-ML) **SILTY CLAY**, red, soft, gray mottling, moist.	
						(GW) **SANDY GRAVEL**, dark brown, orange mottling, black staining, some fines, fine to coarse grain, loose, wet, hydrocarbon odor.	
5		4318				4.0 — 3333.3; 5.0 — 3332.3	
		3662				(SM) **SILTY SAND**, black, staining, some clay, fine grain, loose, plastic, wet, hydrocarbon odor.	
						(CL-ML) **SILTY CLAY**, light gray, mottling, black staining, laminated, stiff, moist, strong hydrocarbon odor.	
	5	4577				(CL-ML) **AS ABOVE**, dusky-red, some gray clay, orange and yellow staining, hydrocarbon odor.	
		3802					
10							
		25.6				(CL-ML) **AS ABOVE**, slightly moist at 11 feet.	
	5						
		15					
15							
		7.3				(CL-ML) **AS ABOVE**, slightly moist from 15-16 feet.	
						16.0 — 3321.3	
						(ML) **CLAYEY SILT**, dusky-red, laminated, stiff, dry, no odor.	
	5					18.0 — 3319.3	
		6.6				(SW) **SAND**, dusky-red, fine to medium grained, few silt and clay, laminated, very stiff, plastic, dry.	
20							
						(SW) **AS ABOVE**, slightly moist.	
		6.8					
	5		CMR-EB11-22.5-23.0-GT				
						(SW) **AS ABOVE**, light gray.	
						(SW) **AS ABOVE**, dusky-red, laminated.	
25		4.8					

Open borehole
7-inch drill steel casing
Sch. 40 PVC riser
Sch. 40 PVC screen

(Continued Next Page)

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WELL ID:
BORING NUMBER:**EB-11D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
25							
		5.3				(SW) **SAND**, dusky-red, fine to medium grained, few silt and clay, laminated, very stiff, plastic, dry. *(continued)* (SW) **AS ABOVE**, light gray, clay content increases with depth. (SW) **AS ABOVE**, dusky-red.	
		2.6				(SW) **AS ABOVE**, very stiff, dry to slightly moist.	
30					30.0	3307.3	

Bottom of borehole at 30.0 feet.

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WELL ID:
BORING NUMBER: **EB-11S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 5/20/19 **COMPLETED** 5/20/19
LOGGED BY Josh Myers **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Geoprobe 3230DT
NORTHING Not Measured **EASTING** Not Measured
DRILLER Steven Eddins
TOTAL BORING DEPTH 12 ft bgs **BOREHOLE SIZE** 3.5 in
DRILLING METHOD Direct Push
TOTAL WELL DEPTH 5.5 ft bgs **SCREEN INTERVAL** 1.5-5.5 ft
SAMPLING METHOD Macrocore
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	TEMPORARY WELL CONSTRUCTION
0							
1	0.3	0.6				(GW) **GRAVEL**, dark brown (10YR 3/3), some sand, little clay, poorly sorted, moist, slight hydrocarbon odor.	Sch. 40 PVC riser
2		0	CMR-EB11-2.0-2.5			(CL) **CLAY**, dark reddish brown (2.5Y 3/3), some silt, slightly plastic, dry, no odor.	Open Borehole
3		0				(GW) **GRAVEL**, black (7.5YR 2.5/1), some redox, fine to coarse sand, poorly-sorted, wet, strong hydrocarbon odor.	
4		373.9	CMR-EB11-2.5-3.0			(SW) **SAND**, very dark gray (5Y 3/1), fine to coarse grain, little silt, little clay, loose, slightly plastic, wet, strong hydrocarbon odor, slight sheen.	Sch. 40 PVC screen
5	0.4					**AS ABOVE**, trace gravel.	
6						(CL-ML) **SILTY CLAY**, dark gray (5Y 4/1), stiff, slightly plastic, dry, strong hydrocarbon odor.	
7		337.6				(CL-ML) **AS ABOVE**, moist.	
8		343.4				(CL-ML) **AS ABOVE**, some discoloration (redox).	
9		241.3				(ML) **CLAYEY SILT**, dark reddish brown (2.5YR 2.5/3), stiff, non-plastic, dry, some hydrocarbon odor.	
10	0.2	123.4					
11		434.2				(ML) **AS ABOVE**, very fine little to trace sand.	
12		292.1				(ML) **SILT**, dark reddish brown (2.5YR 3/3), little clay, medium stiff, dry, no odor.	

0.8 / 1.3 / 2.0 / 5.5 / 7.5 / 11.0 / 12.0

Refusal at 12.0 feet.
Bottom of borehole at 12.0 feet.

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WELL ID:
BORING NUMBER: **EB-14D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/12/19 **COMPLETED** 6/12/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3337.471 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197959.919 **EASTING** 1525711.8
DRILLER James Richardson
TOTAL BORING DEPTH 25 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 25 ft bgs **SCREEN INTERVAL** 15-25 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
						(GW) **SANDY GRAVEL**, brown, some silt, loose, moist, sub-rounded to sub-angular. [FILL]	3336.5	
		0				1.0		
						(CL-ML) **SILTY CLAY**, dusky-red, trace rounded coarse gravel, very stiff, slightly plastic, moist. [FILL]	3335.5	
	5					2.0		
		0				(CL) **SANDY CLAY**, dusky-red, trace coarse angular gravel, very fine to fine-grained sand, stiff, slightly plastic, moist. [FILL]		Open borehole
						(CL) **AS ABOVE**, some very fine to fine grain, plastic, cohesive.	3333.5	
		0				4.0		
5						(SW) **GRAVELLY SAND**, black, some silt, well-graded, loose, moist, sub-rounded to sub-angular. [FILL]	3333.0	
		67.8				4.5		
						5.0	3332.5	7-inch drill steel casing
						(SM) **SILTY FINE SAND**, brown, sub-rounded, loose, moist. [FILL]		
						(CL-ML) **SILTY CLAY**, light gray, laminated, stiff, plastic, cohesive, slighty moist, slight hydrocarbon odor.		
	4	47.1				(CL-ML) **AS ABOVE**, dusky-red, some mottling, slightly laminated, hydrocarbon odor.		Sch. 40 PVC riser
		258.4						
10						(CL-ML) **AS ABOVE**, increased hydrocarbon odor.		
						10.0	3327.5	
		445				(OL) **CLAYEY SILT**, dusky-red to gray mottling, trace fine sands, trace laminations of silty clay and silty sand, very stiff, slightly plastic, dry, slight hydrocarbon odor.		
						(OL) **AS ABOVE**, moderate hydrocarbon odor.		
	4	16.9						
		4.9						
15						15.0	3322.5	
						(OL) **CLAYEY SILT**, dusky-red, some dense and cemented fine sands, laminated, very stiff, slightly plastic, slightly moist.		
		0						
	5	0						
						18.0	3319.5	
						(CL-ML) **SILTY CLAY**, dusky-red to gray clay mottling, stiff, plastic, moist.		
20		0						Sch. 40 PVC screen
						21.0	3316.5	
						(CL-ML) **SILTY CLAY**, light gray, stiff, plastic, moist, mottling.		
						22.0	3315.5	
	5	0				(ML) **SANDY SILT**, very fine to fine-grained sand, laminated, stiff, slightly plastic, moist.		
						(ML) **AS ABOVE**, light brown.		
		0						
25						25.0	3312.5	

Bottom of borehole at 25.0 feet.

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BORING NUMBER: **EB-14S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 5/20/19 **COMPLETED** 5/20/19
LOGGED BY Josh Myers **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured
DRILLING EQUIPMENT Geoprobe 3230DT
NORTHING Not Measured **EASTING** Not Measured
DRILLER Steven Eddins
TOTAL BORING DEPTH 15 ft bgs **BOREHOLE SIZE** 3.5 in
DRILLING METHOD Direct Push **SAMPLING METHOD** Macrocore
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	GRAPHIC LOG	SAMPLE DESCRIPTION
0					
1	2.4	0.6	CMR-EB14-0.5-1.5		(GW-GC) **GRAVEL**, reddish brown (5YR 4/4), sandy clay, poorly-sorted, wet, no odor, angular.
1.0					
2		0.4			(CL) **CLAY**, dark reddish brown (2.5YR 2.5/3), little silt, medium stiff, non-plastic, dry, no odor.
2.0					
3		0.1	CMR-EB14-2.0-2.5		(SP-SC) **SAND**, dark brown (7.5YR 3/2), very fine to fine grain, trace clay, well-sorted, moist, no odor.
4					
5					
6	4.5	0.3			(SP-SC) **AS ABOVE**, sandy clay, soft, plastic.
6.0					(SP-SC) **AS ABOVE**, light olive brown (2.5Y 5/4).
7		7.2			(ML) **SANDY SILT**, dark gray (2.5Y 4/1), trace clay, very fine sand, dry, no odor.
8					
8.0					
9		437.6			(ML) **SILT** dusky-red (5YR 3/2), few clay, stiff, non-plastic to slightly plastic, dry, slight hydrocarbon odor.
10					
11	2	323.9			
11.0					(SM) **SILTY SAND**, very fine grain, well-sorted, loose, dry, slight hydrocarbon odor.
12		55.3			
12.5					(ML) **SILT**, reddish brown (2.5YR 4/3), stiff, some sand, some loosely cemented chips, dry.
13		268.8			
14					
15					
15.0					

Refusal at 15.0 feet.
Bottom of borehole at 15.0 feet.

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WELL ID: **MW-99**
BORING NUMBER: **EB-15**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/14/19 **COMPLETED** 6/14/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3327.42 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197917.266 **EASTING** 1526288.961
DRILLER James Richardson
TOTAL BORING DEPTH 25 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 22 ft bgs **SCREEN INTERVAL** 17-22 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		0	CMR-EB15-0.5-1.0			0.5 (CL) **SANDY CLAY**, gray, well sorted, fine to medium grain, sub-angular to sub-rounded sand, trace roots, soft, non-plastic, wet. [FILL]	3326.9	Cement seal
	4	0				2.5 (SM) **SANDY SILT**, brown, some clay, some poorly sorted, medium to coarse, sub-rounded gravel, soft, moist, trace odor. [FILL]	3324.9	
		0				(CL-ML) **SILTY CLAY**, reddish brown, some poorly sorted, fine to coarse, sub-angular to sub-rounded gravel, stiff, plastic, moist. [FILL]		
5								
		0						Sch 40 PVC riser
	3.5	0				(CL-ML) **AS ABOVE**, some greenish gray mottling, less gravel than above.		Bentonite seal
10						10.0	3317.4	
		0.2				(CL-ML) **SILTY CLAY**, light brown, some fine sand, some fine to coarse sub-rounded to sub-angular gravel, medium stiff, slightly plastic, moist. [FILL]		
	4					12.0	3315.4	
		0.1				12.5 (CL-ML) **SILTY CLAY**, reddish brown, some poorly sorted, fine to medium grain, sub-angular to sub-rounded gravel, stiff, slightly plastic, moist. [FILL]	3314.9	
15						(CL-ML) **SILTY CLAY**, brown, some well sorted, fine sand, and some poorly sorted, fine to coarse, sub-rounded to sub-angular gravel, stiff, slightly plastic, moist. [FILL]		
						15.0 (CL-ML) **AS ABOVE**, yellow brown, greater clay content.	3312.4	
		0.3	CMR-EB15-15.0-16.0			(CL-ML) **SILTY CLAY**, reddish brown, some fine to medium, sub-rounded to sub-angular gravel, medium stiff, slightly plastic, moist. [FILL]		Filter sand
	5	0						
						18.0 (CL) **AS ABOVE**, a 1" thick seam of reddish/gray fine grain sand, very dense, well cemented.	3309.4	
		0.3	CMR-EB15-18.0-19.0			(CL) **SILTY CLAY**, light tan with some gray, some fine sand, soft, plastic, wet, hydrocarbon odor. [FILL]		
20						19.5	3307.9	
		0				20.0 (CL) **AS ABOVE**, black asphalt cobble composed of poorly sorted, fine to coarse, sub-rounded to sub-angular gravel.	3307.4	Sch. 40 PVC screen
		312.4	CMR-EB15-20.5-21.5			21.0 (SP-SC) **CLAYEY SAND**, dark gray, fine grain, poorly graded, sand content decreases with depth, plastic, loose, wet.	3306.4	
		112.9				21.5 (CL-ML) **SILTY CLAY**, dark to light gray, some yellow and red staining stiff, very plastic, moist, slight hydrocarbon odor.	3305.9	
						(SP-SC) **CLAYEY FINE SAND**, yellow, with gray clay, trace roots, laminated, medium dense, hydrocarbon odor.		
		19.2				**SANDSTONE**, well sorted, fine grain, strongly cemented, cross-bedded, dense, dry, hydrocarbon odor.		Bentonite seal
25						25.0 **AS ABOVE**, moist.	3302.4	

Bottom of borehole at 25.0 feet.

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WELL ID:
BORING NUMBER:**WB-01D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/22/19 **COMPLETED** 6/22/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3331.93 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197829.602 **EASTING** 1524972.61
DRILLER James Richardson
TOTAL BORING DEPTH 32 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 32 ft bgs **SCREEN INTERVAL** 27-32 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0		50.7				**GRAVEL FILL**, ballast stone, medium to coarse grain, subangular, moist.	
		19.1	CMR-WB01-1.5-2.0			1.5 — 3330.4 — (ML) **GRAVELLY SANDY SILT**, very dark grayish brown (10YR 3/2) to dark brown (10YR 3/3), fine to coarse gravel, subangualr to subrounded, moist.	
		20.8				2.8 — 3329.2	
		396	CMR-WB01-3.0-4.0			3.0 — 3328.9 — (SW) **GRAVELLY SILTY SAND**, gray and yellow staining, well graded, loose, wet.	Open borehole.
						3.8 — 3328.1	
						4.3 — 3327.7 — (SW) **SAND**, dark brown (10YR 3/3) to dark yellowish brown (10YR 3/4), fine grain, slight hydrocarbon odor, moist to wet.	
5	6.5	433				4.5 — 3327.4	7-inch drill steel casing
		394				6.0 — 3325.9 — (CL-ML) **SILTY CLAY**, very dark gray (10YR 3/1), gray staining, trace subrounded coarse gravel, laminated, stiff, moist.	
		850	CMR-WB01-6.0-6.5			(SP-SM) **SILTY SAND**, very dark gray (10YR 3/1), gray staining, some clay, medium dense, moist, hydrocarbon odor.	
						8.0 — 3323.9 — (CL) **CLAY**, dark grayish brown (10YR 4/2) and yellow mottling, dark gray staining, laminated, moderately plastic, hard, moist, hydrocarbon odor.	
10						10.0 — 3321.9 — (SP-SM) **SILTY SAND**, very dark gray (10YR 3/1), gray staining, poorly graded, fine grain, loose, moist to wet, strong hydrocarbon odor.	
		225				(SP) **SAND**, very fine sand to medium gravel, poorly sorted, some clay, trace silt.	
		33.4				(ML) **SANDY SILT**, dark reddish gray (2.5YR 4/1), very fine to fine sand, slightly plastic, clay laminations, slightly moist, slight hydrocarbon odor.	
	5	21.8				(ML) **AS ABOVE**, dusky red (2.5YR 3/2).	
		16					Sch. 40 PVC riser
15		10.5					
		122				(ML) **AS ABOVE**, strongly laminated.	
		8.5				(ML) **AS ABOVE**, 1-inch thick seam of very fine to fine silty sand, strongly cemented, very dense, dry.	
	5	44				(ML) **AS ABOVE**, slightly moist.	
20		33				19.8 — 3312.2	
		0				20.0 — 3311.9 — (CL) **CLAY**, greenish gray (GLEY1 5/1) to dusky red (2.5YR 3/2), strongly laminated, stiff to hard, moderately plastic, dry.	
						21.0 — 3310.9 — (SP-SM) **SILTY SAND**, very fine to fine grain, interbedded silty clays, strongly cemented, very dense, dry.	
	2.5	0.4				(CL) **CLAY**, greenish gray (GLEY1 5/1), some yellow mottling, laminated, stiff to hard, moderately plastic, dry to slightly moist.	
		31.2				(CL) **AS ABOVE**, very hard, interbedded silty clay.	
25		0.1					

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WELL ID:
BORING NUMBER:**WB-01D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
25							
		0.3				(CL) **CLAY**, greenish gray (GLEY1 5/1), some yellow mottling, laminated, stiff to hard, moderately plastic, dry to slightly moist. *(continued)*	
	5					(CL) **AS ABOVE**, mottled dusky red (2.5YR 3/2) to greenish gray (GLEY 1 5/1), laminated.	
		6				(CL) **AS ABOVE**, moderately cemented silty clays, dry to moist.	
30		1.9					Sch. 40 PVC screen
	2	2.4				31.0 3300.9	
		0				(SP) **SAND**, very fine to fine sand, some silt, laminated, moderately cemented, very dense, dry. 32.0 3299.9	

Bottom of borehole at 32.0 feet.

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WELL ID:
BORING NUMBER:**WB-01S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/22/19 **COMPLETED** 6/22/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 12 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 12 ft bgs **SCREEN INTERVAL** 2-12 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See WB-01D for lithologic descriptions.**	Sch. 40 PVC riser
5							Open borehole.
10			CMR-WB01S-8.0-10.5-GT				Sch. 40 PVC screen

Bottom of borehole at 12.0 feet.

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WELL ID:
BORING NUMBER:**WB-02D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/22/19 **COMPLETED** 6/22/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3331.58 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197807.641 **EASTING** 1524878.625
DRILLER James Richardson
TOTAL BORING DEPTH 32 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 32 ft bgs **SCREEN INTERVAL** 27-32 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		0.8				**GRAVEL FILL**, ballast stone, medium to coarse grain, subangular, moist.	3330.6	
		42				(SW) **GRAVELLY SAND**, dark brown (10YR 3/3) to dark yellowish brown (10YR 3/4), some silt, well graded, fine to coarse gravel, subangular to subrounded, moist. [FILL]	3329.6	
		237	CMR-WB02-2.0-2.5			(SM) **SILTY SAND**, dark brown (10YR 3/3) to dark yellowish brown (10YR 3/4), moderately plastic, soft, moist.		Open borehole.
		445				(SM) **AS ABOVE**, gray staining, hydrocarbon odor.		
5	5.5	608				(SM) **AS ABOVE**, with clay, wet.	3327.6	7-inch drill steel casing
		450				(CL) **CLAY**, gray staining, small shells, weakly laminated, hard, moist, hydrocarbon odor.		
							3323.6	
			CMR-WB02S-8.0-11.5-GT			(CL) **SAND**, very fine sand to medium gravel, some clay, some silt.		
10								
		592	CMR-WB02-10.0-10.75				3320.1	
		403				(ML) **SANDY SILT**, dusky red (2.5YR 3/2) to dark reddish gray (2.5YR 4/1), some clay, very fine to fine sand, loose, medium dense, laminated, slightly plastic, moist, slight hydrocarbon odor.		
	5	123						
		190.8				(ML) **AS ABOVE**, black staining near 14 ft bgs.		Sch. 40 PVC riser
15		163					3316.6	
		320				(CL) **CLAY**, mottled greenish gray (GLEY 1 5/1) to dark reddish gray (2.5YR 4/1), slightly laminated, stiff to hard, moderately plastic, dry.		
		199						
	4	30.4						
		27.6					3312.6	
20		0				(CL-ML) **SILTY CLAY WITH SAND**, dusky red (2.5YR 3/2), very fine to fine sand, laminated, weakly cemented, medium dense, dry.		
		0.1						
		0.6				(CL-ML) **AS ABOVE**, trace sand.		
	2	0					3309.1	
		189				(CL) **CLAY**, greenish gray (GLEY 1 5/1), stiff to hard, slightly plastic, dry to slightly moist.		
						(CL) **AS ABOVE**, trace laminations, slight hydrocarbon odor.		
25						(CL) **AS ABOVE**, mottled greenish gray (GLEY1 5/1) and dusky red (2.5YR 3/2), no laminations.		

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WELL ID:
BORING NUMBER:**WB-02D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
25		30.3				(CL) **CLAY**, greenish gray (GLEY 1 5/1), stiff to hard, slightly plastic, dry to slightly moist. *(continued)* (CL) **AS ABOVE**, greenish gray (GLEY 1 5/1), dry to slightly moist.		
	5							
		29.6				(CL) **AS ABOVE**, mottled dusky red (2.5YR 3/2) to greenish gray (GLEY1 5/1).		
30								Sch. 40 PVC screen
	2					(CL) **AS ABOVE**, dusky red (2.5YR 3/2), some silt, laminated, dry.	3300.6	
		0.8				(SP) **VERY FINE TO FINE SAND**, dark gray, some silt, moderately cemented, laminated, very dense, dry.	3299.6	

31.0
32.0

Bottom of borehole at 32.0 feet.

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WELL ID:
BORING NUMBER:**WB-02S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/22/19 **COMPLETED** 6/22/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 12 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 12 ft bgs **SCREEN INTERVAL** 2-12 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See WB-02D for lithologic descriptions.**	Sch. 40 PVC riser
5							Open borehole.
10			CMR-WB02S-8.5-11.0-GT				Sch. 40 PVC screen

Bottom of borehole at 12.0 feet.

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WELL ID:
BORING NUMBER:**WB-03D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/22/19 **COMPLETED** 6/22/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3330.708 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197787.477 **EASTING** 1524788.61
DRILLER James Richardson
TOTAL BORING DEPTH 35 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 35 ft bgs **SCREEN INTERVAL** 30-35 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG		SAMPLE DESCRIPTION		WELL CONSTRUCTION
0						0.5	**GRAVEL FILL**, ballast stone, medium to coarse grain, subangular, moist.	3330.2	
		5.3	CMR-WB03-0.5-1.0			2.3	(SW) **GRAVELLY SAND**, dark brown (10YR 3/3) to dark yellowish brown (10YR 3/4), some silt, well graded, fine to coarse gravel, subangualr to subrounded, moist, slight hydrocarbon odor.	3328.5	
		0				3.3	(SW) **AS ABOVE**, clay content increases at 2 ft bgs.	3327.5	Open borehole.
		0	CMR-WB03-3.5-4.0			4.3	(SM) **SILTY SAND WITH GRAVEL**, black (10YR 2/1), clay seam at sand interface, cinders and coal fragments, well graded, moist. [FILL]	3326.5	
5	5.75	0				5.0	(SM) **SILTY SAND**, dark brown (10YR 3/3), fine grain, loose, moist. [FILL]	3325.7	7-inch drill steel casing
		0	CMR-WB03-5.0-5.5			5.3	(CL) **SANDY CLAY**, dark grayish brown (10YR 4/2), medium stiff, moderately plastic, sand increases at 4.75 ft, moist. [FILL]	3325.5	
							(SP) **SAND**, poorly graded, fine grain, loose, wet. [FILL]		
						8.0	(CL) **SANDY CLAY**, dark grayish brown (10YR 4/2), some red and yellow mottling, well-graded sand, medium stiff, moderately plastic, moist. [FILL]	3322.7	
10							(SP) **SAND**, very fine to fine grain, some silt, some clay.		
		0.2				11.5		3319.2	
	4.5	11.7					(SP-SM) **LAMINATED SANDY SILT AND CLAY**, interbedded dark reddish gray (2.5YR 4/1) and dusky red (2.5YR 3/2), loose, slightly plastic, dry. (SP-SM) **AS ABOVE**, massive at 12.25 ft, slightly moist.		
		0.3					(SP-SM) **AS ABOVE**, slightly laminated to strongly laminated at 15 ft bgs.		
15						15.0		3315.7	Sch. 40 PVC riser
	2	13.4					(SP-SM) **SANDS WITH SILT**, dark reddish gray (2.5YR 4/1), very fine to fine sand, weakly to moderately cemented, laminated, dry.		
		1.5							
	3	0							
		0							
20						20.0		3310.7	
		0					(CL) **CLAY**, greenish gray (GLEY 1 5/1), some yellow mottling, moderately plastic, stiff, slightly moist.		
						22.0		3308.7	
	5						(CL-ML) **SILTY CLAY**, motttled dusky red (2.5YR 3/2) to greenish gray (GLEY 1 5/1), stiff to hard, none to weakly laminated, dry. (CL-ML) **AS ABOVE**, strongly laminated at 23 ft bgs, no mottling.		
		0							
25						25.0		3305.7	

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WELL ID:
BORING NUMBER:**WB-03D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
25							
		0				(CL-ML) **SILTY CLAY**, very dark greenish gray (GLEY 1 3/1), some black mottling, moderately plastic, stiff, slightly cemented, slightly moist.	
	5					(CL-ML) **AS ABOVE**, greenish gray (GLEY 1 5/1).	
		0				29.0 3301.7	
30						(CL-ML) **AS ABOVE**, mottled weak red (2.5YR 4/2) and greenish gray (GLEY 1 5/1), no black mottling, non cemented, dry.	
						(CL-ML) **AS ABOVE**, cemented, laminated.	
		0				(CL-ML) **AS ABOVE**, slightly moist at 31.5 feet.	
	5					32.5 3298.2	Sch. 40 PVC screen
						(SP) **SAND**, dark gray, very fine to fine grain, some silt, very dense, moderately cemented, laminated, dry.	
35						35.0 3295.7	

Bottom of borehole at 35.0 feet.

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WELL ID:
BORING NUMBER:**WB-03S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/22/19 **COMPLETED** 6/22/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 11.5 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 11 ft bgs **SCREEN INTERVAL** 6.5-11.5 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See WB-03D for lithologic descriptions.**	Open borehole. Sch. 40 PVC riser
5							
10			CMR-WB03S-8.5-11.0-GT				Sch. 40 PVC screen

Bottom of borehole at 11.5 feet.

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WELL ID:
BORING NUMBER:**WB-04D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/19/19 **COMPLETED** 6/20/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3331.41 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197782.662 **EASTING** 1524852.059
DRILLER James Richardson
TOTAL BORING DEPTH 35 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 30 ft bgs **SCREEN INTERVAL** 25-30 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
						FILL, gray, coarse gravel base, loose, dry, angular to sub-angular, ballast stone.	3330.4	
		1.3				(SW) **GRAVELLY SAND**, black, well graded, sub-angular to sub-rounded, with coal fragments and cinders, loose, moist. [FILL]	3329.4	Open borehole
	3.25	1.5				(SW) **WELL GRADED SAND WITH GRAVEL**, tan, fine to coarse grain, sub-rounded gravel, loose, moist. [FILL]		
5							3326.4	
		1.5	CMR-WB04-5.0-6.0			(SM) **POORLY GRADED SILTY SAND**, tan, fine to medium grain, laminated, loose, moist. [FILL]	3325.4	
		2.1				(CL) **SANDY CLAY**, grayish brown, fine sand, soft, plastic, moist. [FILL]		
	3.75	2.2						
		325	CMR-WB04-8.0-9.0				3322.9	
10						(SP) **POORLY GRADED SAND**, grayish brown, sands stained gray at contact, fine grain, little clay and silt, loose, wet, strong hydrocarbon odor. [FILL]	3321.4	7-inch drill steel casing
		585				(SC) **CLAYEY SAND**, dusky red (2.5YR 3/2), fine to very fine, stiff, slightly plastic to plastic, laminated, slightly moist, slight hydrocarbon odor. [FILL]	3320.9	
		187				(SM) **SILTY SAND**, brown (7.5YR 4/4), laminated with clay, poorly graded, fine grain, dense, slightly plastic, slightly moist, slight hydrocarbon odor. [FILL]	3319.9	Sch. 40 PVC riser
	5	22				(CL-ML) **SILTY CLAY**, dusky red (2.5YR 3/2), medium stiff, slightly plastic to plastic, slightly moist.		
15		21				(CL-ML) **AS ABOVE**, slighty hydrocarbon odor, some black staining.	3316.9	
		258				(CL-ML) **SILTY CLAY**, dusky red (2.5YR 3/2), with laminations of grayish (2.5YR 4/2) sandy silt, slightly plastic, dry.	3314.9	
	5	0				(SM) **SILTY SAND**, dusky red (2.5YR 3/2), interbedded laminated silts and some clay, very fine grain, moderately to well sorted, dry.	3313.7	
		0				(CL-ML) **SILTY CLAY**, dusky red (2.5YR 3/2), with laminations of grayish sandy silt, moist.		
20		0				(CL-ML) **AS ABOVE**, hard, dry.		
		164.3						
	5	56.2				(CL-ML) **AS ABOVE**, some yellow mottling.	3308.9	
		12				(CL) **CLAY**, greenish gray (GLEY1 5/1), some yellow mottling, stiff, cohesive, slightly moist to dry.		
25		0						

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WELL ID:
BORING NUMBER:**WB-04D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
25		2.6				(CL) **CLAY**, greenish gray (GLEY1 5/1), some yellow mottling, stiff, cohesive, slightly moist to dry. *(continued)*	
		0					
	5						
		0					
		0					
30							
		0					
	3						
		0					
	2	0					
35							

28.0 3303.4

(CH) **CLAY**, dusky red (2.5YR 3/2) mottled with greenish gray (GLEY1 5/1), very stiff, plastic to very plastic, cohesive, slightly moist.

30.0 3301.4

(CL) **SILTY CLAY**, dusky red (2.5YR 3/2), laminations of very fine, grayish sandy silt, hard, moderately cemented, dry.

33.5 3297.9

(SM) **SANDSTONE**, dark gray (10YR 4/1), laminated, strongly cemented, very dense, dry.

35.0 3296.4

(SM) **AS ABOVE**, slightly moist.

Sch. 40 PVC screen

Bottom of borehole at 35.0 feet.

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WELL ID:
BORING NUMBER:**WB-04S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/20/19 **COMPLETED** 6/20/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 10 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 10 ft bgs **SCREEN INTERVAL** 5-10 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See WB-04D for lithologic descriptions.**	Open borehole; Sch. 40 PVC riser
5							
10			CMR-WB04S-8.0-10.0-GT				Sch. 40 PVC screen

Bottom of borehole at 10.0 feet.

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WELL ID:
BORING NUMBER:**WB-05D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/19/19 **COMPLETED** 6/20/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3330.624 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197765.089 **EASTING** 1524762.853
DRILLER James Richardson
TOTAL BORING DEPTH 33 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 33 ft bgs **SCREEN INTERVAL** 20-33 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
						FILL, gray, coarse gravel base, ballast stone, loose, dry.	3329.6	
		0.2				1.0 **FILL**, gravelly sand, black, well graded, sub-angular to sub-rounded, with coal fragments and cinders, loose, moist.	3328.6	
	3.75	0.3				2.0 **FILL**, well graded sand with gravel, tan, sub-rounded gravel, loose, moist.	3327.9	
		0.4				2.8 **FILL**, gravelly sand, black, well graded sand, sub-angular to sub-rounded, with coal fragments and cinders, loose, moist.	3327.1	Open borehole
5		0.6				3.5 **FILL**, silty sand, tan, poorly graded, fine to medium grain, loose, moist.	3325.6	
		0				5.0 (SM) **SILTY SAND**, black, well graded, fine to coarse grain, sub-angular gravel, loose, moist.		
		0				6.5 (SM) **AS ABOVE**, grayish brown.	3324.1	
	4	0.2	CMR-WB05-7.5-8.5			(SM) **AS ABOVE**, black.		
		0				(CL) **SANDY CLAY**, grayish brown, very fine, loose sand, soft, very plastic, wet.		
10						10.0	3320.6	7-inch drill steel
		0				(CL) **CLAY**, dusky red (2.5YR 3/2), laminated with fine sand and silts, very stiff, slightly plastic to plastic, slightly moist.		
						12.0	3318.6	
	4.5	0				(SM) **SILTY SAND**, brown (7.5YR 4/4), with clay, fine grain, laminated, poorly graded, medium dense, non- to slightly plastic, slightly moist to dry at 14 feet.		
		0				14.0	3316.6	
						14.3 (SM) **SILTY SAND**, hard to soft, plastic, dry to wet, cohesive.	3316.4	
15						15.0 (ML) **SANDY SILT**, dusky red (2.5YR 3/2), little clay, very stiff, slightly plastic.	3315.6	
						(CL-ML) **SILTY CLAY**, dusky red (2.5YR 3/2), with		
						16.5 laminations of grayish green sandy silt, soft, slightly plastic, moist.	3314.1	
	5	0				(CL-ML) **AS ABOVE**, hard, dry.		
						18.0 (OL) **CLAYEY SILT**, weak red (2.5YR 4/2), laminated, very stiff, non- to slightly plastic, dry.	3312.6	
20		0				(CH) **CLAY**, reddish brown (2.5YR 4/3-4/4), slightly mottled with grayish green (GLEY1 5/1), very stiff, plastic to very plastic, moist.		
		0						
	5							
						23.0	3307.6	
						23.5 (ML) **SANDY SILT**, dusky red (2.5YR 3/2), some very fine sand, some clay, interbedded with silt, moderately to strongly cemented, dry.	3307.1	
		0						
25		0				25.0 (CL-ML) **SILTY CLAY**, dusky red (2.5YR 3/2), laminations of	3305.6	

(Continued Next Page)

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WELL ID:
BORING NUMBER:**WB-05D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
25								
		0				25.5 grayish green sandy silt, hard near 25 ft, slightly plastic, dry.	3305.1	
						SILTSTONE, dusky red (2.5YR 3/2), interbedded with weakly cemented silt, very hard, dry.		
						(CL) **CLAY**, greenish gray (GLEY1 5/1), very stiff, plastic to very plastic, moist.		
		0				28.0 (CL) **AS ABOVE**, dry.	3302.6	
						(CL) **CLAY**, dark brown (10YR 3/3), slight mottling with greenish gray (GLEY1 5/1), hard, dry.		
30								
		0						
						33.0	3297.6	

Bottom of borehole at 33.0 feet.

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WELL ID:
BORING NUMBER:**WB-05S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/19/19 **COMPLETED** 6/20/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 10 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 10 ft bgs **SCREEN INTERVAL** 5-10 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See WB-05D for lithologic descriptions.**	Open borehole Sch. 40 PVC riser
5							Sch. 40 PVC screen
10							

Bottom of borehole at 10.0 feet.

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WELL ID:
BORING NUMBER:**WB-06D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/20/19 **COMPLETED** 6/20/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3333.226 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197824.722 **EASTING** 1525051.398
DRILLER James Richardson
TOTAL BORING DEPTH 30 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 30 ft bgs **SCREEN INTERVAL** 25-30 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0							
						1.0 **FILL**, gray, gravel base, coarse, loose, dry, angluar to sub-angular, ballast stone. 3332.2	
		0.5				**FILL**, gravelly sand, dark gray, well-graded, sub-angular to sub-rounded, with coal fragments and cinders, moist.	Open borehole
		0.3				3.0 3330.2	
		0.2				(SW-SC) **WELL GRADED SAND WITH GRAVEL**, tan, fine to coarse grain, loose, moist, sub-rounded gravel. [FILL] 4.0 3329.2	
5	6.25	0.3				(CL) **SANDY CLAY**, brown (10YR 4/3), gray staining at 4 ft, fine grain sand, plastic, soft, moist, no odor. [FILL] 5.0 3328.2	
		0.1				(CL) **CLAY**, brown (10YR 4/3), slightly laminated, medium stiff, slightly plastic to plastic, cohesive, moist. [FILL] 6.0 3327.2	
		12.5	CMR-WB06-6.0-6.25			(CL) **SANDY CLAY**, brown (10YR 4/3), fine grain sand, medium stiff, plastic, moist, slight hydrocarbon odor. [FILL]	
10			CMR-WB06-9.0-11.5-GT			10.0 3323.2	
		0.9				10.5 (SM) **SILTY SAND**, grayish brown (10YR 4/3), poorly graded, fine to medium grain, loose, wet. [FILL] 3322.7	7-inch drill steel casing
		2				11.0 3322.2	
	5	0.7	CMR-WB06-10.0-10.5			(CL) **SANDY CLAY**, brown (10YR 4/3), fine grain sand, medium stiff, plastic, moist to wet. [FILL]	
						(CL-ML) **SILTY CLAY**, dusky red (2.5YR 3/2), with laminations of grayish (2.5YR 4/2) sandy silts, dry to moist.	Sch. 40 PVC riser
		0.6					
15							
		0				(CL-ML) **AS ABOVE**, slightly moist from 16 to 16.5 ft.	
		0					
	5	0				(CL-ML) **AS ABOVE**, very fine, dusky red (2.5YR 3/2) sands, some fines, 2 inch thick laminations, moderately to strongly cemented, dry.	
		0					
						19.3 3314.0	
20		0.3				(CL) **CLAY**, greenish gray (GLEY1 5/1), with some dark gray and black staining, laminated, stiff, very plastic, cohesive, moist.	
		0				21.8 3311.5	
	4					(CL-ML) **SILTY CLAY**, dusky red (2.5YR 3/2) with greenish gray (GLEY1 5/1) mottling, very stiff, plastic, dry to moist.	
		0				23.5 (CL-ML) **AS ABOVE**, mottling decreases, weakly laminated. 3309.7	
						24.0 3309.2	
25	4					(CL) **SILTY CLAY**, dusky red (2.5YR 3/2), laminations of grayish (2.5YR 4/2) stiff sandy silt, hard, plastic, dry.	

(Continued Next Page)

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WELL ID:
BORING NUMBER:**WB-06D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
25								
	4	0				(CL-ML) **SILTY CLAY**, greenish gray (GLEY1 5/1), very stiff, plastic, dry to moist. *(continued)*		
						(CL-ML) **AS ABOVE**, dusky red (2.5YR 3/2) with trace greenish gray (GLEY1 5/1) mottling.		
		0.3				(CL-ML) **AS ABOVE**, 1 to 2 inch thick moderately cemented silts.		← Sch. 40 PVC screen
	2	0				(CH) **AS ABOVE**, very plastic, well laminated, 1 ft of greenish gray (GLEY1 5/1) clay, soft, plastic to very plastic, wet. [possible sluff]		
30		0			30.0	(CL-ML) **AS ABOVE**, moderately cemented silt.	3303.2	

Bottom of borehole at 30.0 feet.

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WELL ID:
BORING NUMBER:**WB-06S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/20/19 **COMPLETED** 6/20/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 11.5 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 12 ft bgs **SCREEN INTERVAL** 6.5-11.5 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See WB-06D for lithologic descriptions.**	Open borehole; Sch. 40 PVC riser; Sch. 40 PVC screen
5							
10			CMR-MW06S-9.0-11.5				

Bottom of borehole at 11.5 feet.

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WELL ID:
BORING NUMBER:**WB-07**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/17/19 **COMPLETED** 6/17/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3327.576 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197786.627 **EASTING** 1525027.557
DRILLER James Richardson
TOTAL BORING DEPTH 10 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 8 ft bgs **SCREEN INTERVAL** 3-8 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0		8				(SM) **SILTY SAND**, very dark grayish brown (10YR 3/2), trace coarse and sub-angular gravel, fine grain, loose, moist. [FILL]	
		0.8				1.3 / 3326.3 (SM) **AS ABOVE**, black (10YR 2/1), no gravel.	Sch. 40 PVC riser
	5	2.8				(CL) **CLAY**, brown (10YR 4/3), trace silt, stiff, plastic, cohesive, moist. [FILL]	Open borehole
		1.2				4.0 / 3323.6	
5		0.7	CMR-WB07-5.0-6.0			(SP) **POORLY-GRADED SAND**, dark grayish brown (10YR 4/2), yellow and orange mottling near 7 ft, little silt, fine to medium grain, sub-rounded, loose, dry. [FILL]	Sch. 40 PVC screen
		0.2				7.0 / 3320.6	
	5	0.3				(CL) **SANDY CLAY**, dusky red (2.5YR 3/2), slightly laminated, very stiff, slightly to non-plastic, moist.	
		0.4				8.3 / 3319.3	
		0.7				(SC) **CLAYEY SAND**, dusky red (2.5YR 3/2), laminated, moderately sorted, fine grain, loose, moist.	
10		0.5				10.0 / 3317.6	

Bottom of borehole at 10.0 feet.

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WELL ID:
BORING NUMBER:**WB-08**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/17/19 **COMPLETED** 6/17/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3326.729 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197778.306 **EASTING** 1524992.146
DRILLER James Richardson
TOTAL BORING DEPTH 10 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 8 ft bgs **SCREEN INTERVAL** 3-8 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		21				(SM) **SILTY SAND**, very dark grayish brown (10YR 3/2), fine grain, loose, moist, slight hydrocarbon odor, sub-rounded. [FIILL]		Sch. 40 PVC riser
		15.1				1.5	3325.2	Open borehole
	3	28.3				(SM) **SILTY SAND**, very dark grayish brown (10YR 3/2), subrounded sand, fine grain, loose, slightly plastic, moist, no hydrocarbon odor. [FILL]	
		309				3.0	3323.7	
5		108				(SP) **POORLY-GRADED SAND**, dark grayish brown (10YR 4/2), little silt, sub-rounded sand, very fine to fine grain, loose, wet, hydrocarbon odor. [FILL]		Sch. 40 PVC screen
		408	CMR-WB08-5.0-7.0-GT			6.0	3320.7	
		89	CMR-WB08-5.0-6.0			(SP) **SAND**, dusky red (2.5YR 3/2), very fine grain, little clay and silt, laminated, very stiff, slightly plastic, moist.		
	4					8.0	3318.7	
		14				(SC) **CLAYEY SAND**, dusky red (2.5YR 3/2), fine grain, moderately sorted, laminated, loose, moist.		
10		10				10.0	3316.7	

Bottom of borehole at 10.0 feet.

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WELL ID:
BORING NUMBER:**WB-09D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/17/19 **COMPLETED** 6/17/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3326.189 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197769.987 **EASTING** 1524956.363
DRILLER James Richardson
TOTAL BORING DEPTH 30 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 30 ft bgs **SCREEN INTERVAL** 25-30 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0							
		8.1				0.5 (SM) **SILTY SAND**, very dark grayish brown (10YR 3/2), moderately sorted, fine to medium grain, sub-rounded to sub-angular sand, loose, moist, slight hydrocarbon odor. [FILL] 3325.7	
						(CL) **SANDY CLAY**, dark brown (10YR 3/3), fine to medium sub-rounded to sub-angular sand, medium stiff, slightly plastic, moist, slight hydrocarbon odor. [FILL] 2.5 3323.7	
	3	30.7	CMR-WB09-2.0-3.0			(SP) **SAND**, dark grayish brown (10YR 4/2), sub-rounded to sub-angular sand, moderately sorted, very fine to fine grain, loose, moist, hydrocarbon odor. [FILL]	Open borehole.
5		427					
		289	CMR-WB09-5.0-7.5			(SM) **AS ABOVE**, wet, strong hydrocarbon odor.	7-inch drill steel casing
		353	CMR-WB09-6.0-6.75			6.8 3319.4	
	5	38.5				(SM) **SAND**, dusky red (2.5YR 3/2), very fine to fine grain, sub-rounded to sub-angular, moderately sorted, litle silt, little clay, laminated, stiff, slightly plastic, moist. 7.5 3318.7	
		15				(CL-ML) **SILTY CLAY**, some fine sand, laminated, very stiff, slightly plastic, dry, slight hydrocarbon odor.	
10		15.8				(CL-ML) **AS ABOVE**, no hydrocarbon odor. 10.0 3316.2	
		0				(SP-SC) **SAND**, dusky red (2.5YR 3/2), fine to medium sub-angular to rounded sand, some clay, loose, slightly moist.	
						11.5 3314.7	
		0				(CL) **CLAY**, greenish gray (GLEY1 5/1), very stiff, slightly plastic, slightly moist.	Drill steel
	5					(CL) **AS ABOVE**, mottled greenish gray (GLEY1 5/1) to dusky red (2.5YR 3/2).	
		0					
15						(CL) **AS ABOVE**, dry.	
						(CL) **AS ABOVE** dusky red (2.5YR 3/2).	
		0				(CL) **AS ABOVE**, moisture seam.	
	5						
		0					
20						(CL) **AS ABOVE**, greenish gray (GLEY1 5/1), well laminated, some black and orange mottling.	
		34.8				(CL) **AS ABOVE**, slightly moist, slightly to not laminated.	
		8.4					
	4.5						
		16					
						(CL) **AS ABOVE**, dusky red (2.5YR 3/2), some mottling with greenish gray (GLEY1 5/1), slightly laminated.	
25		0				25.0 3301.2	

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WELL ID:
BORING NUMBER:**WB-09D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
25							
		0				**WELL-SORTED SANDSTONE**, dark gray (10YR 4/1), grades from reddish gray to greenish gray, fine grain, laminated, strongly cemented, very dense, dry.	Sch. 40 PVC screen (deep well)
		0					
30						30.0 3296.2	

Bottom of borehole at 30.0 feet.

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WELL ID:
BORING NUMBER:**WB-09S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/17/19 **COMPLETED** 6/17/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 8 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 8 ft bgs **SCREEN INTERVAL** 3-8 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See WB-09D for lithologic descriptions.**	Sch. 40 PVC riser
5			CMR-WB09-5.0-7.5-GT				Open borehole Sch. 40 PVC screen

Bottom of borehole at 8.0 feet.

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WELL ID:
BORING NUMBER:**WB-10S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/21/19 **COMPLETED** 6/21/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3325.631 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197762.819 **EASTING** 1524919.232
DRILLER James Richardson
TOTAL BORING DEPTH 10 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 5 ft bgs **SCREEN INTERVAL** 0-5 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0		56				(SM) **SILTY SAND**, dark brown (7.5YR 3/3), fine to medium grain, few subrounded fine to coarse gravel, poorly sorted, loose, moist, slight hydrocarbon odor at 1 ft bgs. [FILL]	3324.1	Sch. 40 PVC screen
		420				1.5 (SP) **SAND**, dark gray, black staining beginning at 1.5 ft.	3323.1	
	4.25	483	CMR-WB10-2.5-5.0-GT			2.5 (SP) **SAND**, very fine to fine, some clay, little silt, moist. (SP) **AS ABOVE**, wet.		
		427				(SP) **AS ABOVE**, gray straining, strong hydrocarbon odor at 3.25 ft bgs.		Open borehole.
5			CMR-WB10-3.0-4.0			5.0	3320.6	
		183				6.0 (CL-ML) **CLAYEY SILT**, dusky red (2.5YR 3/2), trace fine sand, slightly laminated, slightly plastic, soft, moist, slight hydrocarbon odor.	3319.6	
		205	CMR-WB10-6.0-7.0			(SP) **SAND**, very fine to fine, some clay, little silt, moist.		
	4.25	81				(SP) **AS ABOVE**, moderately laminated at 7 ft bgs.		Slough.
						8.0	3317.6	
		27				9.0 (ML) **SANDY SILT WITH CLAY**, laminated dark reddish gray (2.5YR 4/1) and dusky red (2.5YR 3/2), very fine to fine grain, dense, moist.	3316.6	
						9.5	3316.1	
10		28.3	CMR-WB10-9.0-9.5			10.0 (SP) **SAND**, very fine to fine, some clay, little silt, moist.	3315.6	
						SANDSTONE, fine grain, strongly cemented, massive, dry.		

Bottom of borehole at 10.0 feet.

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WELL ID:
BORING NUMBER:**WB-11D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/18/19 **COMPLETED** 6/18/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3324.906 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197753.425 **EASTING** 1524877.715
DRILLER James Richardson
TOTAL BORING DEPTH 30 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 30 ft bgs **SCREEN INTERVAL** 25-30 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0							
		25				0.5 (SM) **SILTY SAND**, brown (10YR 4/3), fine to medium grain, coarse sub-rounded to sub-angular gravel, loose, dry. [FILL] 3324.4 / 1.0 3323.9	
			CMR-WB11-1.0-2.0			(SC) **CLAYEY SAND**, dusky red (2.5YR 3/2), fine grain, loose, moist. [FILL] 2.0 3322.9	
	4	455				(SP) **SAND**, very dark grayish brown (10YR 3/2), some silt, poorly graded, fine to medium grain, loose, moist, hydrocarbon odor. [FILL] 3.3 3321.7	Open borehole
		640	CMR-WB11-3.0-3.4			3.5 3321.4	
		540				(SC) **CLAYEY SAND**, very dark grayish brown (10YR 3/2), fine to medium grain, slightly plastic to plastic, wet, strong hydrocarbon odor, hydrocarbon staining. [FILL] 3.9 3321.0	
5						(SW) **GRAVELLY SAND**, 0.5 inch black seam, poorly sorted, fine to coarse sand and gravel, loose, wet, strong hydrocarbon odor, hydrocarbon staining, free product from 3 to 3.9 ft. [FILL]	7-inch drill steel casing
		327.7				(CH) **CLAY**, plastic to very plastic, moist, hydrocarbon odor, hydrocarbon staining, observed free product globules on side of core bag. [FILL]	
	5	6				(CL-ML) **CLAYEY SILT**, dusky red (2.5YR 3/2), few sand, slightly plastic, moist, slight hydrocarbon odor.	
		2.3				(CL-ML) **AS ABOVE**, dry, slight hydrocarbon odor.	
		9.5				9.5 (CL-ML) **AS ABOVE**, moist. 3315.4	
10						(CL-ML) **SILTY CLAY**, dark reddish brown (2.5YR 3/3), laminated beds of alternating sandy silts and clays, very stiff, dry.	
		110				(CL-ML) **AS ABOVE**, trace sand at 10 ft, poorly laminated, dry.	
	3.5					12.5 (CL-ML) **AS ABOVE**, well laminated. 3312.4	Sch. 40 PVC riser
		9				13.5 (CL-ML) **SILTY CLAY**, greenish gray (GLEY1 5/1), medium stiff, moist. 3311.4	
		0				14.0 (CL) **CLAY**, very dark gray (10YR 3/1), mottled greenish gray (GLEY1 5/1), laminated, hard, moist. 3310.9	
15		0				(CL-ML) **SILTY CLAY**, dusky red (2.5YR 3/2), weakly laminated, medium stiff, slightly moist, drillers initially hit refusal at 14 ft. 15.5 3309.4	
		0				16.0 3308.9	
		0				(CL) **CLAY**, dark grayish brown (10YR 4/2), weakly laminated, very stiff, dry.	
	5					17.5 **SANDSTONE**, dusky red (2.5YR 3/2), few very fine sand with clayey silt, interbedded, strongly cemented, very dense, dry. 3307.4	
		0				(CH) **CLAY**, greenish gray (GLEY1 5/1), weakly laminated, stiff, moist.	
20							
		0				21.8 3303.2	
		0				**SANDSTONE**, very well cemented sandstone, very fine grain, mottled greenish gray (GLEY1 5/1) and dusky red (2.5YR 3/2), massive.	
	5	0				23.0 3301.9	
						(CL-ML) **CLAYEY SILT**, mottled greenish gray (GLEY1 5/1) and dusky red (2.5YR 3/2), medium stiff, moist, dry at 23.5 ft.	
		0				24.0 3300.9	
25							

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WELL ID:
BORING NUMBER:**WB-11D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
25							
		0				**SANDSTONE**, dusky red (2.5YR 3/2), very fine grain, moderately to strongly cemented, interbedded with silty clay and some sand, dry. *(continued)*	
						26.5 3298.4	
	5					**SANDSTONE**, dark gray, fine to very fine grain, strongly cemented, laminated, dry.	Sch. 40 PVC screen
		0					
30						30.0 3294.9	

Bottom of borehole at 30.0 feet.

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WELL ID:
BORING NUMBER:**WB-12S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/18/19 **COMPLETED** 6/20/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3324.083 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197743.956 **EASTING** 1524830.541
DRILLER James Richardson
TOTAL BORING DEPTH 10 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 5 ft bgs **SCREEN INTERVAL** 0-5 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		13	CMR-WB12-0.0-1.0			(SM) **SILTY SAND**, very dark grayish brown (10YR 3/2), trace coarse sub-angular gravel, fine to medium grain, loose, moist.	3323.1	
		52				(SP) **SAND**, very dark grayish brown (10YR 3/2), little silt, poorly graded, fine to medium grain, medium dense, wet.		
	3.5		CMR-WB12-2.0-2.5				3321.6	Open borehole Sch. 40 PVC screen
		81				(CL-ML) **CLAYEY SILT**, dusky red (2.5YR 3/2), sand at 2.5 ft, weakly laminated, hard, non-plastic, moist at sand contact, dry with depth, slight hydrocarbon odor.		
5								
		97				(CL-ML) **AS ABOVE**, little sand, weakly to moderately laminated, dry, moisture at 5.5 ft.		
	5							
		37				(CL-ML) **AS ABOVE**, moisture from 7.5 to 8.25 ft, non-laminated.		Slough.
						(CL-ML) **AS ABOVE**, interbedded 1 inch siltstone layer, very dense, well cemented, with fine grain sand at 8.25 ft.	3315.1	
		19.4				(CH) **CLAY**, dark brown (2.5YR 3/3), non-laminated, hard, plastic to very plastic, moist.		
10						(CH) **AS ABOVE**, weakly laminated, dry.	3314.1	
						Bottom of borehole at 10.0 feet.		

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WELL ID:
BORING NUMBER:**WB-13D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/18/19 **COMPLETED** 6/20/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3323.474 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197736.1 **EASTING** 1524798.356
DRILLER James Richardson
TOTAL BORING DEPTH 30 ft bgs **BOREHOLE SIZE** 7/6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 28 ft bgs **SCREEN INTERVAL** 23-28 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		0				0.8 (SM) **SILTY SAND**, very dark grayish brown (10YR 3/2), trace coarse sub-angular gravel, fine to medium grain, loose, moist.	3322.7	
		0				1.5 (SC-SM) **CLAYEY SAND**, dusky red (2.5YR 3/2), loose, moist.	3322.0	
		0				(SP-SM) **SAND**, very dark grayish brown (10YR 3/2), very fine to fine grained, slightly mottled near 3.5 ft, silt and clay,		Open borehole
		0	CMR-WB13-3.0-3.5			3.5 medium dense, wet.	3320.0	
		0				(CL-ML) **SILTY CLAY**, dark reddish brown (2.5YR 3/3), weakly laminated, very stiff, slighty plastic, moist near silty sand		
5						5.0 contact, dries with depth.	3318.5	7-inch drill steel casing
		0				(ML) **CLAYEY SILT**, dusky red (2.5YR 3/2), little sand, non-plastic, dry, moisture seam at 6 to 6.5 ft.		
						7.5	3316.0	
		0				(CH) **CLAY**, reddish brown (2.5YR 4/4), weakly laminated, hard, plastic to very plastic, dry.		
		0						
10								
		0				(CH) **AS ABOVE**, dark reddish brown (2.5YR 3/3), well laminated.		
		0						Sch. 40 PVC riser
		0						
						14.5 (CH) **AS ABOVE**, 2 inch seam of clay, weak red (2.5YR 4/2), hard, plastic, dry, well laminated.	3309.0	
15		0				(CL) **CLAY**, dusky red (2.5YR 3/2), very stiff, dry,		
		0				16.0 non-laminated.	3307.5	
		0				(CL) **AS ABOVE**, laminated at 15 ft.		
						(SW) **SAND**, dark gray, with some cobbles at 16.5 ft, fine grain, very dense, well cemented, well laminated.		
						18.0	3305.5	
		0				18.5 **SANDSTONE COBBLES**, dark gray, very dense, well cemented.	3305.0	
						(CL) **CLAY**, greenish gray (GLEY1 5/1), laminated, very stiff,		
20		0				20.0 plastic, dry.	3303.5	
						(ML) **CLAYEY SILT**, very dark grayish brown (10YR 3/2), with little sand, non-plastic, dry, slightly moist from 22 to 23 ft.		
		0						
						23.0	3300.5	
		0				(CL-ML) **SILTY CLAY**, reddish brown (2.5YR 5/4), interbedded fine dark gray sand laminations, strongly cemented, very dense, dark gray sand, slightly plastic, dry.		
25						25.0	3298.5	

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WELL ID:
BORING NUMBER:**WB-13D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
25		0				(CL) **CLAY**, very dark grayish brown (10YR 3/2), interbedded fine grain, strongly cemented, very dense, dark gray sand, very stiff, plastic, moist to wet.	Sch. 40 PVC screen
		0					
					27.5	3296.0	
						SANDSTONE, dark grays, fine grain, strongly cemented, laminated, dry.	Bentonite backfill
30					30.0	3293.5	

Bottom of borehole at 30.0 feet.

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WELL ID:
BORING NUMBER:**WB-13S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/18/19 **COMPLETED** 6/20/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 5 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 5 ft bgs **SCREEN INTERVAL** 0-5 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See WB-13S for lithologic descriptions.**	
5			CMR-WB13-2.0-4.5-GT				Open borehole Sch. 40 PVC screen

Bottom of borehole at 5.0 feet.

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WELL ID:
BORING NUMBER:**WB-14D**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/25/19 **COMPLETED** 6/25/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3321.275 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197734.688 **EASTING** 1525031.599
DRILLER James Richardson
TOTAL BORING DEPTH 40 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 25 ft bgs **SCREEN INTERVAL** 20-25 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		0.2				1.0 **FILL**, silty sand, very dark grayish brown (10YR 3/2), poorly graded, trace medium subangular gravel, trace rootlets, fine grain, loose, moist	3320.3	
		0				(SM) **SILTY SAND**, dusky red (2.5YR 3/2), non to weakly laminated, loose, slightly moist.		Open borehole
	5	0.1				3.0	3318.3	
		0.1				(CL-ML) **SILTY CLAY**, dusky red (2.5YR 3/2), trace sand, weakly laminated, clay content increases with depth, hard, slightly to moderately plastic, slightly moist.		
5		0.1				5.0	3316.3	
		0.1	CMR-WB14-5.0-6.0			(ML) **SILT**, dusky red (2.5YR 3/2), little clay, trace sand, non-cohesive, non-laminated, soft, slightly moist.		
	5	0				(ML) **AS ABOVE**, hard, weakly laminted.		
						7.5	3313.8	
						8.0 (SP) **WEAKLY CEMENTED SAND**, dusky red (2.5YR 3/2), stiff to hard clay laminations, fine grain, dense, dry.	3313.3	
		0				(SP) **SILTY SAND**, brown (7.5YR 4/4), fine sand laminations alternate with clayey silt laminations, moderately cemented, dry.		
10						10.0	3311.3	Sch. 40 PVC riser (casing suspended)
		0				(MH) **CLAYEY SILT**, mottled dusky red (2.5YR 3/2) to greenish gray (GLEY1 5/1) from 10 to 11 ft bgs, slightly to moderately plastic, non-cohesive, dry to slightly moist.		
	4.75					(MH) **AS ABOVE**, sand content increases between 12 to 12.75 ft bgs.		
						13.0	3308.3	
		0.5				13.3 (SP) **MODERATELY CEMENTED SAND**, brown (7.5YR 4/4), fine grain, very dense, laminated, dry.	3308.0	
						14.0	3307.3	
15						(ML) **CLAYEY SILT**, mottled dusky red (2.5YR 3/2) to greenish gray (GLEY1 5/1), laminated, weakly to moderately cemented, dry.		
						(CL) **CLAY**, (GLEY1 5/1), weak dark gray to black laminations, hard, slightly moist.		
		0						
	5					17.5	3303.8	
		0.1				(CL-ML) **SILTY CLAY**, weak red (2.5YR 4/2), slightly mottled greenish gray (GLEY1 5/1), moderately to strongly cemented, weakly laminated, non-cohesive, dry.		
20		0.1				(CL-ML) **AS ABOVE**, dusky red (2.5YR 3/2).		
			CMR-WB14-20.0-21.0			(CL-ML) **AS ABOVE**, weakly cemented near 20 ft bgs.		
		0.4						
						22.0	3299.3	
	5					(CL-ML) **AS ABOVE**, moisture seam immediately above sandstone.		Sch. 40 PVC screen (casing suspended)
						23.0 **SANDSTONE**, dark gray, strongly cemented, laminated, dry.	3298.3	
						23.5	3297.8	
		0.1				(CL) **CLAY**, reddish gray (2.5YR 5/1), soft, moderately plastic, moist.		
						24.5	3296.8	
25		0.1				**SANDSTONE**, dark gray, strongly cemented, fractured, dry.		

(Continued Next Page)

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WELL ID:
BORING NUMBER:**WB-14D**

CLIENT Calumet Montana Refining, LLC **PROJECT NAME** RIAIM Investigation

PROJECT NUMBER 1690012344-005 **PROJECT LOCATION** Great Falls, Montana

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
25						**AS ABOVE**, wet in fractures at 24 ft bgs. (CL) **SANDY CLAY**, reddish brown (2.5Y 4/3), fine sand, slightly plastic, weakly laminated, dry to moist. *(continued)*	
	5	0					
		0					
						28.8 3292.5	
						SILTSTONE, very dark greenish gray (GLEY1 3/1), strongly laminated, weakly to moderately cemented, dry. 29.5 3291.8	
30		0.2				30.0 3291.3	
						(OL) **SILT**, black (GLEY1 2.5/N), organic-rich, siltstone fragments, laminated, non-cohesive, slightly moist.	
		0.1				**SILTSTONE**, black (GLEY1 2.5N), hard, moderately cemented, weakly laminated, dry.	
	4.25					32.0 3289.3	
		0.3				(CL-ML) **SILTY CLAY**, greenish gray to (GLEY1 5/1) to black (GLEY1 2.5N), organic-rich, interbedded with siltstone, stiff to hard, moist.	Open borehole
35							
						(CL-ML) **AS ABOVE**, black (GLEY 1 5/1).	
	4.25	0.2				(CL-ML) **AS ABOVE**, non-laminated, non-cohesive.	
40						40.0 3281.3	

Bottom of borehole at 40.0 feet.

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WELL ID:
BORING NUMBER:**WB-14S**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/25/19 **COMPLETED** 6/25/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION Not Measured **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING Not Measured **EASTING** Not Measured
DRILLER James Richardson
TOTAL BORING DEPTH 10 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 10 ft bgs **SCREEN INTERVAL** 5-10 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION	WELL CONSTRUCTION
0						**Blind drilled. See WB-14D for lithologic descriptions.**	Sch. 40 PVC riser Open borehole
5			CMR-WB14-5.0-7.0-GT				Sch. 40 PVC screen
10							

Bottom of borehole at 10.0 feet.

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WELL ID:
BORING NUMBER:**WB-15**

CLIENT Calumet Montana Refining, LLC
PROJECT NAME RIAIM Investigation
PROJECT NUMBER 1690012344-005
PROJECT LOCATION Great Falls, Montana
DATE STARTED 6/25/19 **COMPLETED** 6/25/19
LOGGED BY L. Borucki/A. Hardwick **CHECKED BY** MW/MKE
DRILLING CONTRACTOR Cascade
GROUND ELEVATION 3320.621 ft **TOC ELEVATION** Not Measured
DRILLING EQUIPMENT Boart Longyear BL100C
NORTHING 1197706.658 **EASTING** 1525044.738
DRILLER James Richardson
TOTAL BORING DEPTH 10 ft bgs **BOREHOLE SIZE** 6 in
DRILLING METHOD Sonic
TOTAL WELL DEPTH 10 ft bgs **SCREEN INTERVAL** 0-10 ft
SAMPLING METHOD Continuous
GROUNDWATER LEVEL AT TIME OF DRILLING N/A

DEPTH (ft bgs)	RECOVERY (ft)	PID (ppm)	LABORATORY ID	WATER LEVEL	GRAPHIC LOG	SAMPLE DESCRIPTION		WELL CONSTRUCTION
0								
		0.4				0.5 **SANDY CLAY**, dark brown (10YR 3/3), some medium gravel, soft to medium stiff, slightly plastic, moist. [FILL]	3320.1	
						0.9	3319.7	
		0.2				1.5 (SP) **CLAYEY SAND**, reddish brown (2.5Y 4/3), fine grain, poorly-graded, loose, moist. [FILL]	3319.1	
	5					1.9	3318.7	
		0.3				(CL) **SANDY CLAY**, reddish brown (2.5Y 4/3), moderately stiff, cohesive, moist. [FILL]		
		360				(SW) **WELL-GRADED SAND**, dark yellowish brown (10YR 3/6), some subangular to subrounded gravel, loose, moist. [FILL]		Open borehole
5		475	CMR-WB15-4.0-5.0			5.0 (CL-ML) **SILTY CLAY**, dark reddish brown (2.5YR 3/3), slightly to moderately plastic, moist.	3315.6	Sch. 40 PVC screen
		0.2				(CL-ML) **AS ABOVE**, slight hydrocarbon odor, slightly moist. (CL-ML) **AS ABOVE**, hydrocarbon odor, slightly moist.		
						7.0 (ML) **SILT**, dark reddish brown (2.5YR 3/3), little clay, trace sand, non-cohesive, non-laminated, slightly moist.	3313.6	
	5	0.2				(ML) **AS ABOVE**, fine sand, moderately cemented sand, weakly laminated, dry.		
						8.5	3312.1	
		0.3				(CL) **CLAY**, mottled dark reddish brown (2.5YR 3/4) to greenish gray (GLEY 1 5/1), moderately plastic, stiff to hard, weakly laminated, slightly moist.		
10		0.3				10.0 (ML) **CLAYEY SILT**, dark reddish brown (2.5YR 3/4), little mottling greenish gray (GLEY 1 5/1), slightly plastic, very weakly laminated, dry.	3310.6	

Bottom of borehole at 10.0 feet.

APPENDIX E
Laboratory Analytical Reports

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF21102, 3 Groundwater Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF21102 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB13D-190619	UF21102-001
CMR-WB12-190619	UF21102-002
CMR-WB11D-190619	UF21102-003
TB-18-20190619	UF21102-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of aqueous methyl acetate. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methyl acetate results have been validated as estimated.

Blank Detections
During analysis, zinc and bis(2-ethylhexyl)phthalate was detected in method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All zinc and bis(2-ethylhexyl)phthalate results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF21102

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Zinc detected below the RL in aqueous method blank sample. Project sample detections of zinc below the RL or within 5x the blank result validated as non-detect (U).
Matrix Spike/Matrix Spike Duplicate	No MS?MSD results reported with samples. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	Project sample detections of zinc below the RL or within 5x the blank result validated as non-detect (U).

SDG No. UF21102

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	Two VOCs detected in method blank with no project detections. SVOC bis(2-ethylhexyl)phthalate detected in method blank. All bis(2-ethylhexyl)phthalate project sample detections validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	No issues	Surrogates out due to matrix interference. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out of criteria low for methyl acetate. All aqueous methyl acetate results validated as estimated (J, UJ).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/a
Other Non-conformances	No other non-conformances noted.	CCV out of criteria for some compounds due to matrix interference. No action taken.
Overall Assessment of Data	All aqueous methyl acetate and results validated as estimated (J, UJ). All bis(2-ethylhexyl)phthalate project sample detections validated as non-detect (U).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM - West Rail

Project Number: 1690012344-003

Lot Number:**UF21102**

Date Completed:07/11/2019

07/12/2019 10:18 AM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF21102

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The method blank associated with batch 21394 had 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene detected at a concentration that was below the LOQ. There were no detections for these compounds in the samples associated with this method blank.

The LCS associated with batch 21394 had methyl acetate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Semivolatiles
The method blank associated with batch 20650 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for bis(2-ethylhexyl)phthalate have been flagged with a "B" qualifier.

Montana EPH
Samples -001 and -003 had surrogates recovered outside of the acceptance limits due to confirmed matrix interference.

Montana VPH
The closing continuing calibration verification (CCV) associated with samples -001, -002, and -003 had compounds recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The method blank associated with batch 20830 had zinc detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for zinc have been flagged with a "B" qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF21102

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB13D-190619	Aqueous	06/19/2019 1053	06/21/2019
002	CMR-WB12-190619	Aqueous	06/19/2019 1233	06/21/2019
003	CMR-WB11D-190619	Aqueous	06/19/2019 1415	06/21/2019
004	TB-18-20190619	Aqueous	06/19/2019	06/21/2019

(4 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF21102

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB13D-190619	Aqueous	Acetone	8260B	3.7	J	ug/L	7
001	CMR-WB13D-190619	Aqueous	Toluene	8260B	0.62		ug/L	7
001	CMR-WB13D-190619	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	1.1	BJ	ug/L	9
001	CMR-WB13D-190619	Aqueous	Toluene	Montana VPH	0.71	J	ug/L	14
001	CMR-WB13D-190619	Aqueous	Barium	6020B	91		ug/L	16
001	CMR-WB13D-190619	Aqueous	Chromium	6020B	2.0	J	ug/L	16
001	CMR-WB13D-190619	Aqueous	Cobalt	6020B	1.4	J	ug/L	16
001	CMR-WB13D-190619	Aqueous	Copper	6020B	6.6		ug/L	16
001	CMR-WB13D-190619	Aqueous	Lead	6020B	0.51	J	ug/L	16
001	CMR-WB13D-190619	Aqueous	Nickel	6020B	26		ug/L	16
001	CMR-WB13D-190619	Aqueous	Vanadium	6020B	5.5		ug/L	16
001	CMR-WB13D-190619	Aqueous	Zinc	6020B	13	B	ug/L	16
002	CMR-WB12-190619	Aqueous	Acetone	8260B	11		ug/L	17
002	CMR-WB12-190619	Aqueous	2-Butanone (MEK)	8260B	4.5	J	ug/L	17
002	CMR-WB12-190619	Aqueous	Chloromethane (Methyl	8260B	0.45	J	ug/L	17
002	CMR-WB12-190619	Aqueous	Ethylbenzene	8260B	1.7		ug/L	17
002	CMR-WB12-190619	Aqueous	Isopropylbenzene	8260B	2.3		ug/L	17
002	CMR-WB12-190619	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	1.1	BJ	ug/L	19
002	CMR-WB12-190619	Aqueous	C19 - C36 Aliphatics	Montana EPH	110		ug/L	21
002	CMR-WB12-190619	Aqueous	C9 - C18 Aliphatics	Montana EPH	250		ug/L	21
002	CMR-WB12-190619	Aqueous	C11 - C22 Aromatics	Montana EPH	340		ug/L	22
002	CMR-WB12-190619	Aqueous	C5 - C8 Aliphatics,	Montana VPH	27	J	ug/L	23
002	CMR-WB12-190619	Aqueous	C9 - C12 Aliphatics,	Montana VPH	220		ug/L	23
002	CMR-WB12-190619	Aqueous	C9 - C10 Aromatics	Montana VPH	200		ug/L	24
002	CMR-WB12-190619	Aqueous	Ethylbenzene	Montana VPH	2.0	J	ug/L	24
002	CMR-WB12-190619	Aqueous	Naphthalene	Montana VPH	12		ug/L	24
002	CMR-WB12-190619	Aqueous	o - Xylenes	Montana VPH	0.66	J	ug/L	24
002	CMR-WB12-190619	Aqueous	TPH	Montana VPH	450		ug/L	25
002	CMR-WB12-190619	Aqueous	Antimony	6020B	0.68	J	ug/L	26
002	CMR-WB12-190619	Aqueous	Arsenic	6020B	27		ug/L	26
002	CMR-WB12-190619	Aqueous	Barium	6020B	140		ug/L	26
002	CMR-WB12-190619	Aqueous	Beryllium	6020B	0.22	J	ug/L	26
002	CMR-WB12-190619	Aqueous	Chromium	6020B	2.2	J	ug/L	26
002	CMR-WB12-190619	Aqueous	Cobalt	6020B	12		ug/L	26
002	CMR-WB12-190619	Aqueous	Copper	6020B	4.4	J	ug/L	26
002	CMR-WB12-190619	Aqueous	Lead	6020B	2.0		ug/L	26
002	CMR-WB12-190619	Aqueous	Nickel	6020B	15		ug/L	26
002	CMR-WB12-190619	Aqueous	Vanadium	6020B	5.5		ug/L	26
002	CMR-WB12-190619	Aqueous	Zinc	6020B	18	B	ug/L	26
003	CMR-WB11D-190619	Aqueous	Acetone	8260B	7.1	J	ug/L	27
003	CMR-WB11D-190619	Aqueous	Toluene	8260B	1.8		ug/L	27
003	CMR-WB11D-190619	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.93	BJ	ug/L	29
003	CMR-WB11D-190619	Aqueous	Toluene	Montana VPH	1.1	J	ug/L	34
003	CMR-WB11D-190619	Aqueous	Barium	6020B	32		ug/L	36
003	CMR-WB11D-190619	Aqueous	Cobalt	6020B	1.5	J	ug/L	36

Detection Summary (Continued)

Lot Number: UF21102

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-WB11D-190619	Aqueous	Copper	6020B	4.6	J	ug/L	36
003	CMR-WB11D-190619	Aqueous	Nickel	6020B	23		ug/L	36
003	CMR-WB11D-190619	Aqueous	Selenium	6020B	4.9	J	ug/L	36
003	CMR-WB11D-190619	Aqueous	Vanadium	6020B	3.2	J	ug/L	36
003	CMR-WB11D-190619	Aqueous	Zinc	6020B	9.9	BJ	ug/L	36

(50 detections)

Volatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-001**

Description: **CMR-WB13D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1053**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/02/2019 1813	ECB		21394

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	**67-64-1**	**8260B**	**3.7**	**J**	**10**	**2.0**	**ug/L**	**1**
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	**108-88-3**	**8260B**	**0.62**		**0.50**	**0.40**	**ug/L**	**1**
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-001**

Description: **CMR-WB13D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1053**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/02/2019 1813	ECB		21394

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		85	70-130
Bromofluorobenzene		90	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Semivolatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-001**

Description: **CMR-WB13D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1053**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 1829	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	**117-81-7**	**8270D**	**1.1**	**BJ**	**4.0**	**0.38**	**ug/L**	**1**
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-001**

Description: **CMR-WB13D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1053**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 1829	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		50	37-129
2-Fluorophenol		32	24-127
Nitrobenzene-d5		51	38-127
Phenol-d5		37	28-128
Terphenyl-d14		75	10-148
2,4,6-Tribromophenol		59	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-001**

Description: **CMR-WB13D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1053**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1613	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)	N	39	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-001**

Description: **CMR-WB13D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1053**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0440	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		65	40-140
2-Fluorobiphenyl (fractionation 1)		74	40-140
o - Terphenyl (aromatic)		64	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-001**

Description: **CMR-WB13D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1053**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 1958	STM		21206

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		83	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-001**

Description: **CMR-WB13D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1053**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 1958	STM		21207

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	**108-88-3**	**Montana VPH**	**0.71**	**J**	**5.0**	**0.53**	**ug/L**	**1**
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		78	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: **Ramboll US Corporation**
Laboratory ID: **UF21102-001**
Description: **CMR-WB13D-190619**
Matrix: **Aqueous**
Date Sampled: **06/19/2019 1053**
Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 1958	STM		21208

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-001**

Description: **CMR-WB13D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1053**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1408	TJW	06/26/2019 1259	20714
1	3005A	6020B	1	06/27/2019 1752	BNW	06/26/2019 1925	20830

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	ND		2.0	1.3	ug/L	1
Barium	**7440-39-3**	**6020B**	**91**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	**7440-47-3**	**6020B**	**2.0**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Cobalt	**7440-48-4**	**6020B**	**1.4**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Copper	**7440-50-8**	**6020B**	**6.6**		**5.0**	**1.3**	**ug/L**	**1**
Lead	**7439-92-1**	**6020B**	**0.51**	**J**	**1.0**	**0.25**	**ug/L**	**1**
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	**7440-02-0**	**6020B**	**26**		**5.0**	**1.3**	**ug/L**	**1**
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	**7440-62-2**	**6020B**	**5.5**		**5.0**	**2.5**	**ug/L**	**1**
Zinc	**7440-66-6**	**6020B**	**13**	**B**	**10**	**2.5**	**ug/L**	**1**

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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-002**

Description: **CMR-WB12-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1233**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/02/2019 1836	ECB		21394

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	**67-64-1**	**8260B**	**11**		**10**	**2.0**	**ug/L**	**1**
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	**78-93-3**	**8260B**	**4.5**	**J**	**10**	**2.0**	**ug/L**	**1**
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	**74-87-3**	**8260B**	**0.45**	**J**	**0.50**	**0.40**	**ug/L**	**1**
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	**100-41-4**	**8260B**	**1.7**		**0.50**	**0.40**	**ug/L**	**1**
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	**98-82-8**	**8260B**	**2.3**		**0.50**	**0.40**	**ug/L**	**1**
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-002**

Description: **CMR-WB12-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1233**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/02/2019 1836	ECB		21394

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		86	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-002**

Description: **CMR-WB12-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1233**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 1854	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	**117-81-7**	**8270D**	**1.1**	**BJ**	**4.0**	**0.38**	**ug/L**	**1**
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-002**

Description: **CMR-WB12-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1233**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 1854	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		38	37-129
2-Fluorophenol		28	24-127
Nitrobenzene-d5		43	38-127
Phenol-d5		39	28-128
Terphenyl-d14		43	10-148
2,4,6-Tribromophenol		79	35-144

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-002**

Description: **CMR-WB12-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1233**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1644	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		**Montana EPH**	**110**		**100**	**100**	**ug/L**	**1**
C9 - C18 Aliphatics		**Montana EPH**	**250**		**100**	**100**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		73	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-002**

Description: **CMR-WB12-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1233**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0510	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		**Montana EPH**	**340**		**100**	**100**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		84	40-140
2-Fluorobiphenyl (fractionation 1)		104	40-140
o - Terphenyl (aromatic)		93	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-002**

Description: **CMR-WB12-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1233**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2026	STM		21206

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		**Montana VPH**	**27**	**J**	**75**	**15**	**ug/L**	**1**
C9 - C12 Aliphatics, Adjusted		**Montana VPH**	**220**		**75**	**15**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		116	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-002**

Description: **CMR-WB12-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1233**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2026	STM		21207

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		**Montana VPH**	**200**		**25**	**5.0**	**ug/L**	**1**
Ethylbenzene	**100-41-4**	**Montana VPH**	**2.0**	**J**	**5.0**	**0.62**	**ug/L**	**1**
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	**91-20-3**	**Montana VPH**	**12**		**5.0**	**0.70**	**ug/L**	**1**
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	**95-47-6**	**Montana VPH**	**0.66**	**J**	**5.0**	**0.58**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		97	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-002**

Description: **CMR-WB12-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1233**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2026	STM		21208

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		**Montana VPH**	**450**		**180**	**35**	**ug/L**	**1**

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		123	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-002**

Description: **CMR-WB12-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1233**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1416	TJW	06/26/2019 1259	20714
1	3005A	6020B	1	06/27/2019 1758	BNW	06/26/2019 1925	20830

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	**7440-36-0**	**6020B**	**0.68**	**J**	**2.0**	**0.50**	**ug/L**	**1**
Arsenic	**7440-38-2**	**6020B**	**27**		**2.0**	**1.3**	**ug/L**	**1**
Barium	**7440-39-3**	**6020B**	**140**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	**7440-41-7**	**6020B**	**0.22**	**J**	**0.40**	**0.15**	**ug/L**	**1**
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	**7440-47-3**	**6020B**	**2.2**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Cobalt	**7440-48-4**	**6020B**	**12**		**5.0**	**1.3**	**ug/L**	**1**
Copper	**7440-50-8**	**6020B**	**4.4**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Lead	**7439-92-1**	**6020B**	**2.0**		**1.0**	**0.25**	**ug/L**	**1**
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	**7440-02-0**	**6020B**	**15**		**5.0**	**1.3**	**ug/L**	**1**
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	**7440-62-2**	**6020B**	**5.5**		**5.0**	**2.5**	**ug/L**	**1**
Zinc	**7440-66-6**	**6020B**	**18**	**B**	**10**	**2.5**	**ug/L**	**1**

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B = Detected in the method blank
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DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-003**

Description: **CMR-WB11D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1415**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/02/2019 1900	ECB		21394

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	**67-64-1**	**8260B**	**7.1**	**J**	**10**	**2.0**	**ug/L**	**1**
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	**108-88-3**	**8260B**	**1.8**		**0.50**	**0.40**	**ug/L**	**1**
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-003**

Description: **CMR-WB11D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1415**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/02/2019 1900	ECB		21394

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		88	70-130
Bromofluorobenzene		105	70-130
Toluene-d8		111	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
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ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-003**

Description: **CMR-WB11D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1415**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 1919	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	**117-81-7**	**8270D**	**0.93**	**BJ**	**4.0**	**0.38**	**ug/L**	**1**
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-003**

Description: **CMR-WB11D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1415**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 1919	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		50	37-129
2-Fluorophenol		29	24-127
Nitrobenzene-d5		51	38-127
Phenol-d5		38	28-128
Terphenyl-d14		76	10-148
2,4,6-Tribromophenol		62	35-144

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-003**

Description: **CMR-WB11D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1415**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1714	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)	N	37	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-003**

Description: **CMR-WB11D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1415**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0540	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		56	40-140
2-Fluorobiphenyl (fractionation 1)		73	40-140
o - Terphenyl (aromatic)		54	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-003**

Description: **CMR-WB11D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1415**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2054	STM		21206

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		80	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-003**

Description: **CMR-WB11D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1415**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2054	STM		21207

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	**108-88-3**	**Montana VPH**	**1.1**	**J**	**5.0**	**0.53**	**ug/L**	**1**
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		80	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
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Montana VPH (TPH)

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-003**

Description: **CMR-WB11D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1415**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2054	STM		21208

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-003**

Description: **CMR-WB11D-190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019 1415**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1418	TJW	06/26/2019 1259	20714
1	3005A	6020B	1	06/27/2019 1804	BNW	06/26/2019 1925	20830

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	ND		2.0	1.3	ug/L	1
Barium	**7440-39-3**	**6020B**	**32**		**5.0**	**1.3**	**ug/L**	**1**
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	**7440-48-4**	**6020B**	**1.5**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Copper	**7440-50-8**	**6020B**	**4.6**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	**7440-02-0**	**6020B**	**23**		**5.0**	**1.3**	**ug/L**	**1**
Selenium	**7782-49-2**	**6020B**	**4.9**	**J**	**5.0**	**1.3**	**ug/L**	**1**
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	**7440-62-2**	**6020B**	**3.2**	**J**	**5.0**	**2.5**	**ug/L**	**1**
Zinc	**7440-66-6**	**6020B**	**9.9**	**BJ**	**10**	**2.5**	**ug/L**	**1**

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P = The RPD between two GC columns exceeds 40%
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H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-004**

Description: **TB-18-20190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/02/2019 1200	ECB		21394

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: **Ramboll US Corporation** Laboratory ID: **UF21102-004**

Description: **TB-18-20190619** Matrix: **Aqueous**

Date Sampled: **06/19/2019**

Date Received: **06/21/2019**

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/02/2019 1200	ECB		21394

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		87	70-130
Bromofluorobenzene		93	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21394-001
Batch: 21394
Analytical Method: 8260B
Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/02/2019 1053
Benzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Bromoform	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/02/2019 1053
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/02/2019 1053
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Chloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Chloroform	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Cyclohexane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/02/2019 1053
1,4-Dioxane	ND		1	20	13	ug/L	07/02/2019 1053
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
2-Hexanone	ND		1	10	2.0	ug/L	07/02/2019 1053
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Methyl acetate	ND		1	1.0	0.40	ug/L	07/02/2019 1053
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/02/2019 1053
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/02/2019 1053
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/02/2019 1053
Methylene chloride	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Naphthalene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Styrene	ND		1	0.50	0.41	ug/L	07/02/2019 1053
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Toluene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/02/2019 1053

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21394-001
Batch: 21394
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	**0.41**	**J**	**1**	**0.50**	**0.40**	**ug/L**	**07/02/2019 1053**
1,2,4-Trichlorobenzene	**0.47**	**J**	**1**	**0.50**	**0.40**	**ug/L**	**07/02/2019 1053**
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Trichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/02/2019 1053
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/02/2019 1053
o - Xylenes	ND		1	0.50	0.40	ug/L	07/02/2019 1053

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		86	70-130
Bromofluorobenzene		91	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21394-002
Batch: 21394
Analytical Method: 8260B
Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	95		1	95	60-140	07/02/2019 0953
Benzene	50	46		1	93	70-130	07/02/2019 0953
Bromochloromethane	50	46		1	92	70-130	07/02/2019 0953
Bromodichloromethane	50	47		1	93	70-130	07/02/2019 0953
Bromoform	50	50		1	100	70-130	07/02/2019 0953
Bromomethane (Methyl bromide)	50	50		1	99	70-130	07/02/2019 0953
2-Butanone (MEK)	100	100		1	102	70-130	07/02/2019 0953
Carbon disulfide	50	48		1	96	70-130	07/02/2019 0953
Carbon tetrachloride	50	47		1	95	70-130	07/02/2019 0953
Chlorobenzene	50	48		1	95	70-130	07/02/2019 0953
Chloroethane	50	55		1	110	70-130	07/02/2019 0953
Chloroform	50	44		1	89	70-130	07/02/2019 0953
Chloromethane (Methyl chloride)	50	51		1	101	60-140	07/02/2019 0953
Cyclohexane	50	47		1	93	70-130	07/02/2019 0953
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	94	70-130	07/02/2019 0953
Dibromochloromethane	50	49		1	97	70-130	07/02/2019 0953
1,2-Dibromoethane (EDB)	50	49		1	97	70-130	07/02/2019 0953
1,2-Dichlorobenzene	50	45		1	89	70-130	07/02/2019 0953
1,3-Dichlorobenzene	50	46		1	93	70-130	07/02/2019 0953
1,4-Dichlorobenzene	50	46		1	91	70-130	07/02/2019 0953
Dichlorodifluoromethane	50	54		1	108	60-140	07/02/2019 0953
1,1-Dichloroethane	50	48		1	97	70-130	07/02/2019 0953
1,2-Dichloroethane	50	44		1	89	70-130	07/02/2019 0953
1,1-Dichloroethene	50	48		1	96	70-130	07/02/2019 0953
cis-1,2-Dichloroethene	50	45		1	91	70-130	07/02/2019 0953
trans-1,2-Dichloroethene	50	47		1	95	70-130	07/02/2019 0953
1,2-Dichloropropane	50	47		1	94	70-130	07/02/2019 0953
cis-1,3-Dichloropropene	50	50		1	100	70-130	07/02/2019 0953
trans-1,3-Dichloropropene	50	52		1	104	70-130	07/02/2019 0953
1,4-Dioxane	500	450		1	90	60-140	07/02/2019 0953
Ethylbenzene	50	49		1	99	70-130	07/02/2019 0953
2-Hexanone	100	100		1	104	70-130	07/02/2019 0953
Isopropylbenzene	50	51		1	102	70-130	07/02/2019 0953
Methyl acetate	50	34	N	1	69	70-130	07/02/2019 0953
Methyl tertiary butyl ether (MTBE)	50	47		1	93	70-130	07/02/2019 0953
4-Methyl-2-pentanone	100	93		1	93	70-130	07/02/2019 0953
Methylcyclohexane	50	53		1	106	70-130	07/02/2019 0953
Methylene chloride	50	47		1	94	70-130	07/02/2019 0953
Naphthalene	50	47		1	94	70-130	07/02/2019 0953
Styrene	50	52		1	103	70-130	07/02/2019 0953
1,1,2,2-Tetrachloroethane	50	48		1	96	70-130	07/02/2019 0953
Tetrachloroethene	50	50		1	99	70-130	07/02/2019 0953
Toluene	50	50		1	100	70-130	07/02/2019 0953
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	53		1	106	70-130	07/02/2019 0953

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21394-002
Batch: 21394
Analytical Method: 8260B
Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	46		1	93	70-130	07/02/2019 0953
1,2,4-Trichlorobenzene	50	45		1	89	70-130	07/02/2019 0953
1,1,1-Trichloroethane	50	45		1	90	70-130	07/02/2019 0953
1,1,2-Trichloroethane	50	49		1	98	70-130	07/02/2019 0953
Trichloroethene	50	45		1	90	70-130	07/02/2019 0953
Trichlorofluoromethane	50	53		1	105	70-130	07/02/2019 0953
Vinyl chloride	50	52		1	103	70-130	07/02/2019 0953
Xylenes (total)	100	100		1	101	70-130	07/02/2019 0953
m+p - Xylenes	50	51		1	101	70-130	07/02/2019 0953
o - Xylenes	50	51		1	101	70-130	07/02/2019 0953

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		82	70-130
Bromofluorobenzene		92	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20650-001
Batch: 20650
Analytical Method: 8270D
Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Acenaphthylene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	06/28/2019 1218
Carbazole	ND		1	0.80	0.040	ug/L	06/28/2019 1218
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	06/28/2019 1218
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	06/28/2019 1218
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	06/28/2019 1218
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	06/28/2019 1218
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	06/28/2019 1218
2-Chlorophenol	ND		1	0.80	0.15	ug/L	06/28/2019 1218
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	06/28/2019 1218
Chrysene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Dibenzofuran	ND		1	0.80	0.16	ug/L	06/28/2019 1218
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	06/28/2019 1218
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	06/28/2019 1218
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	06/28/2019 1218
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
Diethylphthalate	ND		1	4.0	0.19	ug/L	06/28/2019 1218
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	06/28/2019 1218
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	06/28/2019 1218
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	06/28/2019 1218
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	06/28/2019 1218
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	06/28/2019 1218
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	06/28/2019 1218
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	06/28/2019 1218
bis(2-Ethylhexyl)phthalate	**0.68**	**J**	**1**	**4.0**	**0.38**	**ug/L**	**06/28/2019 1218**
Fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Fluorene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	06/28/2019 1218
Hexachloroethane	ND		1	0.80	0.17	ug/L	06/28/2019 1218
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Isophorone	ND		1	0.80	0.22	ug/L	06/28/2019 1218

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20650-001
Batch: 20650
Analytical Method: 8270D
Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
2-Methylphenol	ND		1	0.80	0.21	ug/L	06/28/2019 1218
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	06/28/2019 1218
Naphthalene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
2-Nitroaniline	ND		1	1.6	0.66	ug/L	06/28/2019 1218
3-Nitroaniline	ND		1	1.6	0.15	ug/L	06/28/2019 1218
4-Nitroaniline	ND		1	1.6	1.3	ug/L	06/28/2019 1218
Nitrobenzene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
2-Nitrophenol	ND		1	1.6	0.44	ug/L	06/28/2019 1218
4-Nitrophenol	ND		1	4.0	2.1	ug/L	06/28/2019 1218
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	06/28/2019 1218
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	06/28/2019 1218
Pentachlorophenol	ND		1	4.0	1.3	ug/L	06/28/2019 1218
Phenanthrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Phenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
Pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	06/28/2019 1218
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	06/28/2019 1218
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	06/28/2019 1218
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	06/28/2019 1218

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		38	37-129
2-Fluorophenol		30	24-127
Nitrobenzene-d5		39	38-127
Phenol-d5		33	28-128
Terphenyl-d14		63	10-148
2,4,6-Tribromophenol		43	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20650-002
Batch: 20650
Analytical Method: 8270D
Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.7		1	58	30-122	06/28/2019 1243
Acenaphthylene	8.0	5.2		1	65	30-130	06/28/2019 1243
Anthracene	8.0	5.4		1	67	30-123	06/28/2019 1243
Benzo(a)anthracene	8.0	5.9		1	74	40-125	06/28/2019 1243
Benzo(a)pyrene	8.0	5.5		1	69	40-128	06/28/2019 1243
Benzo(b)fluoranthene	8.0	5.4		1	67	30-130	06/28/2019 1243
Benzo(g,h,i)perylene	8.0	6.5		1	81	30-130	06/28/2019 1243
Benzo(k)fluoranthene	8.0	5.8		1	73	30-130	06/28/2019 1243
4-Bromophenyl phenyl ether	8.0	5.2		1	65	30-124	06/28/2019 1243
Butyl benzyl phthalate	8.0	6.4		1	80	54-135	06/28/2019 1243
Carbazole	8.0	5.5		1	68	45-101	06/28/2019 1243
bis (2-Chloro-1-methylethyl) ether	8.0	5.9		1	73	42-124	06/28/2019 1243
4-Chloro-3-methyl phenol	8.0	5.2		1	66	30-123	06/28/2019 1243
bis(2-Chloroethoxy)methane	8.0	5.0		1	63	44-127	06/28/2019 1243
bis(2-Chloroethyl)ether	8.0	5.5		1	69	46-120	06/28/2019 1243
2-Chloronaphthalene	8.0	4.6		1	57	46-100	06/28/2019 1243
2-Chlorophenol	8.0	4.6		1	57	50-117	06/28/2019 1243
4-Chlorophenyl phenyl ether	8.0	5.1		1	63	30-121	06/28/2019 1243
Chrysene	8.0	5.7		1	71	30-130	06/28/2019 1243
Dibenzo(a,h)anthracene	8.0	6.2		1	78	30-130	06/28/2019 1243
Dibenzofuran	8.0	5.0		1	63	30-118	06/28/2019 1243
1,2-Dichlorobenzene	8.0	4.2		1	53	32-111	06/28/2019 1243
1,3-Dichlorobenzene	8.0	4.0		1	50	28-110	06/28/2019 1243
1,4-Dichlorobenzene	8.0	4.0		1	51	29-112	06/28/2019 1243
3,3'-Dichlorobenzidine	8.0	4.4		1	55	10-126	06/28/2019 1243
2,4-Dichlorophenol	8.0	4.6		1	58	30-121	06/28/2019 1243
Diethylphthalate	8.0	5.3		1	67	40-125	06/28/2019 1243
Dimethyl phthalate	8.0	5.2		1	65	40-127	06/28/2019 1243
2,4-Dimethylphenol	8.0	5.9		1	74	20-125	06/28/2019 1243
Di-n-butyl phthalate	8.0	5.8		1	73	40-127	06/28/2019 1243
4,6-Dinitro-2-methylphenol	8.0	5.0		1	63	56-128	06/28/2019 1243
2,4-Dinitrophenol	16	6.7		1	42	11-126	06/28/2019 1243
2,4-Dinitrotoluene	8.0	5.6		1	70	59-127	06/28/2019 1243
2,6-Dinitrotoluene	8.0	5.4		1	67	59-126	06/28/2019 1243
Di-n-octylphthalate	8.0	5.3		1	66	50-136	06/28/2019 1243
bis(2-Ethylhexyl)phthalate	8.0	6.3		1	79	56-128	06/28/2019 1243
Fluoranthene	8.0	5.7		1	72	40-128	06/28/2019 1243
Fluorene	8.0	5.0		1	62	30-124	06/28/2019 1243
Hexachlorobenzene	8.0	5.2		1	65	30-125	06/28/2019 1243
Hexachlorobutadiene	8.0	3.8		1	48	24-110	06/28/2019 1243
Hexachlorocyclopentadiene	40	16		1	39	16-96	06/28/2019 1243
Hexachloroethane	8.0	3.8		1	47	31-110	06/28/2019 1243
Indeno(1,2,3-c,d)pyrene	8.0	6.3		1	79	30-130	06/28/2019 1243
Isophorone	8.0	5.4		1	67	57-123	06/28/2019 1243

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20650-002
Batch: 20650
Analytical Method: 8270D
Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.6		1	58	40-132	06/28/2019 1243
2-Methylphenol	8.0	7.1		1	89	56-119	06/28/2019 1243
3+4-Methylphenol	8.0	5.3		1	66	53-119	06/28/2019 1243
Naphthalene	8.0	4.8		1	60	30-130	06/28/2019 1243
2-Nitroaniline	8.0	5.3		1	67	60-124	06/28/2019 1243
3-Nitroaniline	8.0	4.1		1	51	43-123	06/28/2019 1243
4-Nitroaniline	8.0	5.2		1	65	30-135	06/28/2019 1243
Nitrobenzene	8.0	5.1		1	64	51-122	06/28/2019 1243
2-Nitrophenol	8.0	4.8		1	60	51-118	06/28/2019 1243
4-Nitrophenol	16	9.3		1	58	53-130	06/28/2019 1243
N-Nitrosodi-n-propylamine	8.0	5.7		1	71	54-127	06/28/2019 1243
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.4		1	68	30-123	06/28/2019 1243
Pentachlorophenol	16	9.4		1	59	42-131	06/28/2019 1243
Phenanthrene	8.0	5.2		1	65	40-123	06/28/2019 1243
Phenol	8.0	5.0		1	63	49-117	06/28/2019 1243
Pyrene	8.0	6.2		1	77	40-126	06/28/2019 1243
1,2,4,5-Tetrachlorobenzene	8.0	3.8		1	48	30-130	06/28/2019 1243
2,3,4,6-Tetrachlorophenol	8.0	5.1		1	64	30-130	06/28/2019 1243
1,2,4-Trichlorobenzene	8.0	4.1		1	51	20-90	06/28/2019 1243
2,4,5-Trichlorophenol	8.0	5.0		1	62	30-123	06/28/2019 1243
2,4,6-Trichlorophenol	8.0	4.9		1	62	30-125	06/28/2019 1243

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		60	37-129
2-Fluorophenol		48	24-127
Nitrobenzene-d5		64	38-127
Phenol-d5		62	28-128
Terphenyl-d14		86	10-148
2,4,6-Tribromophenol		71	35-144

LOQ = Limit of Quantitation
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LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20744-001
Batch: 20744
Analytical Method: Montana EPH
Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012
C9 - C18 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20744-002
Batch: 20744
Analytical Method: Montana EPH
Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	260		1	65	40-140	07/08/2019 1042
C9 - C18 Aliphatics	300	140		1	48	40-140	07/08/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		57	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20744-003
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	280		1	69	5.9	40-140	25	07/08/2019 1112
C9 - C18 Aliphatics	300	150		1	51	6.4	40-140	25	07/08/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20745-001
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	07/08/2019 2143

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		45	40-140
2-Fluorobiphenyl (fractionation 1)		60	40-140
o - Terphenyl (aromatic)		52	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20745-002
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	460		1	54	40-140	07/08/2019 2213

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		48	40-140
2-Fluorobiphenyl (fractionation 1)		65	40-140
o - Terphenyl (aromatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20745-003
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	410		1	49	10	40-140	25	07/08/2019 2243

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		61	40-140
2-Fluorobiphenyl (fractionation 1)		62	40-140
o - Terphenyl (aromatic)		54	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21206-001
Batch: 21206
Analytical Method: Montana VPH
Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/29/2019 1830
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/29/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21206-002
Batch: 21206
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	97		1	97	70-130	06/29/2019 1716
C9 - C12 Aliphatics, Adjusted	75	66		1	89	70-130	06/29/2019 1716

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21206-003
Batch: 21206
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	105	7.8	70-130	25	06/29/2019 1745
C9 - C12 Aliphatics, Adjusted	75	73		1	98	10	70-130	25	06/29/2019 1745

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21207-001
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/29/2019 1830
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	06/29/2019 1830
Ethylbenzene	ND		1	5.0	0.62	ug/L	06/29/2019 1830
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/29/2019 1830
Naphthalene	ND		1	5.0	0.70	ug/L	06/29/2019 1830
Toluene	ND		1	5.0	0.53	ug/L	06/29/2019 1830
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/29/2019 1830
o - Xylenes	ND		1	5.0	0.58	ug/L	06/29/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		78	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aromatics) - LCS

Sample ID: UQ21207-002
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	22		1	86	70-130	06/29/2019 1716
C9 - C10 Aromatics	25	23		1	92	70-130	06/29/2019 1716
Ethylbenzene	25	22		1	87	70-130	06/29/2019 1716
Methyl tertiary butyl ether (MTBE)	25	22		1	87	70-130	06/29/2019 1716
Naphthalene	25	20		1	82	70-130	06/29/2019 1716
Toluene	25	22		1	86	70-130	06/29/2019 1716
m+p - Xylenes	50	44		1	88	70-130	06/29/2019 1716
o - Xylenes	25	22		1	89	70-130	06/29/2019 1716

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aromatics) - LCSD

Sample ID: UQ21207-003
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	26		1	102	17	70-130	25	06/29/2019 1745
C9 - C10 Aromatics	25	25		1	99	7.5	70-130	25	06/29/2019 1745
Ethylbenzene	25	25		1	100	15	70-130	25	06/29/2019 1745
Methyl tertiary butyl ether (MTBE)	25	25		1	101	15	70-130	25	06/29/2019 1745
Naphthalene	25	23		1	93	13	70-130	25	06/29/2019 1745
Toluene	25	26		1	102	17	70-130	25	06/29/2019 1745
m+p - Xylenes	50	51		1	102	14	70-130	25	06/29/2019 1745
o - Xylenes	25	25		1	98	9.4	70-130	25	06/29/2019 1745

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (TPH) - MB

Sample ID: UQ21208-001
Batch: 21208
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	06/29/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (TPH) - LCS

Sample ID: UQ21208-002
Batch: 21208
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	350		1	92	70-130	06/29/2019 1716

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (TPH) - LCSD

Sample ID: UQ21208-003
Batch: 21208
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	390		1	104	12	70-130	25	06/29/2019 1745

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - MB

Sample ID: UQ20830-001
Batch: 20830
Analytical Method: 6020B
Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/26/2019 1925

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	06/27/2019 1716
Arsenic	ND		1	2.0	1.3	ug/L	06/27/2019 1716
Barium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Beryllium	ND		1	0.40	0.15	ug/L	06/27/2019 1716
Cadmium	ND		1	0.50	0.13	ug/L	06/27/2019 1716
Chromium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Cobalt	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Copper	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Lead	ND		1	1.0	0.25	ug/L	06/27/2019 1716
Nickel	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Selenium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Silver	ND		1	1.0	0.25	ug/L	06/27/2019 1716
Vanadium	ND		1	5.0	2.5	ug/L	06/27/2019 1716
Zinc	**2.8**	**J**	**1**	**10**	**2.5**	**ug/L**	**06/27/2019 1716**

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - LCS

Sample ID: UQ20830-002
Batch: 20830
Analytical Method: 6020B
Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/26/2019 1925

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	100		1	100	80-120	06/27/2019 1722
Arsenic	100	110		1	106	80-120	06/27/2019 1722
Barium	100	100		1	101	80-120	06/27/2019 1722
Beryllium	100	110		1	109	80-120	06/27/2019 1722
Cadmium	100	99		1	99	80-120	06/27/2019 1722
Chromium	100	100		1	102	80-120	06/27/2019 1722
Cobalt	100	100		1	105	80-120	06/27/2019 1722
Copper	100	100		1	104	80-120	06/27/2019 1722
Lead	100	110		1	105	80-120	06/27/2019 1722
Nickel	100	100		1	101	80-120	06/27/2019 1722
Selenium	100	97		1	97	80-120	06/27/2019 1722
Silver	100	110		1	105	80-120	06/27/2019 1722
Vanadium	100	100		1	104	80-120	06/27/2019 1722
Zinc	100	94		1	94	80-120	06/27/2019 1722

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - MB

Sample ID: UQ20714-001
Batch: 20714
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/27/2019 1355

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20714-002
Batch: 20714
Analytical Method: 7470A
Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	94	80-120	06/27/2019 1358

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Chain of Custody
and
Miscellaneous Documents

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

SHEALY **Chain of Custody Record**

Number 91647

Client: RAMBOLL US CORP.
Address: 7500 COLLEGE BLVD #1905
City: OVERLAND PARK | State: KS | Zip Code: 66210
Project Name: CMR RAIL - WEST RAIL
Project No.: 1690012344-003 | P.O. No.:

Report to Contact: MICHAEL WILSON / DANIEL PRICE
Sampler's Signature: x
Printed Name: BROOKS BAILEY.

Telephone No. / E-mail: dprice@ramboll.com mwilson@ramboll.com
Quote No.:
Analysis (Attach list if more space is needed)

UF21102

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Soil	Oil	Solid	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	VOC	SVOC/EPH	Metals	VPH	Remarks / Cooler I.D.
CMR-WB13D-190619	6/19/19	1053	G	X				X		X	X			X	X	X	X	COOLER 002
CMR-WB12-190619	6/19/19	1233	G	X				X		X	X			X	X	X	X	COOLER 002
CMR-WB11D-190619	6/19/19	1415	G	X				X		X	X			X	X	X	X	COOLER 002
TB-19	—	—	N/A	X							X			X				TRIP BLANK / COOLER 002

6/19/19

Turn Around Time Required (Prior lab approval required for expedited TAT.): X Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client X Disposal by Lab

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☒ Unknown

QC Requirements (Specify):

	Date	Time		Date	Time
1. Relinquished by: Brooks Bailey	6.19.19	17:45	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: Fed EX	6-21-19	1020	4. Laboratory received by: L Hill	6-21-19	1020

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle): (Yes) No Ice Pack
Receipt Temp. 2.1 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 08-01-2014

SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL US CORP. Cooler Inspected by/date: LKH / 06-21-2019 Lot #: UF21102

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☐ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: LKH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

2.1 / 2.1 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) TB(2) were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: LKH Date: 06-21-2019

Comments:

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF21103, 3 Groundwater Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF21103 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB13S-190620	UF21103-001
CMR-WB05S-190620	UF21103-002
CMR-WB104S-190620	UF21103-003
TB-20-20190620	UF21103-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of methyl acetate and acetone. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methyl acetate and acetone results have been validated as estimated.

Blank Detections
During analysis, bis(2-ethylhexyl)phthalate was detected in method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All bis(2-ethylhexyl)phthalate results below the RL or below 5x the blank result have been validated as non-detect (U).

Sample Receipt Issues
The lab reported in the narrative that some samples arrived at the lab with pH values out of criteria. The lab adjusted the pH upon receipt and continued analysis as normal. No additional validation was warranted.

Hold Time
All samples were analyzed by the lab within their hold time requirements. However, due to QC issues during the initial analysis some samples were reanalyzed outside of hold time. While these out of hold time results are generally usable, the results within hold time should be used preferentially.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF21103

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Zinc detected below the RL in aqueous method blank sample. Project sample detections of zinc well above blank result. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UF21103

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	Several VOC samples rerun out of hold time due to LCS issues. Results within hold time should be used preferentially. One SVOC sample received with pH greater than 2. pH adjusted at the lab, no action taken.	No issues
Blanks	SVOC bis(2-ethylhexyl)phthalate detected in method blank. All bis(2-ethylhexyl)phthalate project sample detections validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	No issues	Surrogates out due to matrix interference. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out of criteria high for acetone and low for methyl acetate. All aqueous methyl acetate results validated as estimated (J, UJ) and all detected results for acetone validated as estimated (J).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/a
Other Non-conformances	No other non-conformances noted.	CCV out of criteria for some compounds due to matrix interference. No action taken.
Overall Assessment of Data	All aqueous methyl acetate results validated as estimated (J, UJ) and all detected results for acetone validated as estimated (J). All bis(2-ethylhexyl)phthalate project sample detections validated as non-detect (U).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM - West Rail

Project Number: 1690012344-003

Lot Number:**UF21103**

Date Completed:07/09/2019

07/10/2019 1:25 PM
Approved and released by:
Project Manager: Kelly M. Nance

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF21103

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21545 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. Samples -001, -002, and -003 were re-analyzed outside of the holding time for confirmation. Both sets of data are reported.

The LCS associated with batch 21545 had methyl acetate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Semivolatiles
The method blank associated with batch 20650 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for bis(2-ethylhexyl)phthalate have been flagged with a “B” qualifier.

Sample -003 was diluted 5X due to the sample matrix. The reporting limits have been raised accordingly.

Sample -003 was not preserved to a pH<2, although samples were received in the correct sample containers and preservative.

Montana VPH
Sample -003 had MTBE and naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene and MTBE, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

The closing continuing calibration verification (CCV) associated with samples -001, -002, and -003 was recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals

The method blank associated with batch 20830 had zinc detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for zinc have been flagged with a “B” qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF21103

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB13S-190620	Aqueous	06/20/2019 1035	06/21/2019
002	CMR-WB05S-190620	Aqueous	06/20/2019 1115	06/21/2019
003	CMR-WB104S-190620	Aqueous	06/20/2019 1245	06/21/2019
004	TB-20-20190620	Aqueous	06/20/2019	06/21/2019

(4 samples)

Detection Summary

Ramboll US Corporation

Lot Number: UF21103

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB13S-190620	Aqueous	2-Butanone (MEK)	8260B	2.8	J	ug/L	8
001	CMR-WB13S-190620	Aqueous	Acetone	8260B	13	H	ug/L	10
001	CMR-WB13S-190620	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.68	BJ	ug/L	12
001	CMR-WB13S-190620	Aqueous	C5 - C8 Aliphatics,	Montana VPH	140		ug/L	16
001	CMR-WB13S-190620	Aqueous	TPH	Montana VPH	110	J	ug/L	18
001	CMR-WB13S-190620	Aqueous	Antimony	6020B	1.0	J	ug/L	19
001	CMR-WB13S-190620	Aqueous	Arsenic	6020B	6.2		ug/L	19
001	CMR-WB13S-190620	Aqueous	Barium	6020B	85		ug/L	19
001	CMR-WB13S-190620	Aqueous	Cadmium	6020B	0.16	J	ug/L	19
001	CMR-WB13S-190620	Aqueous	Cobalt	6020B	3.7	J	ug/L	19
001	CMR-WB13S-190620	Aqueous	Copper	6020B	10		ug/L	19
001	CMR-WB13S-190620	Aqueous	Lead	6020B	0.74	J	ug/L	19
001	CMR-WB13S-190620	Aqueous	Nickel	6020B	10		ug/L	19
001	CMR-WB13S-190620	Aqueous	Vanadium	6020B	3.3	J	ug/L	19
001	CMR-WB13S-190620	Aqueous	Zinc	6020B	21	B	ug/L	19
002	CMR-WB05S-190620	Aqueous	2-Butanone (MEK)	8260B	2.9	J	ug/L	20
002	CMR-WB05S-190620	Aqueous	Acetone	8260B	15	H	ug/L	22
002	CMR-WB05S-190620	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.89	BJ	ug/L	24
002	CMR-WB05S-190620	Aqueous	2-Methylnaphthalene	8270D	0.041	J	ug/L	25
002	CMR-WB05S-190620	Aqueous	Antimony	6020B	1.3	J	ug/L	31
002	CMR-WB05S-190620	Aqueous	Arsenic	6020B	1.6	J	ug/L	31
002	CMR-WB05S-190620	Aqueous	Barium	6020B	87		ug/L	31
002	CMR-WB05S-190620	Aqueous	Cadmium	6020B	2.2		ug/L	31
002	CMR-WB05S-190620	Aqueous	Cobalt	6020B	7.0		ug/L	31
002	CMR-WB05S-190620	Aqueous	Copper	6020B	9.7		ug/L	31
002	CMR-WB05S-190620	Aqueous	Lead	6020B	0.51	J	ug/L	31
002	CMR-WB05S-190620	Aqueous	Nickel	6020B	10		ug/L	31
002	CMR-WB05S-190620	Aqueous	Selenium	6020B	4.4	J	ug/L	31
002	CMR-WB05S-190620	Aqueous	Zinc	6020B	520	B	ug/L	31
003	CMR-WB104S-190620	Aqueous	Benzene	8260B	10		ug/L	32
003	CMR-WB104S-190620	Aqueous	2-Butanone (MEK)	8260B	2.8	J	ug/L	32
003	CMR-WB104S-190620	Aqueous	Cyclohexane	8260B	2.5		ug/L	32
003	CMR-WB104S-190620	Aqueous	Ethylbenzene	8260B	98		ug/L	32
003	CMR-WB104S-190620	Aqueous	Isopropylbenzene	8260B	22		ug/L	32
003	CMR-WB104S-190620	Aqueous	Methyl tertiary butyl ether	8260B	6.7		ug/L	32
003	CMR-WB104S-190620	Aqueous	Methylcyclohexane	8260B	5.4		ug/L	32
003	CMR-WB104S-190620	Aqueous	Naphthalene	8260B	2.1		ug/L	32
003	CMR-WB104S-190620	Aqueous	Toluene	8260B	1.0		ug/L	32
003	CMR-WB104S-190620	Aqueous	Xylenes (total)	8260B	3.6		ug/L	33
003	CMR-WB104S-190620	Aqueous	m+p - Xylenes	8260B	3.3		ug/L	33
003	CMR-WB104S-190620	Aqueous	Acetone	8260B	8.9	HJ	ug/L	34
003	CMR-WB104S-190620	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	2.6	BJ	ug/L	36
003	CMR-WB104S-190620	Aqueous	2-Methylnaphthalene	8270D	1.5		ug/L	37
003	CMR-WB104S-190620	Aqueous	Naphthalene	8270D	2.0		ug/L	37
003	CMR-WB104S-190620	Aqueous	C19 - C36 Aliphatics	Montana EPH	700		ug/L	38

Detection Summary (Continued)

Lot Number: UF21103

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-WB104S-190620	Aqueous	C9 - C18 Aliphatics	Montana EPH	1500		ug/L	38
003	CMR-WB104S-190620	Aqueous	C11 - C22 Aromatics	Montana EPH	310		ug/L	39
003	CMR-WB104S-190620	Aqueous	C5 - C8 Aliphatics,	Montana VPH	180		ug/L	40
003	CMR-WB104S-190620	Aqueous	C9 - C12 Aliphatics,	Montana VPH	770		ug/L	40
003	CMR-WB104S-190620	Aqueous	Benzene	Montana VPH	12		ug/L	41
003	CMR-WB104S-190620	Aqueous	C9 - C10 Aromatics	Montana VPH	920		ug/L	41
003	CMR-WB104S-190620	Aqueous	Ethylbenzene	Montana VPH	110		ug/L	41
003	CMR-WB104S-190620	Aqueous	Methyl tertiary butyl ether	Montana VPH	5.6		ug/L	41
003	CMR-WB104S-190620	Aqueous	Naphthalene	Montana VPH	33		ug/L	41
003	CMR-WB104S-190620	Aqueous	Toluene	Montana VPH	1.1	J	ug/L	41
003	CMR-WB104S-190620	Aqueous	m+p - Xylenes	Montana VPH	4.8	J	ug/L	41
003	CMR-WB104S-190620	Aqueous	o - Xylenes	Montana VPH	10		ug/L	41
003	CMR-WB104S-190620	Aqueous	TPH	Montana VPH	2000		ug/L	42
003	CMR-WB104S-190620	Aqueous	Antimony	6020B	1.6	J	ug/L	43
003	CMR-WB104S-190620	Aqueous	Arsenic	6020B	36		ug/L	43
003	CMR-WB104S-190620	Aqueous	Barium	6020B	650		ug/L	43
003	CMR-WB104S-190620	Aqueous	Cadmium	6020B	0.55		ug/L	43
003	CMR-WB104S-190620	Aqueous	Cobalt	6020B	16		ug/L	43
003	CMR-WB104S-190620	Aqueous	Copper	6020B	6.3		ug/L	43
003	CMR-WB104S-190620	Aqueous	Lead	6020B	6.1		ug/L	43
003	CMR-WB104S-190620	Aqueous	Nickel	6020B	12		ug/L	43
003	CMR-WB104S-190620	Aqueous	Zinc	6020B	330	B	ug/L	43

(67 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1503	BWS		21545
2	5030B	8260B	1	07/07/2019 1517	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	28		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	2.8	J	10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1503	BWS		21545
2	5030B	8260B	1	07/07/2019 1517	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130	H	94	70-130
Bromofluorobenzene		99	70-130	H	98	70-130
Toluene-d8		98	70-130	H	96	70-130

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1503	BWS		21545
2	5030B	8260B	1	07/07/2019 1517	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	13	H	10	2.0	ug/L	2
Benzene	71-43-2	8260B	ND	H	0.50	0.40	ug/L	2
Bromochloromethane	74-97-5	8260B	ND	H	0.50	0.40	ug/L	2
Bromodichloromethane	75-27-4	8260B	ND	H	0.50	0.40	ug/L	2
Bromoform	75-25-2	8260B	ND	H	0.50	0.40	ug/L	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND	H	0.50	0.40	ug/L	2
2-Butanone (MEK)	78-93-3	8260B	ND	H	10	2.0	ug/L	2
Carbon disulfide	75-15-0	8260B	ND	H	0.50	0.40	ug/L	2
Carbon tetrachloride	56-23-5	8260B	ND	H	0.50	0.40	ug/L	2
Chlorobenzene	108-90-7	8260B	ND	H	0.50	0.40	ug/L	2
Chloroethane	75-00-3	8260B	ND	H	0.50	0.40	ug/L	2
Chloroform	67-66-3	8260B	ND	H	0.50	0.40	ug/L	2
Chloromethane (Methyl chloride)	74-87-3	8260B	0.56	H	0.50	0.40	ug/L	2
Cyclohexane	110-82-7	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND	H	0.50	0.40	ug/L	2
Dibromochloromethane	124-48-1	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichlorobenzene	95-50-1	8260B	ND	H	0.50	0.40	ug/L	2
1,3-Dichlorobenzene	541-73-1	8260B	ND	H	0.50	0.40	ug/L	2
1,4-Dichlorobenzene	106-46-7	8260B	ND	H	0.50	0.40	ug/L	2
Dichlorodifluoromethane	75-71-8	8260B	ND	H	0.50	0.40	ug/L	2
1,1-Dichloroethane	75-34-3	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichloroethane	107-06-2	8260B	ND	H	0.50	0.40	ug/L	2
1,1-Dichloroethene	75-35-4	8260B	ND	H	0.50	0.40	ug/L	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND	H	0.50	0.40	ug/L	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichloropropane	78-87-5	8260B	ND	H	0.50	0.40	ug/L	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND	H	0.50	0.40	ug/L	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND	H	0.50	0.11	ug/L	2
1,4-Dioxane	123-91-1	8260B	ND	H	20	13	ug/L	2
Ethylbenzene	100-41-4	8260B	ND	H	0.50	0.40	ug/L	2
2-Hexanone	591-78-6	8260B	ND	H	10	2.0	ug/L	2
Isopropylbenzene	98-82-8	8260B	ND	H	0.50	0.40	ug/L	2
Methyl acetate	79-20-9	8260B	ND	H	1.0	0.40	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND	H	0.50	0.40	ug/L	2
4-Methyl-2-pentanone	108-10-1	8260B	ND	H	10	2.0	ug/L	2
Methylcyclohexane	108-87-2	8260B	ND	H	5.0	0.40	ug/L	2
Methylene chloride	75-09-2	8260B	ND	H	0.50	0.40	ug/L	2
Naphthalene	91-20-3	8260B	ND	H	0.50	0.40	ug/L	2
Styrene	100-42-5	8260B	ND	H	0.50	0.41	ug/L	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND	H	0.50	0.40	ug/L	2
Tetrachloroethene	127-18-4	8260B	ND	H	0.50	0.40	ug/L	2
Toluene	108-88-3	8260B	ND	H	0.50	0.40	ug/L	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1503	BWS		21545
2	5030B	8260B	1	07/07/2019 1517	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND	H	1.0	0.42	ug/L	2
1,2,3-Trichlorobenzene	87-61-6	8260B	ND	H	0.50	0.40	ug/L	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND	H	0.50	0.40	ug/L	2
1,1,1-Trichloroethane	71-55-6	8260B	ND	H	0.50	0.40	ug/L	2
1,1,2-Trichloroethane	79-00-5	8260B	ND	H	0.50	0.40	ug/L	2
Trichloroethene	79-01-6	8260B	ND	H	0.50	0.40	ug/L	2
Trichlorofluoromethane	75-69-4	8260B	ND	H	0.50	0.40	ug/L	2
Vinyl chloride	75-01-4	8260B	ND	H	0.50	0.40	ug/L	2
Xylenes (total)	1330-20-7	8260B	ND	H	1.0	0.40	ug/L	2
m+p - Xylenes	179601-23-1	8260B	ND	H	0.50	0.40	ug/L	2
o - Xylenes	95-47-6	8260B	ND	H	0.50	0.40	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130	H	94	70-130
Bromofluorobenzene		99	70-130	H	98	70-130
Toluene-d8		98	70-130	H	96	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 1944	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.68	BJ	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 1944	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		47	37-129
2-Fluorophenol		29	24-127
Nitrobenzene-d5		46	38-127
Phenol-d5		38	28-128
Terphenyl-d14		66	10-148
2,4,6-Tribromophenol		61	35-144

LOQ = Limit of Quantitation
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DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1744	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		54	40-140

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0610	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		54	40-140
2-Fluorobiphenyl (fractionation 1)		68	40-140
o - Terphenyl (aromatic)		58	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2122	STM		21206

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	140		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		83	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2122	STM		21207

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		80	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2122	STM		21208

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	110	J	180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-001
Description: CMR-WB13S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1035
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1421	TJW	06/26/2019 1259	20714
1	3005A	6020B	1	06/27/2019 1810	BNW	06/26/2019 1925	20830

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.0	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	6.2		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	85		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	0.16	J	0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	3.7	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	10		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	0.74	J	1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	10		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	3.3	J	5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	21	B	10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-002
Description: CMR-WB05S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1115
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1529	BWS		21545
2	5030B	8260B	1	07/07/2019 1540	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	19		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	2.9	J	10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-002
Description: CMR-WB05S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1115
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1529	BWS		21545
2	5030B	8260B	1	07/07/2019 1540	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	70-130	H	94	70-130
Bromofluorobenzene		100	70-130	H	105	70-130
Toluene-d8		99	70-130	H	98	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
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2	5030B	8260B	1	07/07/2019 1540	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	15	H	10	2.0	ug/L	2
Benzene	71-43-2	8260B	ND	H	0.50	0.40	ug/L	2
Bromochloromethane	74-97-5	8260B	ND	H	0.50	0.40	ug/L	2
Bromodichloromethane	75-27-4	8260B	ND	H	0.50	0.40	ug/L	2
Bromoform	75-25-2	8260B	ND	H	0.50	0.40	ug/L	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND	H	0.50	0.40	ug/L	2
2-Butanone (MEK)	78-93-3	8260B	3.1	HJ	10	2.0	ug/L	2
Carbon disulfide	75-15-0	8260B	ND	H	0.50	0.40	ug/L	2
Carbon tetrachloride	56-23-5	8260B	ND	H	0.50	0.40	ug/L	2
Chlorobenzene	108-90-7	8260B	ND	H	0.50	0.40	ug/L	2
Chloroethane	75-00-3	8260B	ND	H	0.50	0.40	ug/L	2
Chloroform	67-66-3	8260B	ND	H	0.50	0.40	ug/L	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND	H	0.50	0.40	ug/L	2
Cyclohexane	110-82-7	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND	H	0.50	0.40	ug/L	2
Dibromochloromethane	124-48-1	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichlorobenzene	95-50-1	8260B	ND	H	0.50	0.40	ug/L	2
1,3-Dichlorobenzene	541-73-1	8260B	ND	H	0.50	0.40	ug/L	2
1,4-Dichlorobenzene	106-46-7	8260B	ND	H	0.50	0.40	ug/L	2
Dichlorodifluoromethane	75-71-8	8260B	ND	H	0.50	0.40	ug/L	2
1,1-Dichloroethane	75-34-3	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichloroethane	107-06-2	8260B	ND	H	0.50	0.40	ug/L	2
1,1-Dichloroethene	75-35-4	8260B	ND	H	0.50	0.40	ug/L	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND	H	0.50	0.40	ug/L	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichloropropane	78-87-5	8260B	ND	H	0.50	0.40	ug/L	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND	H	0.50	0.40	ug/L	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND	H	0.50	0.11	ug/L	2
1,4-Dioxane	123-91-1	8260B	ND	H	20	13	ug/L	2
Ethylbenzene	100-41-4	8260B	ND	H	0.50	0.40	ug/L	2
2-Hexanone	591-78-6	8260B	ND	H	10	2.0	ug/L	2
Isopropylbenzene	98-82-8	8260B	ND	H	0.50	0.40	ug/L	2
Methyl acetate	79-20-9	8260B	ND	H	1.0	0.40	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND	H	0.50	0.40	ug/L	2
4-Methyl-2-pentanone	108-10-1	8260B	ND	H	10	2.0	ug/L	2
Methylcyclohexane	108-87-2	8260B	ND	H	5.0	0.40	ug/L	2
Methylene chloride	75-09-2	8260B	ND	H	0.50	0.40	ug/L	2
Naphthalene	91-20-3	8260B	ND	H	0.50	0.40	ug/L	2
Styrene	100-42-5	8260B	ND	H	0.50	0.41	ug/L	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND	H	0.50	0.40	ug/L	2
Tetrachloroethene	127-18-4	8260B	ND	H	0.50	0.40	ug/L	2
Toluene	108-88-3	8260B	ND	H	0.50	0.40	ug/L	2

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Laboratory ID: UF21103-002
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Matrix: Aqueous
Date Sampled: 06/20/2019 1115
Date Received: 06/21/2019

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2	5030B	8260B	1	07/07/2019 1540	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND	H	1.0	0.42	ug/L	2
1,2,3-Trichlorobenzene	87-61-6	8260B	ND	H	0.50	0.40	ug/L	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND	H	0.50	0.40	ug/L	2
1,1,1-Trichloroethane	71-55-6	8260B	ND	H	0.50	0.40	ug/L	2
1,1,2-Trichloroethane	79-00-5	8260B	ND	H	0.50	0.40	ug/L	2
Trichloroethene	79-01-6	8260B	ND	H	0.50	0.40	ug/L	2
Trichlorofluoromethane	75-69-4	8260B	ND	H	0.50	0.40	ug/L	2
Vinyl chloride	75-01-4	8260B	ND	H	0.50	0.40	ug/L	2
Xylenes (total)	1330-20-7	8260B	ND	H	1.0	0.40	ug/L	2
m+p - Xylenes	179601-23-1	8260B	ND	H	0.50	0.40	ug/L	2
o - Xylenes	95-47-6	8260B	ND	H	0.50	0.40	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	70-130	H	94	70-130
Bromofluorobenzene		100	70-130	H	105	70-130
Toluene-d8		99	70-130	H	98	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-002
Description: CMR-WB05S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1115
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 2009	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.89	BJ	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

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Date Received: 06/21/2019

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Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	0.041	J	0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		45	37-129
2-Fluorophenol		29	24-127
Nitrobenzene-d5		51	38-127
Phenol-d5		44	28-128
Terphenyl-d14		64	10-148
2,4,6-Tribromophenol		58	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-002
Description: CMR-WB05S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1115
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1814	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		60	40-140

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-002
Description: CMR-WB05S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1115
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0639	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		60	40-140
2-Fluorobiphenyl (fractionation 1)		69	40-140
o - Terphenyl (aromatic)		61	40-140

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-002
Description: CMR-WB05S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1115
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2150	STM		21206

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		86	70-130

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Montana VPH (aromatics)

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Laboratory ID: UF21103-002
Description: CMR-WB05S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1115
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2150	STM		21207

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		80	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF21103-002
Description: CMR-WB05S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1115
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2150	STM		21208

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		86	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-002
Description: CMR-WB05S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1115
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1423	TJW	06/26/2019 1259	20714
1	3005A	6020B	1	06/27/2019 1815	BNW	06/26/2019 1925	20830

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.3	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	1.6	J	2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	87		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	2.2		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	7.0		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	9.7		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	0.51	J	1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	10		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	4.4	J	5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	520	B	10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1737	BWS		21545
2	5030B	8260B	1	07/07/2019 1603	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	26		10	2.0	ug/L	1
Benzene	71-43-2	8260B	10		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	2.8	J	10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	2.5		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	98		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	22		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	6.7		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	5.4		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	2.1		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	1.0		0.50	0.40	ug/L	1

LOQ = Limit of Quantitation
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1737	BWS		21545
2	5030B	8260B	1	07/07/2019 1603	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	3.6		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	3.3		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		89	70-130	H	93	70-130
Bromofluorobenzene		97	70-130	H	102	70-130
Toluene-d8		98	70-130	H	97	70-130

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1737	BWS		21545
2	5030B	8260B	1	07/07/2019 1603	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	8.9	HJ	10	2.0	ug/L	2
Benzene	71-43-2	8260B	14	H	0.50	0.40	ug/L	2
Bromochloromethane	74-97-5	8260B	ND	H	0.50	0.40	ug/L	2
Bromodichloromethane	75-27-4	8260B	ND	H	0.50	0.40	ug/L	2
Bromoform	75-25-2	8260B	ND	H	0.50	0.40	ug/L	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND	H	0.50	0.40	ug/L	2
2-Butanone (MEK)	78-93-3	8260B	3.0	HJ	10	2.0	ug/L	2
Carbon disulfide	75-15-0	8260B	ND	H	0.50	0.40	ug/L	2
Carbon tetrachloride	56-23-5	8260B	ND	H	0.50	0.40	ug/L	2
Chlorobenzene	108-90-7	8260B	ND	H	0.50	0.40	ug/L	2
Chloroethane	75-00-3	8260B	ND	H	0.50	0.40	ug/L	2
Chloroform	67-66-3	8260B	ND	H	0.50	0.40	ug/L	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND	H	0.50	0.40	ug/L	2
Cyclohexane	110-82-7	8260B	3.1	H	0.50	0.40	ug/L	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND	H	0.50	0.40	ug/L	2
Dibromochloromethane	124-48-1	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichlorobenzene	95-50-1	8260B	ND	H	0.50	0.40	ug/L	2
1,3-Dichlorobenzene	541-73-1	8260B	ND	H	0.50	0.40	ug/L	2
1,4-Dichlorobenzene	106-46-7	8260B	ND	H	0.50	0.40	ug/L	2
Dichlorodifluoromethane	75-71-8	8260B	ND	H	0.50	0.40	ug/L	2
1,1-Dichloroethane	75-34-3	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichloroethane	107-06-2	8260B	ND	H	0.50	0.40	ug/L	2
1,1-Dichloroethene	75-35-4	8260B	ND	H	0.50	0.40	ug/L	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND	H	0.50	0.40	ug/L	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichloropropane	78-87-5	8260B	ND	H	0.50	0.40	ug/L	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND	H	0.50	0.40	ug/L	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND	H	0.50	0.11	ug/L	2
1,4-Dioxane	123-91-1	8260B	ND	H	20	13	ug/L	2
Ethylbenzene	100-41-4	8260B	100	H	0.50	0.40	ug/L	2
2-Hexanone	591-78-6	8260B	ND	H	10	2.0	ug/L	2
Isopropylbenzene	98-82-8	8260B	20	H	0.50	0.40	ug/L	2
Methyl acetate	79-20-9	8260B	ND	H	1.0	0.40	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	8.1	H	0.50	0.40	ug/L	2
4-Methyl-2-pentanone	108-10-1	8260B	ND	H	10	2.0	ug/L	2
Methylcyclohexane	108-87-2	8260B	4.8	HJ	5.0	0.40	ug/L	2
Methylene chloride	75-09-2	8260B	ND	H	0.50	0.40	ug/L	2
Naphthalene	91-20-3	8260B	2.3	H	0.50	0.40	ug/L	2
Styrene	100-42-5	8260B	ND	H	0.50	0.41	ug/L	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND	H	0.50	0.40	ug/L	2
Tetrachloroethene	127-18-4	8260B	ND	H	0.50	0.40	ug/L	2
Toluene	108-88-3	8260B	0.94	H	0.50	0.40	ug/L	2

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1737	BWS		21545
2	5030B	8260B	1	07/07/2019 1603	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND	H	1.0	0.42	ug/L	2
1,2,3-Trichlorobenzene	87-61-6	8260B	ND	H	0.50	0.40	ug/L	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND	H	0.50	0.40	ug/L	2
1,1,1-Trichloroethane	71-55-6	8260B	ND	H	0.50	0.40	ug/L	2
1,1,2-Trichloroethane	79-00-5	8260B	ND	H	0.50	0.40	ug/L	2
Trichloroethene	79-01-6	8260B	ND	H	0.50	0.40	ug/L	2
Trichlorofluoromethane	75-69-4	8260B	ND	H	0.50	0.40	ug/L	2
Vinyl chloride	75-01-4	8260B	ND	H	0.50	0.40	ug/L	2
Xylenes (total)	1330-20-7	8260B	3.3	H	1.0	0.40	ug/L	2
m+p - Xylenes	179601-23-1	8260B	3.3	H	0.50	0.40	ug/L	2
o - Xylenes	95-47-6	8260B	ND	H	0.50	0.40	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		89	70-130	H	93	70-130
Bromofluorobenzene		97	70-130	H	102	70-130
Toluene-d8		98	70-130	H	97	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	06/28/2019 2034	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.80	0.20	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.80	0.20	ug/L	1
Anthracene	120-12-7	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.80	0.20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.80	0.20	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		4.0	0.75	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		20	1.1	ug/L	1
Carbazole	86-74-8	8270D	ND		4.0	0.20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		4.0	0.85	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		4.0	1.3	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		4.0	0.30	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		4.0	0.80	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		4.0	0.75	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		4.0	0.75	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		4.0	0.80	ug/L	1
Chrysene	218-01-9	8270D	ND		0.80	0.20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.80	0.20	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		4.0	0.80	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4.0	0.85	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4.0	0.90	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4.0	0.80	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		20	4.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		4.0	0.95	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		20	0.95	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		20	0.90	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		4.0	0.75	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		20	2.1	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		20	4.5	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		20	6.6	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		8.0	1.8	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		8.0	1.7	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		20	2.4	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	2.6	BJ	20	1.9	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.80	0.20	ug/L	1
Fluorene	86-73-7	8270D	ND		0.80	0.20	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		4.0	0.75	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		4.0	0.85	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		20	5.5	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		4.0	0.85	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.80	0.20	ug/L	1
Isophorone	78-59-1	8270D	ND		4.0	1.1	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	06/28/2019 2034	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	1.5		0.80	0.20	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		4.0	1.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		8.0	2.3	ug/L	1
Naphthalene	91-20-3	8270D	2.0		0.80	0.20	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		8.0	3.3	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		8.0	0.75	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		8.0	6.6	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		4.0	0.85	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		8.0	2.2	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		20	10	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		4.0	1.4	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		4.0	2.5	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		20	6.7	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.80	0.20	ug/L	1
Phenol	108-95-2	8270D	ND		4.0	0.95	ug/L	1
Pyrene	129-00-0	8270D	ND		0.80	0.20	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		4.0	1.3	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4.0	2.8	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4.0	1.9	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		4.0	0.95	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		4.0	1.1	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		43	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		60	38-127
Phenol-d5		39	28-128
Terphenyl-d14		39	10-148
2,4,6-Tribromophenol		92	35-144

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1844	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	700		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	1500		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		54	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0709	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	310		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		53	40-140
2-Fluorobiphenyl (fractionation 1)		63	40-140
o - Terphenyl (aromatic)		59	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2256	STM		21206

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	180		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	770		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		111	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2256	STM		21207

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	12		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	920		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	110		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	5.6		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	33		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	1.1	J	5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	4.8	J	5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	10		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		108	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2256	STM		21208

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	2000		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		108	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-003
Description: CMR-WB104S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1245
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1431	TJW	06/26/2019 1259	20714
1	3005A	6020B	1	06/27/2019 1821	BNW	06/26/2019 1925	20830

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.6	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	36		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	650		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	0.55		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	16		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	6.3		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	6.1		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	12		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	330	B	10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-004
Description: TB-20-20190620
Matrix: Aqueous
Date Sampled: 06/20/2019
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1345	BWS		21545

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21103-004
Description: TB-20-20190620
Matrix: Aqueous
Date Sampled: 06/20/2019
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1345	BWS		21545

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		93	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21545-001
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/03/2019 1243
Benzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromoform	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/03/2019 1243
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chloroform	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Cyclohexane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/03/2019 1243
1,4-Dioxane	ND		1	20	13	ug/L	07/03/2019 1243
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
2-Hexanone	ND		1	10	2.0	ug/L	07/03/2019 1243
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Methyl acetate	ND		1	1.0	0.40	ug/L	07/03/2019 1243
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/03/2019 1243
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/03/2019 1243
Methylene chloride	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Naphthalene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Styrene	ND		1	0.50	0.41	ug/L	07/03/2019 1243
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Toluene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/03/2019 1243

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21545-001
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Trichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/03/2019 1243
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/03/2019 1243
o - Xylenes	ND		1	0.50	0.40	ug/L	07/03/2019 1243

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21545-002
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	170	N	1	167	60-140	07/03/2019 1141
Benzene	50	47		1	93	70-130	07/03/2019 1141
Bromochloromethane	50	43		1	86	70-130	07/03/2019 1141
Bromodichloromethane	50	46		1	92	70-130	07/03/2019 1141
Bromoform	50	52		1	104	70-130	07/03/2019 1141
Bromomethane (Methyl bromide)	50	46		1	92	70-130	07/03/2019 1141
2-Butanone (MEK)	100	130		1	127	70-130	07/03/2019 1141
Carbon disulfide	50	47		1	95	70-130	07/03/2019 1141
Carbon tetrachloride	50	43		1	86	70-130	07/03/2019 1141
Chlorobenzene	50	48		1	96	70-130	07/03/2019 1141
Chloroethane	50	48		1	95	70-130	07/03/2019 1141
Chloroform	50	42		1	84	70-130	07/03/2019 1141
Chloromethane (Methyl chloride)	50	42		1	84	60-140	07/03/2019 1141
Cyclohexane	50	39		1	78	70-130	07/03/2019 1141
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	94	70-130	07/03/2019 1141
Dibromochloromethane	50	49		1	98	70-130	07/03/2019 1141
1,2-Dibromoethane (EDB)	50	48		1	96	70-130	07/03/2019 1141
1,2-Dichlorobenzene	50	48		1	96	70-130	07/03/2019 1141
1,3-Dichlorobenzene	50	48		1	95	70-130	07/03/2019 1141
1,4-Dichlorobenzene	50	47		1	95	70-130	07/03/2019 1141
Dichlorodifluoromethane	50	44		1	89	60-140	07/03/2019 1141
1,1-Dichloroethane	50	44		1	88	70-130	07/03/2019 1141
1,2-Dichloroethane	50	45		1	89	70-130	07/03/2019 1141
1,1-Dichloroethene	50	44		1	88	70-130	07/03/2019 1141
cis-1,2-Dichloroethene	50	43		1	85	70-130	07/03/2019 1141
trans-1,2-Dichloroethene	50	43		1	87	70-130	07/03/2019 1141
1,2-Dichloropropane	50	46		1	92	70-130	07/03/2019 1141
cis-1,3-Dichloropropene	50	49		1	98	70-130	07/03/2019 1141
trans-1,3-Dichloropropene	50	48		1	96	70-130	07/03/2019 1141
1,4-Dioxane	500	410		1	81	60-140	07/03/2019 1141
Ethylbenzene	50	49		1	97	70-130	07/03/2019 1141
2-Hexanone	100	110		1	106	70-130	07/03/2019 1141
Isopropylbenzene	50	49		1	98	70-130	07/03/2019 1141
Methyl acetate	50	33	N	1	66	70-130	07/03/2019 1141
Methyl tertiary butyl ether (MTBE)	50	45		1	91	70-130	07/03/2019 1141
4-Methyl-2-pentanone	100	90		1	90	70-130	07/03/2019 1141
Methylcyclohexane	50	47		1	94	70-130	07/03/2019 1141
Methylene chloride	50	44		1	88	70-130	07/03/2019 1141
Naphthalene	50	47		1	94	70-130	07/03/2019 1141
Styrene	50	49		1	99	70-130	07/03/2019 1141
1,1,2,2-Tetrachloroethane	50	46		1	93	70-130	07/03/2019 1141
Tetrachloroethene	50	50		1	100	70-130	07/03/2019 1141
Toluene	50	46		1	92	70-130	07/03/2019 1141
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	97	70-130	07/03/2019 1141

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21545-002
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	48		1	96	70-130	07/03/2019 1141
1,2,4-Trichlorobenzene	50	49		1	98	70-130	07/03/2019 1141
1,1,1-Trichloroethane	50	43		1	87	70-130	07/03/2019 1141
1,1,2-Trichloroethane	50	46		1	93	70-130	07/03/2019 1141
Trichloroethene	50	47		1	94	70-130	07/03/2019 1141
Trichlorofluoromethane	50	44		1	89	70-130	07/03/2019 1141
Vinyl chloride	50	41		1	81	70-130	07/03/2019 1141
Xylenes (total)	100	95		1	95	70-130	07/03/2019 1141
m+p - Xylenes	50	47		1	95	70-130	07/03/2019 1141
o - Xylenes	50	48		1	96	70-130	07/03/2019 1141

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		89	70-130
Bromofluorobenzene		99	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21775-001
Batch: 21775
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/07/2019 1435
Benzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Bromoform	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/07/2019 1435
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/07/2019 1435
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Chloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Chloroform	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Cyclohexane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/07/2019 1435
1,4-Dioxane	ND		1	20	13	ug/L	07/07/2019 1435
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
2-Hexanone	ND		1	10	2.0	ug/L	07/07/2019 1435
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Methyl acetate	ND		1	1.0	0.40	ug/L	07/07/2019 1435
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/07/2019 1435
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/07/2019 1435
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/07/2019 1435
Methylene chloride	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Naphthalene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Styrene	ND		1	0.50	0.41	ug/L	07/07/2019 1435
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Toluene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/07/2019 1435

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21775-001
Batch: 21775
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	0.43	J	1	0.50	0.40	ug/L	07/07/2019 1435
1,2,4-Trichlorobenzene	0.44	J	1	0.50	0.40	ug/L	07/07/2019 1435
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Trichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/07/2019 1435
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/07/2019 1435
o - Xylenes	ND		1	0.50	0.40	ug/L	07/07/2019 1435

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		93	70-130
Bromofluorobenzene		99	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21775-002
Batch: 21775
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	120		1	115	60-140	07/07/2019 1254
Benzene	50	50		1	101	70-130	07/07/2019 1254
Bromochloromethane	50	50		1	100	70-130	07/07/2019 1254
Bromodichloromethane	50	50		1	100	70-130	07/07/2019 1254
Bromoform	50	52		1	104	70-130	07/07/2019 1254
Bromomethane (Methyl bromide)	50	47		1	95	70-130	07/07/2019 1254
2-Butanone (MEK)	100	110		1	107	70-130	07/07/2019 1254
Carbon disulfide	50	53		1	106	70-130	07/07/2019 1254
Carbon tetrachloride	50	52		1	104	70-130	07/07/2019 1254
Chlorobenzene	50	49		1	99	70-130	07/07/2019 1254
Chloroethane	50	52		1	104	70-130	07/07/2019 1254
Chloroform	50	49		1	98	70-130	07/07/2019 1254
Chloromethane (Methyl chloride)	50	43		1	86	60-140	07/07/2019 1254
Cyclohexane	50	48		1	96	70-130	07/07/2019 1254
1,2-Dibromo-3-chloropropane (DBCP)	50	50		1	99	70-130	07/07/2019 1254
Dibromochloromethane	50	53		1	106	70-130	07/07/2019 1254
1,2-Dibromoethane (EDB)	50	50		1	101	70-130	07/07/2019 1254
1,2-Dichlorobenzene	50	47		1	93	70-130	07/07/2019 1254
1,3-Dichlorobenzene	50	45		1	90	70-130	07/07/2019 1254
1,4-Dichlorobenzene	50	44		1	88	70-130	07/07/2019 1254
Dichlorodifluoromethane	50	41		1	82	60-140	07/07/2019 1254
1,1-Dichloroethane	50	51		1	101	70-130	07/07/2019 1254
1,2-Dichloroethane	50	48		1	96	70-130	07/07/2019 1254
1,1-Dichloroethene	50	57		1	115	70-130	07/07/2019 1254
cis-1,2-Dichloroethene	50	49		1	98	70-130	07/07/2019 1254
trans-1,2-Dichloroethene	50	53		1	105	70-130	07/07/2019 1254
1,2-Dichloropropane	50	47		1	94	70-130	07/07/2019 1254
cis-1,3-Dichloropropene	50	54		1	107	70-130	07/07/2019 1254
trans-1,3-Dichloropropene	50	53		1	106	70-130	07/07/2019 1254
1,4-Dioxane	500	530		1	107	60-140	07/07/2019 1254
Ethylbenzene	50	50		1	100	70-130	07/07/2019 1254
2-Hexanone	100	98		1	98	70-130	07/07/2019 1254
Isopropylbenzene	50	51		1	103	70-130	07/07/2019 1254
Methyl acetate	50	42		1	84	70-130	07/07/2019 1254
Methyl tertiary butyl ether (MTBE)	50	51		1	103	70-130	07/07/2019 1254
4-Methyl-2-pentanone	100	97		1	97	70-130	07/07/2019 1254
Methylcyclohexane	50	51		1	103	70-130	07/07/2019 1254
Methylene chloride	50	51		1	103	70-130	07/07/2019 1254
Naphthalene	50	48		1	97	70-130	07/07/2019 1254
Styrene	50	50		1	101	70-130	07/07/2019 1254
1,1,2,2-Tetrachloroethane	50	47		1	93	70-130	07/07/2019 1254
Tetrachloroethene	50	51		1	102	70-130	07/07/2019 1254
Toluene	50	51		1	102	70-130	07/07/2019 1254
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	99	70-130	07/07/2019 1254

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21775-002
Batch: 21775
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	48		1	96	70-130	07/07/2019 1254
1,2,4-Trichlorobenzene	50	48		1	95	70-130	07/07/2019 1254
1,1,1-Trichloroethane	50	48		1	97	70-130	07/07/2019 1254
1,1,2-Trichloroethane	50	50		1	101	70-130	07/07/2019 1254
Trichloroethene	50	50		1	100	70-130	07/07/2019 1254
Trichlorofluoromethane	50	52		1	103	70-130	07/07/2019 1254
Vinyl chloride	50	46		1	91	70-130	07/07/2019 1254
Xylenes (total)	100	100		1	100	70-130	07/07/2019 1254
m+p - Xylenes	50	50		1	100	70-130	07/07/2019 1254
o - Xylenes	50	50		1	100	70-130	07/07/2019 1254

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		94	70-130
Toluene-d8		94	70-130

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20650-001
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Acenaphthylene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	06/28/2019 1218
Carbazole	ND		1	0.80	0.040	ug/L	06/28/2019 1218
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	06/28/2019 1218
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	06/28/2019 1218
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	06/28/2019 1218
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	06/28/2019 1218
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	06/28/2019 1218
2-Chlorophenol	ND		1	0.80	0.15	ug/L	06/28/2019 1218
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	06/28/2019 1218
Chrysene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Dibenzofuran	ND		1	0.80	0.16	ug/L	06/28/2019 1218
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	06/28/2019 1218
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	06/28/2019 1218
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	06/28/2019 1218
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
Diethylphthalate	ND		1	4.0	0.19	ug/L	06/28/2019 1218
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	06/28/2019 1218
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	06/28/2019 1218
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	06/28/2019 1218
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	06/28/2019 1218
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	06/28/2019 1218
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	06/28/2019 1218
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	06/28/2019 1218
bis(2-Ethylhexyl)phthalate	0.68	J	1	4.0	0.38	ug/L	06/28/2019 1218
Fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Fluorene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	06/28/2019 1218
Hexachloroethane	ND		1	0.80	0.17	ug/L	06/28/2019 1218
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Isophorone	ND		1	0.80	0.22	ug/L	06/28/2019 1218

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20650-001
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
2-Methylphenol	ND		1	0.80	0.21	ug/L	06/28/2019 1218
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	06/28/2019 1218
Naphthalene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
2-Nitroaniline	ND		1	1.6	0.66	ug/L	06/28/2019 1218
3-Nitroaniline	ND		1	1.6	0.15	ug/L	06/28/2019 1218
4-Nitroaniline	ND		1	1.6	1.3	ug/L	06/28/2019 1218
Nitrobenzene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
2-Nitrophenol	ND		1	1.6	0.44	ug/L	06/28/2019 1218
4-Nitrophenol	ND		1	4.0	2.1	ug/L	06/28/2019 1218
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	06/28/2019 1218
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	06/28/2019 1218
Pentachlorophenol	ND		1	4.0	1.3	ug/L	06/28/2019 1218
Phenanthrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Phenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
Pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	06/28/2019 1218
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	06/28/2019 1218
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	06/28/2019 1218
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	06/28/2019 1218

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		38	37-129
2-Fluorophenol		30	24-127
Nitrobenzene-d5		39	38-127
Phenol-d5		33	28-128
Terphenyl-d14		63	10-148
2,4,6-Tribromophenol		43	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20650-002
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.7		1	58	30-122	06/28/2019 1243
Acenaphthylene	8.0	5.2		1	65	30-130	06/28/2019 1243
Anthracene	8.0	5.4		1	67	30-123	06/28/2019 1243
Benzo(a)anthracene	8.0	5.9		1	74	40-125	06/28/2019 1243
Benzo(a)pyrene	8.0	5.5		1	69	40-128	06/28/2019 1243
Benzo(b)fluoranthene	8.0	5.4		1	67	30-130	06/28/2019 1243
Benzo(g,h,i)perylene	8.0	6.5		1	81	30-130	06/28/2019 1243
Benzo(k)fluoranthene	8.0	5.8		1	73	30-130	06/28/2019 1243
4-Bromophenyl phenyl ether	8.0	5.2		1	65	30-124	06/28/2019 1243
Butyl benzyl phthalate	8.0	6.4		1	80	54-135	06/28/2019 1243
Carbazole	8.0	5.5		1	68	45-101	06/28/2019 1243
bis (2-Chloro-1-methylethyl) ether	8.0	5.9		1	73	42-124	06/28/2019 1243
4-Chloro-3-methyl phenol	8.0	5.2		1	66	30-123	06/28/2019 1243
bis(2-Chloroethoxy)methane	8.0	5.0		1	63	44-127	06/28/2019 1243
bis(2-Chloroethyl)ether	8.0	5.5		1	69	46-120	06/28/2019 1243
2-Chloronaphthalene	8.0	4.6		1	57	46-100	06/28/2019 1243
2-Chlorophenol	8.0	4.6		1	57	50-117	06/28/2019 1243
4-Chlorophenyl phenyl ether	8.0	5.1		1	63	30-121	06/28/2019 1243
Chrysene	8.0	5.7		1	71	30-130	06/28/2019 1243
Dibenzo(a,h)anthracene	8.0	6.2		1	78	30-130	06/28/2019 1243
Dibenzofuran	8.0	5.0		1	63	30-118	06/28/2019 1243
1,2-Dichlorobenzene	8.0	4.2		1	53	32-111	06/28/2019 1243
1,3-Dichlorobenzene	8.0	4.0		1	50	28-110	06/28/2019 1243
1,4-Dichlorobenzene	8.0	4.0		1	51	29-112	06/28/2019 1243
3,3'-Dichlorobenzidine	8.0	4.4		1	55	10-126	06/28/2019 1243
2,4-Dichlorophenol	8.0	4.6		1	58	30-121	06/28/2019 1243
Diethylphthalate	8.0	5.3		1	67	40-125	06/28/2019 1243
Dimethyl phthalate	8.0	5.2		1	65	40-127	06/28/2019 1243
2,4-Dimethylphenol	8.0	5.9		1	74	20-125	06/28/2019 1243
Di-n-butyl phthalate	8.0	5.8		1	73	40-127	06/28/2019 1243
4,6-Dinitro-2-methylphenol	8.0	5.0		1	63	56-128	06/28/2019 1243
2,4-Dinitrophenol	16	6.7		1	42	11-126	06/28/2019 1243
2,4-Dinitrotoluene	8.0	5.6		1	70	59-127	06/28/2019 1243
2,6-Dinitrotoluene	8.0	5.4		1	67	59-126	06/28/2019 1243
Di-n-octylphthalate	8.0	5.3		1	66	50-136	06/28/2019 1243
bis(2-Ethylhexyl)phthalate	8.0	6.3		1	79	56-128	06/28/2019 1243
Fluoranthene	8.0	5.7		1	72	40-128	06/28/2019 1243
Fluorene	8.0	5.0		1	62	30-124	06/28/2019 1243
Hexachlorobenzene	8.0	5.2		1	65	30-125	06/28/2019 1243
Hexachlorobutadiene	8.0	3.8		1	48	24-110	06/28/2019 1243
Hexachlorocyclopentadiene	40	16		1	39	16-96	06/28/2019 1243
Hexachloroethane	8.0	3.8		1	47	31-110	06/28/2019 1243
Indeno(1,2,3-c,d)pyrene	8.0	6.3		1	79	30-130	06/28/2019 1243
Isophorone	8.0	5.4		1	67	57-123	06/28/2019 1243

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20650-002
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.6		1	58	40-132	06/28/2019 1243
2-Methylphenol	8.0	7.1		1	89	56-119	06/28/2019 1243
3+4-Methylphenol	8.0	5.3		1	66	53-119	06/28/2019 1243
Naphthalene	8.0	4.8		1	60	30-130	06/28/2019 1243
2-Nitroaniline	8.0	5.3		1	67	60-124	06/28/2019 1243
3-Nitroaniline	8.0	4.1		1	51	43-123	06/28/2019 1243
4-Nitroaniline	8.0	5.2		1	65	30-135	06/28/2019 1243
Nitrobenzene	8.0	5.1		1	64	51-122	06/28/2019 1243
2-Nitrophenol	8.0	4.8		1	60	51-118	06/28/2019 1243
4-Nitrophenol	16	9.3		1	58	53-130	06/28/2019 1243
N-Nitrosodi-n-propylamine	8.0	5.7		1	71	54-127	06/28/2019 1243
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.4		1	68	30-123	06/28/2019 1243
Pentachlorophenol	16	9.4		1	59	42-131	06/28/2019 1243
Phenanthrene	8.0	5.2		1	65	40-123	06/28/2019 1243
Phenol	8.0	5.0		1	63	49-117	06/28/2019 1243
Pyrene	8.0	6.2		1	77	40-126	06/28/2019 1243
1,2,4,5-Tetrachlorobenzene	8.0	3.8		1	48	30-130	06/28/2019 1243
2,3,4,6-Tetrachlorophenol	8.0	5.1		1	64	30-130	06/28/2019 1243
1,2,4-Trichlorobenzene	8.0	4.1		1	51	20-90	06/28/2019 1243
2,4,5-Trichlorophenol	8.0	5.0		1	62	30-123	06/28/2019 1243
2,4,6-Trichlorophenol	8.0	4.9		1	62	30-125	06/28/2019 1243

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		60	37-129
2-Fluorophenol		48	24-127
Nitrobenzene-d5		64	38-127
Phenol-d5		62	28-128
Terphenyl-d14		86	10-148
2,4,6-Tribromophenol		71	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20744-001
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012
C9 - C18 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
+ = RPD is out of criteria

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20744-002
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	260		1	65	40-140	07/08/2019 1042
C9 - C18 Aliphatics	300	140		1	48	40-140	07/08/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		57	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20744-003
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	280		1	69	5.9	40-140	25	07/08/2019 1112
C9 - C18 Aliphatics	300	150		1	51	6.4	40-140	25	07/08/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20745-001
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	07/08/2019 2143

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		45	40-140
2-Fluorobiphenyl (fractionation 1)		60	40-140
o - Terphenyl (aromatic)		52	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20745-002
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	460		1	54	40-140	07/08/2019 2213

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		48	40-140
2-Fluorobiphenyl (fractionation 1)		65	40-140
o - Terphenyl (aromatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20745-003
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	410		1	49	10	40-140	25	07/08/2019 2243

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		61	40-140
2-Fluorobiphenyl (fractionation 1)		62	40-140
o - Terphenyl (aromatic)		54	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21206-001
Batch: 21206
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/29/2019 1830
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/29/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21206-002
Batch: 21206
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	97		1	97	70-130	06/29/2019 1716
C9 - C12 Aliphatics, Adjusted	75	66		1	89	70-130	06/29/2019 1716

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21206-003
Batch: 21206
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	105	7.8	70-130	25	06/29/2019 1745
C9 - C12 Aliphatics, Adjusted	75	73		1	98	10	70-130	25	06/29/2019 1745

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21207-001
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/29/2019 1830
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	06/29/2019 1830
Ethylbenzene	ND		1	5.0	0.62	ug/L	06/29/2019 1830
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/29/2019 1830
Naphthalene	ND		1	5.0	0.70	ug/L	06/29/2019 1830
Toluene	ND		1	5.0	0.53	ug/L	06/29/2019 1830
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/29/2019 1830
o - Xylenes	ND		1	5.0	0.58	ug/L	06/29/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		78	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21207-002
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	22		1	86	70-130	06/29/2019 1716
C9 - C10 Aromatics	25	23		1	92	70-130	06/29/2019 1716
Ethylbenzene	25	22		1	87	70-130	06/29/2019 1716
Methyl tertiary butyl ether (MTBE)	25	22		1	87	70-130	06/29/2019 1716
Naphthalene	25	20		1	82	70-130	06/29/2019 1716
Toluene	25	22		1	86	70-130	06/29/2019 1716
m+p - Xylenes	50	44		1	88	70-130	06/29/2019 1716
o - Xylenes	25	22		1	89	70-130	06/29/2019 1716

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21207-003
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	26		1	102	17	70-130	25	06/29/2019 1745
C9 - C10 Aromatics	25	25		1	99	7.5	70-130	25	06/29/2019 1745
Ethylbenzene	25	25		1	100	15	70-130	25	06/29/2019 1745
Methyl tertiary butyl ether (MTBE)	25	25		1	101	15	70-130	25	06/29/2019 1745
Naphthalene	25	23		1	93	13	70-130	25	06/29/2019 1745
Toluene	25	26		1	102	17	70-130	25	06/29/2019 1745
m+p - Xylenes	50	51		1	102	14	70-130	25	06/29/2019 1745
o - Xylenes	25	25		1	98	9.4	70-130	25	06/29/2019 1745

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21208-001
Batch: 21208
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	06/29/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21208-002
Batch: 21208
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	350		1	92	70-130	06/29/2019 1716

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21208-003
Batch: 21208
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	390		1	104	12	70-130	25	06/29/2019 1745

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20830-001
Batch: 20830
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/26/2019 1925

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	06/27/2019 1716
Arsenic	ND		1	2.0	1.3	ug/L	06/27/2019 1716
Barium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Beryllium	ND		1	0.40	0.15	ug/L	06/27/2019 1716
Cadmium	ND		1	0.50	0.13	ug/L	06/27/2019 1716
Chromium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Cobalt	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Copper	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Lead	ND		1	1.0	0.25	ug/L	06/27/2019 1716
Nickel	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Selenium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Silver	ND		1	1.0	0.25	ug/L	06/27/2019 1716
Vanadium	ND		1	5.0	2.5	ug/L	06/27/2019 1716
Zinc	2.8	J	1	10	2.5	ug/L	06/27/2019 1716

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20830-002
Batch: 20830
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/26/2019 1925

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	100		1	100	80-120	06/27/2019 1722
Arsenic	100	110		1	106	80-120	06/27/2019 1722
Barium	100	100		1	101	80-120	06/27/2019 1722
Beryllium	100	110		1	109	80-120	06/27/2019 1722
Cadmium	100	99		1	99	80-120	06/27/2019 1722
Chromium	100	100		1	102	80-120	06/27/2019 1722
Cobalt	100	100		1	105	80-120	06/27/2019 1722
Copper	100	100		1	104	80-120	06/27/2019 1722
Lead	100	110		1	105	80-120	06/27/2019 1722
Nickel	100	100		1	101	80-120	06/27/2019 1722
Selenium	100	97		1	97	80-120	06/27/2019 1722
Silver	100	110		1	105	80-120	06/27/2019 1722
Vanadium	100	100		1	104	80-120	06/27/2019 1722
Zinc	100	94		1	94	80-120	06/27/2019 1722

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20714-001
Batch: 20714
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/27/2019 1355

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20714-002
Batch: 20714
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	94	80-120	06/27/2019 1358

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UF21103-002MS
Batch: 20714
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	ND	0.0020	0.0020		1	99	85-115	06/27/2019 1426

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF21103-002MD
Batch: 20714
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Mercury	ND	0.0020	0.0020		1	102	3.1	85-115	20	06/27/2019 1428

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody

and

Miscellaneous Documents

Shealy Environmental Services, Inc.
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SHEALY

Chain of Custody Record

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

Number 92778

Client: RAMBOLL US CORP.
Address: 15000 COLLEGE BLVD. #1905
City: OVERLAND PARK | State: KS | Zip Code: 66210
Project Name: CMR - RAIL - WEST RAIL
Project No.: 1690012344-002
P.O. No.:
Report to Contact: MICHAEL WILSON / DAN RILEY
Sampler's Signature: x
Printed Name: ANDREW HARDWICK, BROOKS BAILEY, LIZ BARKLEY
Telephone No. / E-mail: MWILSON@RAMBOLL.COM, DRILEY@RAMBOLL.COM
Quote No.:
Analysis (Attach list if more space is needed)
Page 1 of 1

UF21103

KM N2

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Grab/Composite	Matrix: Aqueous	Soil	Other (Specify)	No of Containers by Preservative Type: Unpres	H2SO4	HNO3	HCl	NaOH	Other	VOC	SVOC	EDB	Metals	VPH	Remarks / Cooler I.D.
CMR-WB13S-190620	6/20/19	1035	G	X			2		1	7			X	X	X	X	X	COOLER 2
CMR-WB05S-190620		1115	G	X			2		1	7			X	X	X	X	X	COOLER 2
CMR-WB04S-190620		1245	G	X			2		1	7			X	X	X	X	X	COOLER 2
TB-20	—	—	N/A	X						2			X					COOLER 2 / TRIP BLANK
~~CMR-WB06S-190620~~ BF	6.20.19	1545	G	X			2		1	7			X	X	X	X	X	

MS 6/20/19

Turn Around Time Required (Prior lab approval required for expedited TAT.): X Standard | Rush (Specify)

Sample Disposal: Return to Client | X Disposal by Lab

Possible Hazard Identification: Non-Hazard | Flammable | Skin Irritant | Poison | X Unknown

QC Requirements (Specify)

	Date	Time
1. Relinquished by	6.20.19	17:40
2. Relinquished by		
3. Relinquished by		
4. Relinquished by: Fed EX	6-21-19	1020

	Date	Time
1. Received by		
2. Received by		
3. Received by		
4. Laboratory received by: L Hite	6-21-19	1020

LAB USE ONLY
Received on ice (Circle): (Yes) No Ice Pack
Receipt Temp. 2.5 °C

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 09-01-2014

SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.
Document Number: MED018C-14

Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL US CORP. Cooler Inspected by/date: LKH / 06-21-2019 Lot #: UF21103

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☐ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: LKH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

2.5 / 2.5 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA .
Time of preservation NA . If more than one preservative is needed, please note in the comments below.

Sample(s) TB(2) were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA .

SR barcode labels applied by: LKH Date: 06-21-2019

Comments:

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF22026, 2 Groundwater Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF22026 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB11S-190621	UF22026-001
CMR-WB10-190621	UF22026-002
TB-20-20190621	UF22026-003

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of methyl acetate. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methyl acetate results have been validated as estimated.

Blank Detections
During analysis, acetone and bis(2-ethylhexyl)phthalate were detected in method and trip blank samples (respectively). This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All acetone and bis(2-ethylhexyl)phthalate results below the RL or below 5x the blank result have been validated as non-detect (U).

Sample Receipt Issues
The lab reported in the narrative that some samples arrived at the lab with pH values out of criteria. The lab adjusted the pH upon receipt and continued analysis as normal. No additional validation was warranted.

Hold Time
All samples were analyzed by the lab within their hold time requirements. However, due to QC issues during the initial analysis some samples were reanalyzed outside of hold time. While these out of hold time results are generally usable, the results within hold time should be used preferentially.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF22026

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 2 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Zinc detected below the RL in aqueous method blank sample. Project sample detections of zinc well above blank result. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UF22026

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 2 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	Several VOC samples rerun out of hold time due to LCS issues. Results within hold time should be used preferentially. One SVOC sample received with pH greater than 2. pH adjusted at the lab, no action taken.	No issues
Blanks	SVOC bis(2-ethylhexyl)phthalate detected in method blank. All project sample detections validated as non-detect (U). Acetone detected in trip blank. All acetone results validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	No issues	Surrogates out due to matrix interference. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out of criteria high for acetone and low for methyl acetate. All aqueous methyl acetate results validated as estimated (J, UJ) and all detected results for acetone validated as estimated (J).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/a
Other Non-conformances	No other non-conformances noted.	CCV out of criteria for some compounds due to matrix interference. No action taken.
Overall Assessment of Data	All aqueous methyl acetate results validated as estimated (J, UJ) and all detected results for acetone validated as estimated (J). All acetone and bis(2-ethylhexyl)phthalate results validated as non-detect (U).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM - West Rail

Project Number: 1690012344-003

Lot Number:**UF22026**

Date Completed:07/11/2019

07/12/2019 10:40 AM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF22026

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21545 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. Samples -001, and -002 were re-analyzed outside of the holding time for confirmation. Both sets of data are reported. The LCS associated with batch 21545 had methyl acetate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Semivolatiles
The method blank associated with batch 20650 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for bis(2-ethylhexyl)phthalate have been flagged with a “B” qualifier. Samples -001 and -002 were diluted 5X due to the sample matrix. The reporting limits have been raised accordingly.

Montana VPH
Samples -001 and -002 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene and MTBE, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

The closing continuing calibration verification (CCV) associated with samples -001, -002, and -003 was recovered outside of the acceptance limits due to objective evidence of matrix interference.

The closing continuing calibration verification (CCV) associated with samples -001 and -002 had compounds recovered outside of the acceptance limits due to objective evidence of matrix interference.

Samples -001 and -002 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals

The method blank associated with batch 20830 had zinc detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for zinc have been flagged with a "B" qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF22026

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB11S-190621	Aqueous	06/21/2019 1200	06/22/2019
002	CMR-WB10-190621	Aqueous	06/21/2019 1145	06/22/2019
003	TB-20-20190621	Aqueous	06/21/2019	06/22/2019

(3 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF22026

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB11S-190621	Aqueous	Benzene	8260B	39		ug/L	7
001	CMR-WB11S-190621	Aqueous	2-Butanone (MEK)	8260B	20		ug/L	7
001	CMR-WB11S-190621	Aqueous	Cyclohexane	8260B	26		ug/L	7
001	CMR-WB11S-190621	Aqueous	Ethylbenzene	8260B	190		ug/L	7
001	CMR-WB11S-190621	Aqueous	Isopropylbenzene	8260B	25		ug/L	7
001	CMR-WB11S-190621	Aqueous	Methylcyclohexane	8260B	28		ug/L	7
001	CMR-WB11S-190621	Aqueous	Naphthalene	8260B	2.0		ug/L	7
001	CMR-WB11S-190621	Aqueous	Toluene	8260B	1.1		ug/L	7
001	CMR-WB11S-190621	Aqueous	Xylenes (total)	8260B	14		ug/L	8
001	CMR-WB11S-190621	Aqueous	m+p - Xylenes	8260B	14		ug/L	8
001	CMR-WB11S-190621	Aqueous	Acetone	8260B	9.7	HJ	ug/L	9
001	CMR-WB11S-190621	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	2.7	BJ	ug/L	11
001	CMR-WB11S-190621	Aqueous	2-Methylnaphthalene	8270D	0.87		ug/L	12
001	CMR-WB11S-190621	Aqueous	3+4-Methylphenol	8270D	4.0	J	ug/L	12
001	CMR-WB11S-190621	Aqueous	Naphthalene	8270D	1.5		ug/L	12
001	CMR-WB11S-190621	Aqueous	C19 - C36 Aliphatics	Montana EPH	410		ug/L	13
001	CMR-WB11S-190621	Aqueous	C9 - C18 Aliphatics	Montana EPH	990		ug/L	13
001	CMR-WB11S-190621	Aqueous	C11 - C22 Aromatics	Montana EPH	230		ug/L	14
001	CMR-WB11S-190621	Aqueous	C5 - C8 Aliphatics,	Montana VPH	280	J	ug/L	15
001	CMR-WB11S-190621	Aqueous	C9 - C12 Aliphatics,	Montana VPH	1500		ug/L	15
001	CMR-WB11S-190621	Aqueous	Benzene	Montana VPH	38		ug/L	16
001	CMR-WB11S-190621	Aqueous	C9 - C10 Aromatics	Montana VPH	1100		ug/L	16
001	CMR-WB11S-190621	Aqueous	Ethylbenzene	Montana VPH	170		ug/L	16
001	CMR-WB11S-190621	Aqueous	Naphthalene	Montana VPH	83		ug/L	16
001	CMR-WB11S-190621	Aqueous	Toluene	Montana VPH	2.1	J	ug/L	16
001	CMR-WB11S-190621	Aqueous	m+p - Xylenes	Montana VPH	24		ug/L	16
001	CMR-WB11S-190621	Aqueous	o - Xylenes	Montana VPH	86		ug/L	16
001	CMR-WB11S-190621	Aqueous	TPH	Montana VPH	3100		ug/L	17
001	CMR-WB11S-190621	Aqueous	Antimony	6020B	0.50	J	ug/L	18
001	CMR-WB11S-190621	Aqueous	Arsenic	6020B	150		ug/L	18
001	CMR-WB11S-190621	Aqueous	Barium	6020B	1700		ug/L	18
001	CMR-WB11S-190621	Aqueous	Beryllium	6020B	0.20	J	ug/L	18
001	CMR-WB11S-190621	Aqueous	Chromium	6020B	2.3	J	ug/L	18
001	CMR-WB11S-190621	Aqueous	Cobalt	6020B	3.0	J	ug/L	18
001	CMR-WB11S-190621	Aqueous	Copper	6020B	3.3	J	ug/L	18
001	CMR-WB11S-190621	Aqueous	Lead	6020B	2.2		ug/L	18
001	CMR-WB11S-190621	Aqueous	Nickel	6020B	8.2		ug/L	18
001	CMR-WB11S-190621	Aqueous	Vanadium	6020B	6.8		ug/L	18
001	CMR-WB11S-190621	Aqueous	Zinc	6020B	21	B	ug/L	18
002	CMR-WB10-190621	Aqueous	Benzene	8260B	67		ug/L	19
002	CMR-WB10-190621	Aqueous	2-Butanone (MEK)	8260B	14		ug/L	19
002	CMR-WB10-190621	Aqueous	Cyclohexane	8260B	8.6		ug/L	19
002	CMR-WB10-190621	Aqueous	Ethylbenzene	8260B	82		ug/L	19
002	CMR-WB10-190621	Aqueous	Isopropylbenzene	8260B	18		ug/L	19
002	CMR-WB10-190621	Aqueous	Methyl acetate	8260B	0.50	J	ug/L	19

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-WB10-190621	Aqueous	Methylcyclohexane	8260B	14		ug/L	19
002	CMR-WB10-190621	Aqueous	Naphthalene	8260B	3.4		ug/L	19
002	CMR-WB10-190621	Aqueous	Xylenes (total)	8260B	42		ug/L	20
002	CMR-WB10-190621	Aqueous	m+p - Xylenes	8260B	41		ug/L	20
002	CMR-WB10-190621	Aqueous	o - Xylenes	8260B	1.5		ug/L	20
002	CMR-WB10-190621	Aqueous	Acetone	8260B	18	H	ug/L	21
002	CMR-WB10-190621	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	3.3	BJ	ug/L	23
002	CMR-WB10-190621	Aqueous	2-Methylnaphthalene	8270D	1.2		ug/L	24
002	CMR-WB10-190621	Aqueous	3+4-Methylphenol	8270D	6.3	J	ug/L	24
002	CMR-WB10-190621	Aqueous	Naphthalene	8270D	2.0		ug/L	24
002	CMR-WB10-190621	Aqueous	Phenol	8270D	2.0	J	ug/L	24
002	CMR-WB10-190621	Aqueous	C19 - C36 Aliphatics	Montana EPH	2700		ug/L	25
002	CMR-WB10-190621	Aqueous	C9 - C18 Aliphatics	Montana EPH	5800		ug/L	25
002	CMR-WB10-190621	Aqueous	C11 - C22 Aromatics	Montana EPH	820		ug/L	26
002	CMR-WB10-190621	Aqueous	C5 - C8 Aliphatics,	Montana VPH	230		ug/L	27
002	CMR-WB10-190621	Aqueous	C9 - C12 Aliphatics,	Montana VPH	860		ug/L	27
002	CMR-WB10-190621	Aqueous	Benzene	Montana VPH	67		ug/L	28
002	CMR-WB10-190621	Aqueous	C9 - C10 Aromatics	Montana VPH	960		ug/L	28
002	CMR-WB10-190621	Aqueous	Ethylbenzene	Montana VPH	88		ug/L	28
002	CMR-WB10-190621	Aqueous	Naphthalene	Montana VPH	26		ug/L	28
002	CMR-WB10-190621	Aqueous	m+p - Xylenes	Montana VPH	42		ug/L	28
002	CMR-WB10-190621	Aqueous	o - Xylenes	Montana VPH	3.6	J	ug/L	28
002	CMR-WB10-190621	Aqueous	TPH	Montana VPH	2400		ug/L	29
002	CMR-WB10-190621	Aqueous	Antimony	6020B	1.2	J	ug/L	30
002	CMR-WB10-190621	Aqueous	Arsenic	6020B	390		ug/L	30
002	CMR-WB10-190621	Aqueous	Barium	6020B	2100		ug/L	30
002	CMR-WB10-190621	Aqueous	Cobalt	6020B	3.1	J	ug/L	30
002	CMR-WB10-190621	Aqueous	Copper	6020B	1.6	J	ug/L	30
002	CMR-WB10-190621	Aqueous	Lead	6020B	0.48	J	ug/L	30
002	CMR-WB10-190621	Aqueous	Nickel	6020B	5.3		ug/L	30
002	CMR-WB10-190621	Aqueous	Zinc	6020B	45	B	ug/L	30
003	TB-20-20190621	Aqueous	Acetone	8260B	3.5	J	ug/L	31

(77 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1803	BWS		21545
2	5030B	8260B	1	07/07/2019 1626	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	11		10	2.0	ug/L	1
Benzene	71-43-2	8260B	39		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	20		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	26		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	190		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	25		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	28		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	2.0		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	1.1		0.50	0.40	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1803	BWS		21545
2	5030B	8260B	1	07/07/2019 1626	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	14		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	14		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		87	70-130	H	93	70-130
Bromofluorobenzene		96	70-130	H	105	70-130
Toluene-d8		96	70-130	H	100	70-130

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1803	BWS		21545
2	5030B	8260B	1	07/07/2019 1626	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	9.7	HJ	10	2.0	ug/L	2
Benzene	71-43-2	8260B	41	H	0.50	0.40	ug/L	2
Bromochloromethane	74-97-5	8260B	ND	H	0.50	0.40	ug/L	2
Bromodichloromethane	75-27-4	8260B	ND	H	0.50	0.40	ug/L	2
Bromoform	75-25-2	8260B	ND	H	0.50	0.40	ug/L	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND	H	0.50	0.40	ug/L	2
2-Butanone (MEK)	78-93-3	8260B	17	H	10	2.0	ug/L	2
Carbon disulfide	75-15-0	8260B	ND	H	0.50	0.40	ug/L	2
Carbon tetrachloride	56-23-5	8260B	ND	H	0.50	0.40	ug/L	2
Chlorobenzene	108-90-7	8260B	ND	H	0.50	0.40	ug/L	2
Chloroethane	75-00-3	8260B	ND	H	0.50	0.40	ug/L	2
Chloroform	67-66-3	8260B	ND	H	0.50	0.40	ug/L	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND	H	0.50	0.40	ug/L	2
Cyclohexane	110-82-7	8260B	33	H	0.50	0.40	ug/L	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND	H	0.50	0.40	ug/L	2
Dibromochloromethane	124-48-1	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichlorobenzene	95-50-1	8260B	ND	H	0.50	0.40	ug/L	2
1,3-Dichlorobenzene	541-73-1	8260B	ND	H	0.50	0.40	ug/L	2
1,4-Dichlorobenzene	106-46-7	8260B	ND	H	0.50	0.40	ug/L	2
Dichlorodifluoromethane	75-71-8	8260B	ND	H	0.50	0.40	ug/L	2
1,1-Dichloroethane	75-34-3	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichloroethane	107-06-2	8260B	ND	H	0.50	0.40	ug/L	2
1,1-Dichloroethene	75-35-4	8260B	ND	H	0.50	0.40	ug/L	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND	H	0.50	0.40	ug/L	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichloropropane	78-87-5	8260B	ND	H	0.50	0.40	ug/L	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND	H	0.50	0.40	ug/L	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND	H	0.50	0.11	ug/L	2
1,4-Dioxane	123-91-1	8260B	ND	H	20	13	ug/L	2
Ethylbenzene	100-41-4	8260B	180	H	0.50	0.40	ug/L	2
2-Hexanone	591-78-6	8260B	ND	H	10	2.0	ug/L	2
Isopropylbenzene	98-82-8	8260B	25	H	0.50	0.40	ug/L	2
Methyl acetate	79-20-9	8260B	ND	H	1.0	0.40	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND	H	0.50	0.40	ug/L	2
4-Methyl-2-pentanone	108-10-1	8260B	ND	H	10	2.0	ug/L	2
Methylcyclohexane	108-87-2	8260B	30	H	5.0	0.40	ug/L	2
Methylene chloride	75-09-2	8260B	ND	H	0.50	0.40	ug/L	2
Naphthalene	91-20-3	8260B	2.2	H	0.50	0.40	ug/L	2
Styrene	100-42-5	8260B	ND	H	0.50	0.41	ug/L	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND	H	0.50	0.40	ug/L	2
Tetrachloroethene	127-18-4	8260B	ND	H	0.50	0.40	ug/L	2
Toluene	108-88-3	8260B	1.1	H	0.50	0.40	ug/L	2

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1803	BWS		21545
2	5030B	8260B	1	07/07/2019 1626	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND	H	1.0	0.42	ug/L	2
1,2,3-Trichlorobenzene	87-61-6	8260B	ND	H	0.50	0.40	ug/L	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND	H	0.50	0.40	ug/L	2
1,1,1-Trichloroethane	71-55-6	8260B	ND	H	0.50	0.40	ug/L	2
1,1,2-Trichloroethane	79-00-5	8260B	ND	H	0.50	0.40	ug/L	2
Trichloroethene	79-01-6	8260B	ND	H	0.50	0.40	ug/L	2
Trichlorofluoromethane	75-69-4	8260B	ND	H	0.50	0.40	ug/L	2
Vinyl chloride	75-01-4	8260B	ND	H	0.50	0.40	ug/L	2
Xylenes (total)	1330-20-7	8260B	14	H	1.0	0.40	ug/L	2
m+p - Xylenes	179601-23-1	8260B	14	H	0.50	0.40	ug/L	2
o - Xylenes	95-47-6	8260B	ND	H	0.50	0.40	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		87	70-130	H	93	70-130
Bromofluorobenzene		96	70-130	H	105	70-130
Toluene-d8		96	70-130	H	100	70-130

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	06/28/2019 2148	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.80	0.20	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.80	0.20	ug/L	1
Anthracene	120-12-7	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.80	0.20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.80	0.20	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		4.0	0.75	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		20	1.1	ug/L	1
Carbazole	86-74-8	8270D	ND		4.0	0.20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		4.0	0.85	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		4.0	1.3	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		4.0	0.30	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		4.0	0.80	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		4.0	0.75	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		4.0	0.75	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		4.0	0.80	ug/L	1
Chrysene	218-01-9	8270D	ND		0.80	0.20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.80	0.20	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		4.0	0.80	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4.0	0.85	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4.0	0.90	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4.0	0.80	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		20	4.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		4.0	0.95	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		20	0.95	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		20	0.90	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		4.0	0.75	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		20	2.1	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		20	4.5	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		20	6.6	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		8.0	1.8	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		8.0	1.7	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		20	2.4	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	2.7	BJ	20	1.9	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.80	0.20	ug/L	1
Fluorene	86-73-7	8270D	ND		0.80	0.20	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		4.0	0.75	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		4.0	0.85	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		20	5.5	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		4.0	0.85	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.80	0.20	ug/L	1
Isophorone	78-59-1	8270D	ND		4.0	1.1	ug/L	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	06/28/2019 2148	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	0.87		0.80	0.20	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		4.0	1.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	4.0	J	8.0	2.3	ug/L	1
Naphthalene	91-20-3	8270D	1.5		0.80	0.20	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		8.0	3.3	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		8.0	0.75	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		8.0	6.6	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		4.0	0.85	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		8.0	2.2	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		20	10	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		4.0	1.4	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		4.0	2.5	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		20	6.7	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.80	0.20	ug/L	1
Phenol	108-95-2	8270D	ND		4.0	0.95	ug/L	1
Pyrene	129-00-0	8270D	ND		0.80	0.20	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		4.0	1.3	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4.0	2.8	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4.0	1.9	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		4.0	0.95	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		4.0	1.1	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		48	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		59	38-127
Phenol-d5		47	28-128
Terphenyl-d14		46	10-148
2,4,6-Tribromophenol		85	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1914	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	410		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	990		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		64	40-140

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0739	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	230		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		47	40-140
2-Fluorobiphenyl (fractionation 1)		61	40-140
o - Terphenyl (aromatic)		63	40-140

LOQ = Limit of Quantitation
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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	5	07/05/2019 1325	JJG		21823

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	280	J	380	75	ug/L	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	1500		380	75	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	173	70-130

LOQ = Limit of Quantitation
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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 2325	STM		21207
2	VPH	Montana VPH	5	07/05/2019 1325	JJG		21822

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	38		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	1100		130	25	ug/L	2
Ethylbenzene	100-41-4	Montana VPH	170		25	3.1	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	83		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	2.1	J	5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	24		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	86		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Run 1 Acceptance Limits	Q	Run 2 % Recovery	Run 2 Acceptance Limits
2,5-Dibromotoluene (PID)	N	301	70-130		102	70-130

LOQ = Limit of Quantitation
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	5	07/05/2019 1325	JJG		21821

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	3100		880	180	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	141	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-001
Description: CMR-WB11S-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1200
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1433	TJW	06/26/2019 1259	20714
1	3005A	6020B	1	06/27/2019 1827	BNW	06/26/2019 1925	20830

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.50	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	150		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	1700		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	0.20	J	0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	2.3	J	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	3.0	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	3.3	J	5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	2.2		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	8.2		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	6.8		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	21	B	10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1831	BWS		21545
2	5030B	8260B	1	07/07/2019 1649	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	24		10	2.0	ug/L	1
Benzene	71-43-2	8260B	67		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	14		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	8.6		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	82		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	18		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	0.50	J	1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	14		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	3.4		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1831	BWS		21545
2	5030B	8260B	1	07/07/2019 1649	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	42		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	41		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	1.5		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		93	70-130	H	91	70-130
Bromofluorobenzene		103	70-130	H	103	70-130
Toluene-d8		101	70-130	H	97	70-130

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1831	BWS		21545
2	5030B	8260B	1	07/07/2019 1649	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	18	H	10	2.0	ug/L	2
Benzene	71-43-2	8260B	65	H	0.50	0.40	ug/L	2
Bromochloromethane	74-97-5	8260B	ND	H	0.50	0.40	ug/L	2
Bromodichloromethane	75-27-4	8260B	ND	H	0.50	0.40	ug/L	2
Bromoform	75-25-2	8260B	ND	H	0.50	0.40	ug/L	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND	H	0.50	0.40	ug/L	2
2-Butanone (MEK)	78-93-3	8260B	13	H	10	2.0	ug/L	2
Carbon disulfide	75-15-0	8260B	ND	H	0.50	0.40	ug/L	2
Carbon tetrachloride	56-23-5	8260B	ND	H	0.50	0.40	ug/L	2
Chlorobenzene	108-90-7	8260B	ND	H	0.50	0.40	ug/L	2
Chloroethane	75-00-3	8260B	ND	H	0.50	0.40	ug/L	2
Chloroform	67-66-3	8260B	ND	H	0.50	0.40	ug/L	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND	H	0.50	0.40	ug/L	2
Cyclohexane	110-82-7	8260B	11	H	0.50	0.40	ug/L	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND	H	0.50	0.40	ug/L	2
Dibromochloromethane	124-48-1	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichlorobenzene	95-50-1	8260B	ND	H	0.50	0.40	ug/L	2
1,3-Dichlorobenzene	541-73-1	8260B	ND	H	0.50	0.40	ug/L	2
1,4-Dichlorobenzene	106-46-7	8260B	ND	H	0.50	0.40	ug/L	2
Dichlorodifluoromethane	75-71-8	8260B	ND	H	0.50	0.40	ug/L	2
1,1-Dichloroethane	75-34-3	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichloroethane	107-06-2	8260B	ND	H	0.50	0.40	ug/L	2
1,1-Dichloroethene	75-35-4	8260B	ND	H	0.50	0.40	ug/L	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND	H	0.50	0.40	ug/L	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND	H	0.50	0.40	ug/L	2
1,2-Dichloropropane	78-87-5	8260B	ND	H	0.50	0.40	ug/L	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND	H	0.50	0.40	ug/L	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND	H	0.50	0.11	ug/L	2
1,4-Dioxane	123-91-1	8260B	ND	H	20	13	ug/L	2
Ethylbenzene	100-41-4	8260B	74	H	0.50	0.40	ug/L	2
2-Hexanone	591-78-6	8260B	ND	H	10	2.0	ug/L	2
Isopropylbenzene	98-82-8	8260B	17	H	0.50	0.40	ug/L	2
Methyl acetate	79-20-9	8260B	ND	H	1.0	0.40	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND	H	0.50	0.40	ug/L	2
4-Methyl-2-pentanone	108-10-1	8260B	ND	H	10	2.0	ug/L	2
Methylcyclohexane	108-87-2	8260B	15	H	5.0	0.40	ug/L	2
Methylene chloride	75-09-2	8260B	ND	H	0.50	0.40	ug/L	2
Naphthalene	91-20-3	8260B	3.3	H	0.50	0.40	ug/L	2
Styrene	100-42-5	8260B	ND	H	0.50	0.41	ug/L	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND	H	0.50	0.40	ug/L	2
Tetrachloroethene	127-18-4	8260B	ND	H	0.50	0.40	ug/L	2
Toluene	108-88-3	8260B	ND	H	0.50	0.40	ug/L	2

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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1831	BWS		21545
2	5030B	8260B	1	07/07/2019 1649	ECB		21775

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND	H	1.0	0.42	ug/L	2
1,2,3-Trichlorobenzene	87-61-6	8260B	ND	H	0.50	0.40	ug/L	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND	H	0.50	0.40	ug/L	2
1,1,1-Trichloroethane	71-55-6	8260B	ND	H	0.50	0.40	ug/L	2
1,1,2-Trichloroethane	79-00-5	8260B	ND	H	0.50	0.40	ug/L	2
Trichloroethene	79-01-6	8260B	ND	H	0.50	0.40	ug/L	2
Trichlorofluoromethane	75-69-4	8260B	ND	H	0.50	0.40	ug/L	2
Vinyl chloride	75-01-4	8260B	ND	H	0.50	0.40	ug/L	2
Xylenes (total)	1330-20-7	8260B	39	H	1.0	0.40	ug/L	2
m+p - Xylenes	179601-23-1	8260B	37	H	0.50	0.40	ug/L	2
o - Xylenes	95-47-6	8260B	1.4	H	0.50	0.40	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		93	70-130	H	91	70-130
Bromofluorobenzene		103	70-130	H	103	70-130
Toluene-d8		101	70-130	H	97	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	06/28/2019 2212	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.80	0.20	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.80	0.20	ug/L	1
Anthracene	120-12-7	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.80	0.20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.80	0.20	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		4.0	0.75	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		20	1.1	ug/L	1
Carbazole	86-74-8	8270D	ND		4.0	0.20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		4.0	0.85	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		4.0	1.3	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		4.0	0.30	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		4.0	0.80	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		4.0	0.75	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		4.0	0.75	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		4.0	0.80	ug/L	1
Chrysene	218-01-9	8270D	ND		0.80	0.20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.80	0.20	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		4.0	0.80	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4.0	0.85	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4.0	0.90	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4.0	0.80	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		20	4.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		4.0	0.95	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		20	0.95	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		20	0.90	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		4.0	0.75	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		20	2.1	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		20	4.5	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		20	6.6	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		8.0	1.8	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		8.0	1.7	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		20	2.4	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	3.3	BJ	20	1.9	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.80	0.20	ug/L	1
Fluorene	86-73-7	8270D	ND		0.80	0.20	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		4.0	0.75	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		4.0	0.85	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		20	5.5	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		4.0	0.85	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.80	0.20	ug/L	1
Isophorone	78-59-1	8270D	ND		4.0	1.1	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	06/28/2019 2212	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	1.2		0.80	0.20	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		4.0	1.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	6.3	J	8.0	2.3	ug/L	1
Naphthalene	91-20-3	8270D	2.0		0.80	0.20	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		8.0	3.3	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		8.0	0.75	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		8.0	6.6	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		4.0	0.85	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		8.0	2.2	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		20	10	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		4.0	1.4	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		4.0	2.5	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		20	6.7	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.80	0.20	ug/L	1
Phenol	108-95-2	8270D	2.0	J	4.0	0.95	ug/L	1
Pyrene	129-00-0	8270D	ND		0.80	0.20	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		4.0	1.3	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4.0	2.8	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4.0	1.9	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		4.0	0.95	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		4.0	1.1	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		51	37-129
2-Fluorophenol		38	24-127
Nitrobenzene-d5		58	38-127
Phenol-d5		48	28-128
Terphenyl-d14		55	10-148
2,4,6-Tribromophenol		92	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1944	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	2700		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	5800		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		53	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0809	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	820		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		42	40-140
2-Fluorobiphenyl (fractionation 1)		64	40-140
o - Terphenyl (aromatic)		63	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	07/05/2019 1353	JJG		21823

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	230		75	15	ug/L	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	860		75	15	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	134	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	07/05/2019 1353	JJG		21822

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	67		5.0	0.51	ug/L	2
C9 - C10 Aromatics		Montana VPH	960		25	5.0	ug/L	2
Ethylbenzene	100-41-4	Montana VPH	88		5.0	0.62	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	2
Naphthalene	91-20-3	Montana VPH	26		5.0	0.70	ug/L	2
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	2
m+p - Xylenes	179601-23-1	Montana VPH	42		5.0	1.2	ug/L	2
o - Xylenes	95-47-6	Montana VPH	3.6	J	5.0	0.58	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		84	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	07/05/2019 1353	JJG		21821

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	2400		180	35	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	174	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-002
Description: CMR-WB10-190621
Matrix: Aqueous
Date Sampled: 06/21/2019 1145
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1436	TJW	06/26/2019 1259	20714
1	3005A	6020B	1	06/27/2019 1833	BNW	06/26/2019 1925	20830

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.2	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	390		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	2100		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	3.1	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	1.6	J	5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	0.48	J	1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	5.3		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	45	B	10	2.5	ug/L	1

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-003
Description: TB-20-20190621
Matrix: Aqueous
Date Sampled: 06/21/2019
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1411	BWS		21545

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	3.5	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF22026-003
Description: TB-20-20190621
Matrix: Aqueous
Date Sampled: 06/21/2019
Date Received: 06/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1411	BWS		21545

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21545-001
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/03/2019 1243
Benzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromoform	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/03/2019 1243
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chloroform	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Cyclohexane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/03/2019 1243
1,4-Dioxane	ND		1	20	13	ug/L	07/03/2019 1243
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
2-Hexanone	ND		1	10	2.0	ug/L	07/03/2019 1243
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Methyl acetate	ND		1	1.0	0.40	ug/L	07/03/2019 1243
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/03/2019 1243
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/03/2019 1243
Methylene chloride	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Naphthalene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Styrene	ND		1	0.50	0.41	ug/L	07/03/2019 1243
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Toluene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/03/2019 1243

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21545-001
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Trichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/03/2019 1243
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/03/2019 1243
o - Xylenes	ND		1	0.50	0.40	ug/L	07/03/2019 1243

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21545-002
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	170	N	1	167	60-140	07/03/2019 1141
Benzene	50	47		1	93	70-130	07/03/2019 1141
Bromochloromethane	50	43		1	86	70-130	07/03/2019 1141
Bromodichloromethane	50	46		1	92	70-130	07/03/2019 1141
Bromoform	50	52		1	104	70-130	07/03/2019 1141
Bromomethane (Methyl bromide)	50	46		1	92	70-130	07/03/2019 1141
2-Butanone (MEK)	100	130		1	127	70-130	07/03/2019 1141
Carbon disulfide	50	47		1	95	70-130	07/03/2019 1141
Carbon tetrachloride	50	43		1	86	70-130	07/03/2019 1141
Chlorobenzene	50	48		1	96	70-130	07/03/2019 1141
Chloroethane	50	48		1	95	70-130	07/03/2019 1141
Chloroform	50	42		1	84	70-130	07/03/2019 1141
Chloromethane (Methyl chloride)	50	42		1	84	60-140	07/03/2019 1141
Cyclohexane	50	39		1	78	70-130	07/03/2019 1141
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	94	70-130	07/03/2019 1141
Dibromochloromethane	50	49		1	98	70-130	07/03/2019 1141
1,2-Dibromoethane (EDB)	50	48		1	96	70-130	07/03/2019 1141
1,2-Dichlorobenzene	50	48		1	96	70-130	07/03/2019 1141
1,3-Dichlorobenzene	50	48		1	95	70-130	07/03/2019 1141
1,4-Dichlorobenzene	50	47		1	95	70-130	07/03/2019 1141
Dichlorodifluoromethane	50	44		1	89	60-140	07/03/2019 1141
1,1-Dichloroethane	50	44		1	88	70-130	07/03/2019 1141
1,2-Dichloroethane	50	45		1	89	70-130	07/03/2019 1141
1,1-Dichloroethene	50	44		1	88	70-130	07/03/2019 1141
cis-1,2-Dichloroethene	50	43		1	85	70-130	07/03/2019 1141
trans-1,2-Dichloroethene	50	43		1	87	70-130	07/03/2019 1141
1,2-Dichloropropane	50	46		1	92	70-130	07/03/2019 1141
cis-1,3-Dichloropropene	50	49		1	98	70-130	07/03/2019 1141
trans-1,3-Dichloropropene	50	48		1	96	70-130	07/03/2019 1141
1,4-Dioxane	500	410		1	81	60-140	07/03/2019 1141
Ethylbenzene	50	49		1	97	70-130	07/03/2019 1141
2-Hexanone	100	110		1	106	70-130	07/03/2019 1141
Isopropylbenzene	50	49		1	98	70-130	07/03/2019 1141
Methyl acetate	50	33	N	1	66	70-130	07/03/2019 1141
Methyl tertiary butyl ether (MTBE)	50	45		1	91	70-130	07/03/2019 1141
4-Methyl-2-pentanone	100	90		1	90	70-130	07/03/2019 1141
Methylcyclohexane	50	47		1	94	70-130	07/03/2019 1141
Methylene chloride	50	44		1	88	70-130	07/03/2019 1141
Naphthalene	50	47		1	94	70-130	07/03/2019 1141
Styrene	50	49		1	99	70-130	07/03/2019 1141
1,1,2,2-Tetrachloroethane	50	46		1	93	70-130	07/03/2019 1141
Tetrachloroethene	50	50		1	100	70-130	07/03/2019 1141
Toluene	50	46		1	92	70-130	07/03/2019 1141
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	97	70-130	07/03/2019 1141

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21545-002
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	48		1	96	70-130	07/03/2019 1141
1,2,4-Trichlorobenzene	50	49		1	98	70-130	07/03/2019 1141
1,1,1-Trichloroethane	50	43		1	87	70-130	07/03/2019 1141
1,1,2-Trichloroethane	50	46		1	93	70-130	07/03/2019 1141
Trichloroethene	50	47		1	94	70-130	07/03/2019 1141
Trichlorofluoromethane	50	44		1	89	70-130	07/03/2019 1141
Vinyl chloride	50	41		1	81	70-130	07/03/2019 1141
Xylenes (total)	100	95		1	95	70-130	07/03/2019 1141
m+p - Xylenes	50	47		1	95	70-130	07/03/2019 1141
o - Xylenes	50	48		1	96	70-130	07/03/2019 1141

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		89	70-130
Bromofluorobenzene		99	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21775-001
Batch: 21775
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/07/2019 1435
Benzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Bromoform	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/07/2019 1435
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/07/2019 1435
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Chloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Chloroform	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Cyclohexane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/07/2019 1435
1,4-Dioxane	ND		1	20	13	ug/L	07/07/2019 1435
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
2-Hexanone	ND		1	10	2.0	ug/L	07/07/2019 1435
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Methyl acetate	ND		1	1.0	0.40	ug/L	07/07/2019 1435
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/07/2019 1435
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/07/2019 1435
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/07/2019 1435
Methylene chloride	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Naphthalene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Styrene	ND		1	0.50	0.41	ug/L	07/07/2019 1435
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Toluene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/07/2019 1435

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21775-001
Batch: 21775
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	0.43	J	1	0.50	0.40	ug/L	07/07/2019 1435
1,2,4-Trichlorobenzene	0.44	J	1	0.50	0.40	ug/L	07/07/2019 1435
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Trichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/07/2019 1435
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/07/2019 1435
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/07/2019 1435
o - Xylenes	ND		1	0.50	0.40	ug/L	07/07/2019 1435

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		93	70-130
Bromofluorobenzene		99	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21775-002
Batch: 21775
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	120		1	115	60-140	07/07/2019 1254
Benzene	50	50		1	101	70-130	07/07/2019 1254
Bromochloromethane	50	50		1	100	70-130	07/07/2019 1254
Bromodichloromethane	50	50		1	100	70-130	07/07/2019 1254
Bromoform	50	52		1	104	70-130	07/07/2019 1254
Bromomethane (Methyl bromide)	50	47		1	95	70-130	07/07/2019 1254
2-Butanone (MEK)	100	110		1	107	70-130	07/07/2019 1254
Carbon disulfide	50	53		1	106	70-130	07/07/2019 1254
Carbon tetrachloride	50	52		1	104	70-130	07/07/2019 1254
Chlorobenzene	50	49		1	99	70-130	07/07/2019 1254
Chloroethane	50	52		1	104	70-130	07/07/2019 1254
Chloroform	50	49		1	98	70-130	07/07/2019 1254
Chloromethane (Methyl chloride)	50	43		1	86	60-140	07/07/2019 1254
Cyclohexane	50	48		1	96	70-130	07/07/2019 1254
1,2-Dibromo-3-chloropropane (DBCP)	50	50		1	99	70-130	07/07/2019 1254
Dibromochloromethane	50	53		1	106	70-130	07/07/2019 1254
1,2-Dibromoethane (EDB)	50	50		1	101	70-130	07/07/2019 1254
1,2-Dichlorobenzene	50	47		1	93	70-130	07/07/2019 1254
1,3-Dichlorobenzene	50	45		1	90	70-130	07/07/2019 1254
1,4-Dichlorobenzene	50	44		1	88	70-130	07/07/2019 1254
Dichlorodifluoromethane	50	41		1	82	60-140	07/07/2019 1254
1,1-Dichloroethane	50	51		1	101	70-130	07/07/2019 1254
1,2-Dichloroethane	50	48		1	96	70-130	07/07/2019 1254
1,1-Dichloroethene	50	57		1	115	70-130	07/07/2019 1254
cis-1,2-Dichloroethene	50	49		1	98	70-130	07/07/2019 1254
trans-1,2-Dichloroethene	50	53		1	105	70-130	07/07/2019 1254
1,2-Dichloropropane	50	47		1	94	70-130	07/07/2019 1254
cis-1,3-Dichloropropene	50	54		1	107	70-130	07/07/2019 1254
trans-1,3-Dichloropropene	50	53		1	106	70-130	07/07/2019 1254
1,4-Dioxane	500	530		1	107	60-140	07/07/2019 1254
Ethylbenzene	50	50		1	100	70-130	07/07/2019 1254
2-Hexanone	100	98		1	98	70-130	07/07/2019 1254
Isopropylbenzene	50	51		1	103	70-130	07/07/2019 1254
Methyl acetate	50	42		1	84	70-130	07/07/2019 1254
Methyl tertiary butyl ether (MTBE)	50	51		1	103	70-130	07/07/2019 1254
4-Methyl-2-pentanone	100	97		1	97	70-130	07/07/2019 1254
Methylcyclohexane	50	51		1	103	70-130	07/07/2019 1254
Methylene chloride	50	51		1	103	70-130	07/07/2019 1254
Naphthalene	50	48		1	97	70-130	07/07/2019 1254
Styrene	50	50		1	101	70-130	07/07/2019 1254
1,1,2,2-Tetrachloroethane	50	47		1	93	70-130	07/07/2019 1254
Tetrachloroethene	50	51		1	102	70-130	07/07/2019 1254
Toluene	50	51		1	102	70-130	07/07/2019 1254
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	99	70-130	07/07/2019 1254

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21775-002
Batch: 21775
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	48		1	96	70-130	07/07/2019 1254
1,2,4-Trichlorobenzene	50	48		1	95	70-130	07/07/2019 1254
1,1,1-Trichloroethane	50	48		1	97	70-130	07/07/2019 1254
1,1,2-Trichloroethane	50	50		1	101	70-130	07/07/2019 1254
Trichloroethene	50	50		1	100	70-130	07/07/2019 1254
Trichlorofluoromethane	50	52		1	103	70-130	07/07/2019 1254
Vinyl chloride	50	46		1	91	70-130	07/07/2019 1254
Xylenes (total)	100	100		1	100	70-130	07/07/2019 1254
m+p - Xylenes	50	50		1	100	70-130	07/07/2019 1254
o - Xylenes	50	50		1	100	70-130	07/07/2019 1254

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		94	70-130
Toluene-d8		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20650-001
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Acenaphthylene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	06/28/2019 1218
Carbazole	ND		1	0.80	0.040	ug/L	06/28/2019 1218
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	06/28/2019 1218
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	06/28/2019 1218
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	06/28/2019 1218
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	06/28/2019 1218
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	06/28/2019 1218
2-Chlorophenol	ND		1	0.80	0.15	ug/L	06/28/2019 1218
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	06/28/2019 1218
Chrysene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Dibenzofuran	ND		1	0.80	0.16	ug/L	06/28/2019 1218
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	06/28/2019 1218
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	06/28/2019 1218
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	06/28/2019 1218
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
Diethylphthalate	ND		1	4.0	0.19	ug/L	06/28/2019 1218
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	06/28/2019 1218
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	06/28/2019 1218
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	06/28/2019 1218
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	06/28/2019 1218
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	06/28/2019 1218
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	06/28/2019 1218
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	06/28/2019 1218
bis(2-Ethylhexyl)phthalate	0.68	J	1	4.0	0.38	ug/L	06/28/2019 1218
Fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Fluorene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	06/28/2019 1218
Hexachloroethane	ND		1	0.80	0.17	ug/L	06/28/2019 1218
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Isophorone	ND		1	0.80	0.22	ug/L	06/28/2019 1218

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20650-001
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
2-Methylphenol	ND		1	0.80	0.21	ug/L	06/28/2019 1218
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	06/28/2019 1218
Naphthalene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
2-Nitroaniline	ND		1	1.6	0.66	ug/L	06/28/2019 1218
3-Nitroaniline	ND		1	1.6	0.15	ug/L	06/28/2019 1218
4-Nitroaniline	ND		1	1.6	1.3	ug/L	06/28/2019 1218
Nitrobenzene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
2-Nitrophenol	ND		1	1.6	0.44	ug/L	06/28/2019 1218
4-Nitrophenol	ND		1	4.0	2.1	ug/L	06/28/2019 1218
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	06/28/2019 1218
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	06/28/2019 1218
Pentachlorophenol	ND		1	4.0	1.3	ug/L	06/28/2019 1218
Phenanthrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Phenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
Pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	06/28/2019 1218
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	06/28/2019 1218
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	06/28/2019 1218
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	06/28/2019 1218

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		38	37-129
2-Fluorophenol		30	24-127
Nitrobenzene-d5		39	38-127
Phenol-d5		33	28-128
Terphenyl-d14		63	10-148
2,4,6-Tribromophenol		43	35-144

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20650-002
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.7		1	58	30-122	06/28/2019 1243
Acenaphthylene	8.0	5.2		1	65	30-130	06/28/2019 1243
Anthracene	8.0	5.4		1	67	30-123	06/28/2019 1243
Benzo(a)anthracene	8.0	5.9		1	74	40-125	06/28/2019 1243
Benzo(a)pyrene	8.0	5.5		1	69	40-128	06/28/2019 1243
Benzo(b)fluoranthene	8.0	5.4		1	67	30-130	06/28/2019 1243
Benzo(g,h,i)perylene	8.0	6.5		1	81	30-130	06/28/2019 1243
Benzo(k)fluoranthene	8.0	5.8		1	73	30-130	06/28/2019 1243
4-Bromophenyl phenyl ether	8.0	5.2		1	65	30-124	06/28/2019 1243
Butyl benzyl phthalate	8.0	6.4		1	80	54-135	06/28/2019 1243
Carbazole	8.0	5.5		1	68	45-101	06/28/2019 1243
bis (2-Chloro-1-methylethyl) ether	8.0	5.9		1	73	42-124	06/28/2019 1243
4-Chloro-3-methyl phenol	8.0	5.2		1	66	30-123	06/28/2019 1243
bis(2-Chloroethoxy)methane	8.0	5.0		1	63	44-127	06/28/2019 1243
bis(2-Chloroethyl)ether	8.0	5.5		1	69	46-120	06/28/2019 1243
2-Chloronaphthalene	8.0	4.6		1	57	46-100	06/28/2019 1243
2-Chlorophenol	8.0	4.6		1	57	50-117	06/28/2019 1243
4-Chlorophenyl phenyl ether	8.0	5.1		1	63	30-121	06/28/2019 1243
Chrysene	8.0	5.7		1	71	30-130	06/28/2019 1243
Dibenzo(a,h)anthracene	8.0	6.2		1	78	30-130	06/28/2019 1243
Dibenzofuran	8.0	5.0		1	63	30-118	06/28/2019 1243
1,2-Dichlorobenzene	8.0	4.2		1	53	32-111	06/28/2019 1243
1,3-Dichlorobenzene	8.0	4.0		1	50	28-110	06/28/2019 1243
1,4-Dichlorobenzene	8.0	4.0		1	51	29-112	06/28/2019 1243
3,3'-Dichlorobenzidine	8.0	4.4		1	55	10-126	06/28/2019 1243
2,4-Dichlorophenol	8.0	4.6		1	58	30-121	06/28/2019 1243
Diethylphthalate	8.0	5.3		1	67	40-125	06/28/2019 1243
Dimethyl phthalate	8.0	5.2		1	65	40-127	06/28/2019 1243
2,4-Dimethylphenol	8.0	5.9		1	74	20-125	06/28/2019 1243
Di-n-butyl phthalate	8.0	5.8		1	73	40-127	06/28/2019 1243
4,6-Dinitro-2-methylphenol	8.0	5.0		1	63	56-128	06/28/2019 1243
2,4-Dinitrophenol	16	6.7		1	42	11-126	06/28/2019 1243
2,4-Dinitrotoluene	8.0	5.6		1	70	59-127	06/28/2019 1243
2,6-Dinitrotoluene	8.0	5.4		1	67	59-126	06/28/2019 1243
Di-n-octylphthalate	8.0	5.3		1	66	50-136	06/28/2019 1243
bis(2-Ethylhexyl)phthalate	8.0	6.3		1	79	56-128	06/28/2019 1243
Fluoranthene	8.0	5.7		1	72	40-128	06/28/2019 1243
Fluorene	8.0	5.0		1	62	30-124	06/28/2019 1243
Hexachlorobenzene	8.0	5.2		1	65	30-125	06/28/2019 1243
Hexachlorobutadiene	8.0	3.8		1	48	24-110	06/28/2019 1243
Hexachlorocyclopentadiene	40	16		1	39	16-96	06/28/2019 1243
Hexachloroethane	8.0	3.8		1	47	31-110	06/28/2019 1243
Indeno(1,2,3-c,d)pyrene	8.0	6.3		1	79	30-130	06/28/2019 1243
Isophorone	8.0	5.4		1	67	57-123	06/28/2019 1243

LOQ = Limit of Quantitation
DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20650-002
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.6		1	58	40-132	06/28/2019 1243
2-Methylphenol	8.0	7.1		1	89	56-119	06/28/2019 1243
3+4-Methylphenol	8.0	5.3		1	66	53-119	06/28/2019 1243
Naphthalene	8.0	4.8		1	60	30-130	06/28/2019 1243
2-Nitroaniline	8.0	5.3		1	67	60-124	06/28/2019 1243
3-Nitroaniline	8.0	4.1		1	51	43-123	06/28/2019 1243
4-Nitroaniline	8.0	5.2		1	65	30-135	06/28/2019 1243
Nitrobenzene	8.0	5.1		1	64	51-122	06/28/2019 1243
2-Nitrophenol	8.0	4.8		1	60	51-118	06/28/2019 1243
4-Nitrophenol	16	9.3		1	58	53-130	06/28/2019 1243
N-Nitrosodi-n-propylamine	8.0	5.7		1	71	54-127	06/28/2019 1243
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.4		1	68	30-123	06/28/2019 1243
Pentachlorophenol	16	9.4		1	59	42-131	06/28/2019 1243
Phenanthrene	8.0	5.2		1	65	40-123	06/28/2019 1243
Phenol	8.0	5.0		1	63	49-117	06/28/2019 1243
Pyrene	8.0	6.2		1	77	40-126	06/28/2019 1243
1,2,4,5-Tetrachlorobenzene	8.0	3.8		1	48	30-130	06/28/2019 1243
2,3,4,6-Tetrachlorophenol	8.0	5.1		1	64	30-130	06/28/2019 1243
1,2,4-Trichlorobenzene	8.0	4.1		1	51	20-90	06/28/2019 1243
2,4,5-Trichlorophenol	8.0	5.0		1	62	30-123	06/28/2019 1243
2,4,6-Trichlorophenol	8.0	4.9		1	62	30-125	06/28/2019 1243

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		60	37-129
2-Fluorophenol		48	24-127
Nitrobenzene-d5		64	38-127
Phenol-d5		62	28-128
Terphenyl-d14		86	10-148
2,4,6-Tribromophenol		71	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20744-001
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012
C9 - C18 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20744-002
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	260		1	65	40-140	07/08/2019 1042
C9 - C18 Aliphatics	300	140		1	48	40-140	07/08/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		57	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20744-003
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	280		1	69	5.9	40-140	25	07/08/2019 1112
C9 - C18 Aliphatics	300	150		1	51	6.4	40-140	25	07/08/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana EPH (aromatics) - MB

Sample ID: UQ20745-001
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	07/08/2019 2143

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		45	40-140
2-Fluorobiphenyl (fractionation 1)		60	40-140
o - Terphenyl (aromatic)		52	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20745-002
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	460		1	54	40-140	07/08/2019 2213

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		48	40-140
2-Fluorobiphenyl (fractionation 1)		65	40-140
o - Terphenyl (aromatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20745-003
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	410		1	49	10	40-140	25	07/08/2019 2243

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		61	40-140
2-Fluorobiphenyl (fractionation 1)		62	40-140
o - Terphenyl (aromatic)		54	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21207-001
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/29/2019 1830
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/29/2019 1830
Naphthalene	ND		1	5.0	0.70	ug/L	06/29/2019 1830
Toluene	ND		1	5.0	0.53	ug/L	06/29/2019 1830
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/29/2019 1830
o - Xylenes	ND		1	5.0	0.58	ug/L	06/29/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		78	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21207-002
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	22		1	86	70-130	06/29/2019 1716
Methyl tertiary butyl ether (MTBE)	25	22		1	87	70-130	06/29/2019 1716
Naphthalene	25	20		1	82	70-130	06/29/2019 1716
Toluene	25	22		1	86	70-130	06/29/2019 1716
m+p - Xylenes	50	44		1	88	70-130	06/29/2019 1716
o - Xylenes	25	22		1	89	70-130	06/29/2019 1716

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21207-003
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	26		1	102	17	70-130	25	06/29/2019 1745
Methyl tertiary butyl ether (MTBE)	25	25		1	101	15	70-130	25	06/29/2019 1745
Naphthalene	25	23		1	93	13	70-130	25	06/29/2019 1745
Toluene	25	26		1	102	17	70-130	25	06/29/2019 1745
m+p - Xylenes	50	51		1	102	14	70-130	25	06/29/2019 1745
o - Xylenes	25	25		1	98	9.4	70-130	25	06/29/2019 1745

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21821-001
Batch: 21821
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	07/05/2019 1220

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21821-002
Batch: 21821
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	400		1	106	70-130	07/05/2019 1124

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21821-003
Batch: 21821
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	410		1	109	3.5	70-130	25	07/05/2019 1152

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21822-001
Batch: 21822
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	07/05/2019 1220
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	07/05/2019 1220
Ethylbenzene	ND		1	5.0	0.62	ug/L	07/05/2019 1220
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	07/05/2019 1220
Naphthalene	ND		1	5.0	0.70	ug/L	07/05/2019 1220
Toluene	ND		1	5.0	0.53	ug/L	07/05/2019 1220
m+p - Xylenes	ND		1	5.0	1.2	ug/L	07/05/2019 1220
o - Xylenes	ND		1	5.0	0.58	ug/L	07/05/2019 1220

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21822-002
Batch: 21822
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	25		1	99	70-130	07/05/2019 1124
C9 - C10 Aromatics	25	25		1	101	70-130	07/05/2019 1124
Ethylbenzene	25	25		1	100	70-130	07/05/2019 1124
Methyl tertiary butyl ether (MTBE)	25	25		1	98	70-130	07/05/2019 1124
Naphthalene	25	24		1	94	70-130	07/05/2019 1124
Toluene	25	25		1	99	70-130	07/05/2019 1124
m+p - Xylenes	50	51		1	102	70-130	07/05/2019 1124
o - Xylenes	25	25		1	100	70-130	07/05/2019 1124

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21822-003
Batch: 21822
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	28		1	111	11	70-130	25	07/05/2019 1152
C9 - C10 Aromatics	25	27		1	108	6.5	70-130	25	07/05/2019 1152
Ethylbenzene	25	28		1	110	9.9	70-130	25	07/05/2019 1152
Methyl tertiary butyl ether (MTBE)	25	28		1	113	14	70-130	25	07/05/2019 1152
Naphthalene	25	23		1	91	3.0	70-130	25	07/05/2019 1152
Toluene	25	28		1	114	14	70-130	25	07/05/2019 1152
m+p - Xylenes	50	55		1	111	8.5	70-130	25	07/05/2019 1152
o - Xylenes	25	27		1	108	7.3	70-130	25	07/05/2019 1152

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		85	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21823-001
Batch: 21823
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/05/2019 1220
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/05/2019 1220

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21823-002
Batch: 21823
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	112	70-130	07/05/2019 1124
C9 - C12 Aliphatics, Adjusted	75	75		1	100	70-130	07/05/2019 1124

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21823-003
Batch: 21823
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	120		1	116	3.5	70-130	25	07/05/2019 1152
C9 - C12 Aliphatics, Adjusted	75	82		1	109	9.3	70-130	25	07/05/2019 1152

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20830-001
Batch: 20830
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/26/2019 1925

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	06/27/2019 1716
Arsenic	ND		1	2.0	1.3	ug/L	06/27/2019 1716
Barium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Beryllium	ND		1	0.40	0.15	ug/L	06/27/2019 1716
Cadmium	ND		1	0.50	0.13	ug/L	06/27/2019 1716
Chromium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Cobalt	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Copper	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Lead	ND		1	1.0	0.25	ug/L	06/27/2019 1716
Nickel	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Selenium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Silver	ND		1	1.0	0.25	ug/L	06/27/2019 1716
Vanadium	ND		1	5.0	2.5	ug/L	06/27/2019 1716
Zinc	2.8	J	1	10	2.5	ug/L	06/27/2019 1716

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20830-002
Batch: 20830
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/26/2019 1925

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	100		1	100	80-120	06/27/2019 1722
Arsenic	100	110		1	106	80-120	06/27/2019 1722
Barium	100	100		1	101	80-120	06/27/2019 1722
Beryllium	100	110		1	109	80-120	06/27/2019 1722
Cadmium	100	99		1	99	80-120	06/27/2019 1722
Chromium	100	100		1	102	80-120	06/27/2019 1722
Cobalt	100	100		1	105	80-120	06/27/2019 1722
Copper	100	100		1	104	80-120	06/27/2019 1722
Lead	100	110		1	105	80-120	06/27/2019 1722
Nickel	100	100		1	101	80-120	06/27/2019 1722
Selenium	100	97		1	97	80-120	06/27/2019 1722
Silver	100	110		1	105	80-120	06/27/2019 1722
Vanadium	100	100		1	104	80-120	06/27/2019 1722
Zinc	100	94		1	94	80-120	06/27/2019 1722

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20714-001
Batch: 20714
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/27/2019 1355

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20714-002
Batch: 20714
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	94	80-120	06/27/2019 1358

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody
and
Miscellaneous Documents

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Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

SHEALY Chain of Custody Record

Number 92780

Client: RAMBOLL US CORP.	Report to Contact: MICHAEL WILSON, DANIEL PRALL	Telephone No. / E-mail: MWILSON@RAMBOLL.COM, DPRALL@RAMBOLL.COM	Quote No.
Address: 7500 COLLEGE BLVD #925	Sampler's Signature: x	Analysis (Attach list if more space is needed)	Page 1 of 1
City: OVERLAND PARK	State: KS	Zip Code: 66210	
Project Name: CMR - RAIM - WEST RAIL	Printed Name: BROOKS BAILEY, ANDREW HALDWICK		
Project No.: 1690012344-003	P.O. No.		

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Sample Type (G=Grab, C=Composite)	Matrix: Aqueous	Matrix: Solid	Matrix: Non-aqueous	No. of Containers by Preservative Type: Unpres.	HCl	HNO3	H2SO4	NaOH	ZnAc/NaOH	VOC	SVOC	GRO	Metals	VFA	Remarks / Cooler I.D.
CMR - WB11S-190621	6/21/19	1200	G	X			2		1	7			X	X	X	X	X	COOLER 1
CMR - WB10-190621	1	1145	G	X			2		1	6								COOLER 1
TB-20	—	—	MA	X						2								COOLER 1

UF22026
KMN2

Turn Around Time Required (Prior lab approval required for expedited TAT.): X Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client X Disposal by Lab

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison X Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by	6/21/19	1600	1. Received by		
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by: FedEx	Date 6/22/19	Time 0925	4. Laboratory received by	Date 6/22/19	Time 0925

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack
Receipt Temp. 5.9 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 05-01-2014

SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.
Document Number: MF0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: Tetra Tech Cooler Inspected by/date: JSH / 06/22/19 Lot #: UF22026

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☐ Yes	☑ No		1. Were custody seals present on the cooler?
☐ Yes	☐ No	☑ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: JSH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

3.9 / 3.9 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☐ Yes	☑ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? Broken: 1 of 2 vials for TB-20
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA .
Time of preservation NA . If more than one preservative is needed, please note in the comments below.

Sample(s) UF22026-003 were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA .

SR barcode labels applied by: JSH Date: 06/22/19

Comments:

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF24002, 3 Groundwater Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF24002 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB10-3.0-4.0-190621	UF24002-001
CMR-WB10-6.0-7.0-190621	UF24002-002
CMR-WB10-9.0-9.5-190621	UF24002-003
TB-21-20190621	UF24002-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of aqueous chloromethane and solid bromomethane. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all aqueous chloromethane and solid bromomethane results have been validated as estimated.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF24002

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UF24002

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	No issues	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to sample dilution, no action taken.	Surrogates out due to matrix interference. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out of criteria low for chloromethane (aqueous) and bromomethane (solids). All results for chloromethane (aqueous) and bromomethane (solids) results validated as estimated (J, UJ).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/a
Other Non-conformances	No other non-conformances noted.	No other non-conformances noted.
Overall Assessment of Data	All results for chloromethane (aqueous) and bromomethane (solids) results validated as estimated (J, UJ).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM - West Rail

Project Number: 1690012344-003

Lot Number:**UF24002**

Date Completed:07/11/2019

07/12/2019 10:45 AM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF24002

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21588 had chloroethane recovered marginally outside of the acceptance limits. The LCS associated with batch 51695 had bromomethane recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Semivolatiles
Sample -001 was diluted 25X due to high concentrations of the target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
Samples -001 and -002 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene and MTBE, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Samples -001 and -002 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Sample Summary
Ramboll US Corporation
Lot Number: UF24002

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB10-3.0-4.0-190621	Solid	06/21/2019 0940	06/24/2019
002	CMR-WB10-6.0-7.0-190621	Solid	06/21/2019 0945	06/24/2019
003	CMR-WB10-9.0-9.5-190621	Solid	06/21/2019 0950	06/24/2019
004	TB-21-20190621	Aqueous	06/21/2019	06/24/2019

(4 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF24002

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB10-3.0-4.0-190621	Solid	Cyclohexane	8260B	380		ug/kg	6
001	CMR-WB10-3.0-4.0-190621	Solid	Ethylbenzene	8260B	1800		ug/kg	6
001	CMR-WB10-3.0-4.0-190621	Solid	Isopropylbenzene	8260B	1300		ug/kg	6
001	CMR-WB10-3.0-4.0-190621	Solid	Methylcyclohexane	8260B	2300		ug/kg	6
001	CMR-WB10-3.0-4.0-190621	Solid	Xylenes (total)	8260B	580	J	ug/kg	7
001	CMR-WB10-3.0-4.0-190621	Solid	m+p - Xylenes	8260B	580		ug/kg	7
001	CMR-WB10-3.0-4.0-190621	Solid	Anthracene	8270D	49	J	ug/kg	8
001	CMR-WB10-3.0-4.0-190621	Solid	2-Methylnaphthalene	8270D	270		ug/kg	9
001	CMR-WB10-3.0-4.0-190621	Solid	Naphthalene	8270D	210		ug/kg	9
001	CMR-WB10-3.0-4.0-190621	Solid	Phenanthrene	8270D	55	J	ug/kg	9
001	CMR-WB10-3.0-4.0-190621	Solid	C19 - C36 Aliphatics	Montana EPH	710		mg/kg	10
001	CMR-WB10-3.0-4.0-190621	Solid	C9 - C18 Aliphatics	Montana EPH	1800		mg/kg	10
001	CMR-WB10-3.0-4.0-190621	Solid	C11 - C22 Aromatics	Montana EPH	360		mg/kg	11
001	CMR-WB10-3.0-4.0-190621	Solid	C5 - C8 Aliphatics,	Montana VPH	170		mg/kg	12
001	CMR-WB10-3.0-4.0-190621	Solid	C9 - C12 Aliphatics,	Montana VPH	480		mg/kg	12
001	CMR-WB10-3.0-4.0-190621	Solid	Benzene	Montana VPH	0.11	J	mg/kg	13
001	CMR-WB10-3.0-4.0-190621	Solid	C9 - C10 Aromatics	Montana VPH	320		mg/kg	13
001	CMR-WB10-3.0-4.0-190621	Solid	Ethylbenzene	Montana VPH	5.9		mg/kg	13
001	CMR-WB10-3.0-4.0-190621	Solid	Naphthalene	Montana VPH	9.4		mg/kg	13
001	CMR-WB10-3.0-4.0-190621	Solid	m+p - Xylenes	Montana VPH	1.5		mg/kg	13
001	CMR-WB10-3.0-4.0-190621	Solid	TPH	Montana VPH	1100		mg/kg	14
001	CMR-WB10-3.0-4.0-190621	Solid	Arsenic	6020B	18		mg/kg	15
001	CMR-WB10-3.0-4.0-190621	Solid	Barium	6020B	210		mg/kg	15
001	CMR-WB10-3.0-4.0-190621	Solid	Beryllium	6020B	0.11	J	mg/kg	15
001	CMR-WB10-3.0-4.0-190621	Solid	Cadmium	6020B	0.12	J	mg/kg	15
001	CMR-WB10-3.0-4.0-190621	Solid	Chromium	6020B	10		mg/kg	15
001	CMR-WB10-3.0-4.0-190621	Solid	Cobalt	6020B	3.7		mg/kg	15
001	CMR-WB10-3.0-4.0-190621	Solid	Copper	6020B	8.4		mg/kg	15
001	CMR-WB10-3.0-4.0-190621	Solid	Lead	6020B	5.8		mg/kg	15
001	CMR-WB10-3.0-4.0-190621	Solid	Nickel	6020B	8.2		mg/kg	15
001	CMR-WB10-3.0-4.0-190621	Solid	Vanadium	6020B	25		mg/kg	15
001	CMR-WB10-3.0-4.0-190621	Solid	Zinc	6020B	27		mg/kg	15
002	CMR-WB10-6.0-7.0-190621	Solid	Acetone	8260B	17	J	ug/kg	16
002	CMR-WB10-6.0-7.0-190621	Solid	Isopropylbenzene	8260B	2.4	J	ug/kg	16
002	CMR-WB10-6.0-7.0-190621	Solid	Methylcyclohexane	8260B	10		ug/kg	16
002	CMR-WB10-6.0-7.0-190621	Solid	C9 - C18 Aliphatics	Montana EPH	12		mg/kg	20
002	CMR-WB10-6.0-7.0-190621	Solid	C5 - C8 Aliphatics,	Montana VPH	1.5	J	mg/kg	22
002	CMR-WB10-6.0-7.0-190621	Solid	C9 - C12 Aliphatics,	Montana VPH	13		mg/kg	22
002	CMR-WB10-6.0-7.0-190621	Solid	C9 - C10 Aromatics	Montana VPH	8.7		mg/kg	23
002	CMR-WB10-6.0-7.0-190621	Solid	Ethylbenzene	Montana VPH	0.14	J	mg/kg	23
002	CMR-WB10-6.0-7.0-190621	Solid	Naphthalene	Montana VPH	0.66		mg/kg	23
002	CMR-WB10-6.0-7.0-190621	Solid	o - Xylenes	Montana VPH	0.28		mg/kg	23
002	CMR-WB10-6.0-7.0-190621	Solid	TPH	Montana VPH	29		mg/kg	24
002	CMR-WB10-6.0-7.0-190621	Solid	Antimony	6020B	0.24	J	mg/kg	25
002	CMR-WB10-6.0-7.0-190621	Solid	Arsenic	6020B	2.4		mg/kg	25

Detection Summary (Continued)

Lot Number: UF24002

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-WB10-6.0-7.0-190621	Solid	Barium	6020B	200		mg/kg	25
002	CMR-WB10-6.0-7.0-190621	Solid	Beryllium	6020B	0.14		mg/kg	25
002	CMR-WB10-6.0-7.0-190621	Solid	Cadmium	6020B	0.036	J	mg/kg	25
002	CMR-WB10-6.0-7.0-190621	Solid	Chromium	6020B	72		mg/kg	25
002	CMR-WB10-6.0-7.0-190621	Solid	Cobalt	6020B	5.8		mg/kg	25
002	CMR-WB10-6.0-7.0-190621	Solid	Copper	6020B	15		mg/kg	25
002	CMR-WB10-6.0-7.0-190621	Solid	Lead	6020B	6.8		mg/kg	25
002	CMR-WB10-6.0-7.0-190621	Solid	Nickel	6020B	18		mg/kg	25
002	CMR-WB10-6.0-7.0-190621	Solid	Vanadium	6020B	71		mg/kg	25
002	CMR-WB10-6.0-7.0-190621	Solid	Zinc	6020B	48		mg/kg	25
003	CMR-WB10-9.0-9.5-190621	Solid	Acetone	8260B	69		ug/kg	26
003	CMR-WB10-9.0-9.5-190621	Solid	Isopropylbenzene	8260B	2.2	J	ug/kg	26
003	CMR-WB10-9.0-9.5-190621	Solid	Methylcyclohexane	8260B	11		ug/kg	26
003	CMR-WB10-9.0-9.5-190621	Solid	2-Methylnaphthalene	8270D	2.2	J	ug/kg	29
003	CMR-WB10-9.0-9.5-190621	Solid	C9 - C18 Aliphatics	Montana EPH	15		mg/kg	30
003	CMR-WB10-9.0-9.5-190621	Solid	C9 - C12 Aliphatics,	Montana VPH	2.5	J	mg/kg	32
003	CMR-WB10-9.0-9.5-190621	Solid	C9 - C10 Aromatics	Montana VPH	0.64	J	mg/kg	33
003	CMR-WB10-9.0-9.5-190621	Solid	o - Xylenes	Montana VPH	0.036	J	mg/kg	33
003	CMR-WB10-9.0-9.5-190621	Solid	TPH	Montana VPH	4.9	J	mg/kg	34
003	CMR-WB10-9.0-9.5-190621	Solid	Arsenic	6020B	1.5		mg/kg	35
003	CMR-WB10-9.0-9.5-190621	Solid	Barium	6020B	1400		mg/kg	35
003	CMR-WB10-9.0-9.5-190621	Solid	Beryllium	6020B	0.15		mg/kg	35
003	CMR-WB10-9.0-9.5-190621	Solid	Cadmium	6020B	1.3		mg/kg	35
003	CMR-WB10-9.0-9.5-190621	Solid	Chromium	6020B	28		mg/kg	35
003	CMR-WB10-9.0-9.5-190621	Solid	Cobalt	6020B	7.9		mg/kg	35
003	CMR-WB10-9.0-9.5-190621	Solid	Copper	6020B	14		mg/kg	35
003	CMR-WB10-9.0-9.5-190621	Solid	Lead	6020B	6.3		mg/kg	35
003	CMR-WB10-9.0-9.5-190621	Solid	Nickel	6020B	21		mg/kg	35
003	CMR-WB10-9.0-9.5-190621	Solid	Vanadium	6020B	76		mg/kg	35
003	CMR-WB10-9.0-9.5-190621	Solid	Zinc	6020B	56		mg/kg	35

(75 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-001
Description: CMR-WB10-3.0-4.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0940
% Solids: 83.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	1	07/05/2019 1733	JM1		21695	6.02

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1200	240	ug/kg	2
Benzene	71-43-2	8260B	ND		300	120	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		300	120	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		300	120	ug/kg	2
Bromoform	75-25-2	8260B	ND		300	120	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		300	120	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		1200	240	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		300	120	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		300	120	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		300	120	ug/kg	2
Chloroethane	75-00-3	8260B	ND		300	120	ug/kg	2
Chloroform	67-66-3	8260B	ND		300	120	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		300	120	ug/kg	2
Cyclohexane	110-82-7	8260B	380		300	120	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		300	120	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		300	120	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		300	120	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		300	120	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		300	120	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		300	120	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		300	120	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		300	120	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		300	120	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		300	120	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		300	120	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		300	120	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		300	120	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		300	120	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		300	120	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		15000	1500	ug/kg	2
Ethylbenzene	100-41-4	8260B	1800		300	120	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		600	240	ug/kg	2
Isopropylbenzene	98-82-8	8260B	1300		300	120	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		300	120	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		300	120	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		600	240	ug/kg	2
Methylcyclohexane	108-87-2	8260B	2300		300	120	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		300	120	ug/kg	2
Naphthalene	91-20-3	8260B	ND		300	120	ug/kg	2
Styrene	100-42-5	8260B	ND		300	120	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		300	120	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		300	120	ug/kg	2
Toluene	108-88-3	8260B	ND		300	120	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		300	120	ug/kg	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-001
Description: CMR-WB10-3.0-4.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0940
% Solids: 83.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	1	07/05/2019 1733	JM1		21695	6.02

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		300	120	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		300	120	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		300	120	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		300	120	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		300	120	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		300	120	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		300	120	ug/kg	2
Xylenes (total)	1330-20-7	8260B	580	J	600	240	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	580		300	120	ug/kg	2
o - Xylenes	95-47-6	8260B	ND		300	120	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		114	53-142
Bromofluorobenzene		118	47-138
Toluene-d8		124	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-001
Description: CMR-WB10-3.0-4.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0940
% Solids: 83.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	07/06/2019 2028	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		81	25	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		81	29	ug/kg	1
Anthracene	120-12-7	8270D	49	J	81	15	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		81	18	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		81	20	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		81	15	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		81	20	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		81	14	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		390	150	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		390	150	ug/kg	1
Carbazole	86-74-8	8270D	ND		390	150	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		390	150	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		390	150	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		390	150	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		390	150	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		390	150	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		390	150	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		390	150	ug/kg	1
Chrysene	218-01-9	8270D	ND		81	14	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		81	15	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		390	150	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		2000	750	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		2000	750	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		2000	750	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		390	150	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		390	150	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		390	150	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		390	220	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		390	150	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		390	150	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		2000	750	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		2000	750	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		810	300	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		810	300	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		390	150	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		2000	750	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		81	13	ug/kg	1
Fluorene	86-73-7	8270D	ND		81	17	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		390	150	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		390	150	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		2000	750	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		390	150	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		81	30	ug/kg	1
Isophorone	78-59-1	8270D	ND		390	150	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
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N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-001
Description: CMR-WB10-3.0-4.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0940
% Solids: 83.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	07/06/2019 2028	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	270		81	30	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		390	150	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		810	300	ug/kg	1
Naphthalene	91-20-3	8270D	210		81	29	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		810	300	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		810	300	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		810	300	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		390	150	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		810	300	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		2000	750	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		390	150	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		390	150	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		2000	750	ug/kg	1
Phenanthrene	85-01-8	8270D	55	J	81	22	ug/kg	1
Phenol	108-95-2	8270D	ND		390	150	ug/kg	1
Pyrene	129-00-0	8270D	ND		81	15	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		990	300	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		2000	300	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		2000	750	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		390	150	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		390	150	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		66	33-102
2-Fluorophenol		43	35-115
Nitrobenzene-d5	N	127	22-109
Phenol-d5		70	33-122
Terphenyl-d14		71	41-120
2,4,6-Tribromophenol		57	30-117

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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-001
Description: CMR-WB10-3.0-4.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0940
% Solids: 83.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 1637	DAL1	06/25/2019 1759	20678

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	710		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	1800		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		54	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-001
Description: CMR-WB10-3.0-4.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0940
% Solids: 83.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 2334	DAL1	06/25/2019 1759	20679

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	360		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		82	40-140
2-Fluorobiphenyl (fractionation 1)		90	40-140
o - Terphenyl (aromatic)		87	40-140

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-001
Description: CMR-WB10-3.0-4.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0940
% Solids: 83.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	2	07/03/2019 1431	JJG		21739

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	170		8.8	1.8	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	480		8.8	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1120	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-001
Description: CMR-WB10-3.0-4.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0940
% Solids: 83.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	2	07/03/2019 1431	JJG		21738

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.11	J	0.59	0.080	mg/kg	1
C9 - C10 Aromatics		Montana VPH	320		2.9	1.2	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	5.9		0.59	0.073	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.59	0.13	mg/kg	1
Naphthalene	91-20-3	Montana VPH	9.4		0.59	0.30	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.59	0.094	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	1.5		0.59	0.13	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.59	0.066	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	467	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF24002-001
Description: CMR-WB10-3.0-4.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0940
% Solids: 83.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	2	07/03/2019 1431	JJG		21737

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1100		18	3.5	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1230	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-001
Description: CMR-WB10-3.0-4.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0940
% Solids: 83.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/02/2019 2142	BNW	07/01/2019 0831	21081
1	7471B	7471B	1	06/28/2019 1720	TJW	06/27/2019 1855	20850

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.59	0.23	mg/kg	1
Arsenic	7440-38-2	6020B	18		0.59	0.23	mg/kg	1
Barium	7440-39-3	6020B	210		1.5	0.36	mg/kg	1
Beryllium	7440-41-7	6020B	0.11	J	0.12	0.040	mg/kg	1
Cadmium	7440-43-9	6020B	0.12	J	0.15	0.029	mg/kg	1
Chromium	7440-47-3	6020B	10		1.5	0.65	mg/kg	1
Cobalt	7440-48-4	6020B	3.7		1.5	0.35	mg/kg	1
Copper	7440-50-8	6020B	8.4		1.5	0.38	mg/kg	1
Lead	7439-92-1	6020B	5.8		0.29	0.080	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.088	0.021	mg/kg	1
Nickel	7440-02-0	6020B	8.2		1.5	0.35	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.5	0.55	mg/kg	1
Silver	7440-22-4	6020B	ND		0.29	0.070	mg/kg	1
Vanadium	7440-62-2	6020B	25		1.5	0.29	mg/kg	1
Zinc	7440-66-6	6020B	27		2.9	0.59	mg/kg	1

LOQ = Limit of Quantitation
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ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-002
Description: CMR-WB10-6.0-7.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0945
% Solids: 91.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/01/2019 1620	JM1		21331	6.08

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	17	J	18	3.6	ug/kg	1
Benzene	71-43-2	8260B	ND		4.5	1.8	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.5	1.8	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.5	1.8	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.5	1.8	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.5	1.8	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		18	3.6	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.5	1.8	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.5	1.8	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.5	1.8	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.5	1.8	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.5	1.8	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.5	1.8	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.5	1.8	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.5	1.8	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.5	1.8	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.5	1.8	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.5	1.8	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.5	1.8	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.5	1.8	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.5	1.8	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.5	1.8	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.5	1.8	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.5	1.8	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		230	23	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.5	1.8	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.0	3.6	ug/kg	1
Isopropylbenzene	98-82-8	8260B	2.4	J	4.5	1.8	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.5	1.8	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.5	1.8	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.0	3.6	ug/kg	1
Methylcyclohexane	108-87-2	8260B	10		4.5	1.8	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.5	1.8	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.5	1.8	ug/kg	1
Styrene	100-42-5	8260B	ND		4.5	1.8	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.5	1.8	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.5	1.8	ug/kg	1
Toluene	108-88-3	8260B	ND		4.5	1.8	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.5	1.8	ug/kg	1

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-002
Description: CMR-WB10-6.0-7.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0945
% Solids: 91.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/01/2019 1620	JM1		21331	6.08

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.5	1.8	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.5	1.8	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.5	1.8	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.5	1.8	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.5	1.8	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.5	1.8	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.5	1.8	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.0	3.6	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.5	1.8	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.5	1.8	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		103	47-138
Toluene-d8		106	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-002
Description: CMR-WB10-6.0-7.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0945
% Solids: 91.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/07/2019 0239	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		2.9	0.90	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		2.9	1.0	ug/kg	1
Anthracene	120-12-7	8270D	ND		2.9	0.56	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		2.9	0.64	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		2.9	0.72	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		2.9	0.54	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		2.9	0.71	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		2.9	0.52	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		14	5.4	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		14	5.4	ug/kg	1
Carbazole	86-74-8	8270D	ND		14	5.4	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		14	5.4	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		14	5.4	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		14	5.4	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		14	5.4	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		14	5.4	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		14	5.4	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		14	5.4	ug/kg	1
Chrysene	218-01-9	8270D	ND		2.9	0.49	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		2.9	0.56	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		14	5.4	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		73	27	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		73	27	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		73	27	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		14	5.4	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		14	5.4	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		14	5.4	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		14	8.1	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		14	5.4	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		14	5.4	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		73	27	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		73	27	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		29	11	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		29	11	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		14	5.4	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		73	27	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		2.9	0.46	ug/kg	1
Fluorene	86-73-7	8270D	ND		2.9	0.62	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		14	5.4	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		14	5.4	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		73	27	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		14	5.4	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		2.9	1.1	ug/kg	1
Isophorone	78-59-1	8270D	ND		14	5.4	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-002
Description: CMR-WB10-6.0-7.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0945
% Solids: 91.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/07/2019 0239	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		2.9	1.1	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		14	5.4	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		29	11	ug/kg	1
Naphthalene	91-20-3	8270D	ND		2.9	1.1	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		29	11	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		29	11	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		29	11	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		14	5.4	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		29	11	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		73	27	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		14	5.4	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		14	5.4	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		73	27	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		2.9	0.78	ug/kg	1
Phenol	108-95-2	8270D	ND		14	5.4	ug/kg	1
Pyrene	129-00-0	8270D	ND		2.9	0.54	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		36	11	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		73	11	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		73	27	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		14	5.4	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		14	5.4	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		41	33-102
2-Fluorophenol		37	35-115
Nitrobenzene-d5		44	22-109
Phenol-d5		36	33-122
Terphenyl-d14		45	41-120
2,4,6-Tribromophenol		65	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-002
Description: CMR-WB10-6.0-7.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0945
% Solids: 91.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 1707	DAL1	06/25/2019 1759	20678

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		10	10	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	12		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		74	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-002
Description: CMR-WB10-6.0-7.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0945
% Solids: 91.2
Date Received: 06/24/2019
06/24/2019 2310

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/07/2019 0004	DAL1	06/25/2019 1759	20679

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		62	40-140
2-Fluorobiphenyl (fractionation 1)		87	40-140
o - Terphenyl (aromatic)		76	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-002
Description: CMR-WB10-6.0-7.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0945
% Solids: 91.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1459	JJG		21739

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	1.5	J	4.0	0.80	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	13		4.0	0.80	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	150	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-002
Description: CMR-WB10-6.0-7.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0945
% Solids: 91.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1459	JJG		21738

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.27	0.036	mg/kg	1
C9 - C10 Aromatics		Montana VPH	8.7		1.3	0.53	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	0.14	J	0.27	0.033	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.27	0.058	mg/kg	1
Naphthalene	91-20-3	Montana VPH	0.66		0.27	0.14	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.27	0.043	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.27	0.060	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.28		0.27	0.030	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	133	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF24002-002
Description: CMR-WB10-6.0-7.0-190621
Matrix: Solid
Date Sampled: 06/21/2019 0945
% Solids: 91.2 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1459	JJG		21737

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	29		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	216	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB10-6.0-7.0-190621
Date Sampled: 06/21/2019 0945
Date Received: 06/24/2019

Laboratory ID: UF24002-002
Matrix: Solid
% Solids: 91.2 06/24/2019 2310

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/02/2019 2148	BNW	07/01/2019 0831	21081
1	7471B	7471B	1	06/28/2019 1722	TJW	06/27/2019 1855	20850

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.24	J	0.53	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	2.4		0.53	0.21	mg/kg	1
Barium	7440-39-3	6020B	200		1.4	0.33	mg/kg	1
Beryllium	7440-41-7	6020B	0.14		0.11	0.036	mg/kg	1
Cadmium	7440-43-9	6020B	0.036	J	0.14	0.027	mg/kg	1
Chromium	7440-47-3	6020B	72		1.4	0.59	mg/kg	1
Cobalt	7440-48-4	6020B	5.8		1.4	0.32	mg/kg	1
Copper	7440-50-8	6020B	15		1.4	0.35	mg/kg	1
Lead	7439-92-1	6020B	6.8		0.27	0.073	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.090	0.022	mg/kg	1
Nickel	7440-02-0	6020B	18		1.4	0.32	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.50	mg/kg	1
Silver	7440-22-4	6020B	ND		0.27	0.064	mg/kg	1
Vanadium	7440-62-2	6020B	71		1.4	0.27	mg/kg	1
Zinc	7440-66-6	6020B	48		2.7	0.53	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-003
Description: CMR-WB10-9.0-9.5-190621
Matrix: Solid
Date Sampled: 06/21/2019 0950
% Solids: 91.7 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/01/2019 1642	JM1		21331	6.80

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	69		16	3.2	ug/kg	1
Benzene	71-43-2	8260B	ND		4.0	1.6	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.0	1.6	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.0	1.6	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.0	1.6	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.0	1.6	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		16	3.2	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.0	1.6	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.0	1.6	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.0	1.6	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.0	1.6	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.0	1.6	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.0	1.6	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.0	1.6	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.0	1.6	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.0	1.6	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.0	1.6	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.0	1.6	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.0	1.6	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.0	1.6	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.0	1.6	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.0	1.6	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.0	1.6	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.0	1.6	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.0	1.6	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.0	1.6	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.0	1.6	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.0	1.6	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.0	1.6	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		200	20	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.0	1.6	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		8.0	3.2	ug/kg	1
Isopropylbenzene	98-82-8	8260B	2.2	J	4.0	1.6	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.0	1.6	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.0	1.6	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		8.0	3.2	ug/kg	1
Methylcyclohexane	108-87-2	8260B	11		4.0	1.6	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.0	1.6	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.0	1.6	ug/kg	1
Styrene	100-42-5	8260B	ND		4.0	1.6	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.0	1.6	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.0	1.6	ug/kg	1
Toluene	108-88-3	8260B	ND		4.0	1.6	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.0	1.6	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-003
Description: CMR-WB10-9.0-9.5-190621
Matrix: Solid
Date Sampled: 06/21/2019 0950
% Solids: 91.7 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/01/2019 1642	JM1		21331	6.80

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.0	1.6	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.0	1.6	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.0	1.6	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.0	1.6	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.0	1.6	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.0	1.6	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.0	1.6	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		8.0	3.2	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.0	1.6	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.0	1.6	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		93	53-142
Bromofluorobenzene		104	47-138
Toluene-d8		102	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-003
Description: CMR-WB10-9.0-9.5-190621
Matrix: Solid
Date Sampled: 06/21/2019 0950
% Solids: 91.7
06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/06/2019 2142	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		2.8	0.88	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		2.8	1.0	ug/kg	1
Anthracene	120-12-7	8270D	ND		2.8	0.54	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		2.8	0.62	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		2.8	0.70	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		2.8	0.53	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		2.8	0.69	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		2.8	0.51	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		14	5.3	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		14	5.3	ug/kg	1
Carbazole	86-74-8	8270D	ND		14	5.3	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		14	5.3	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		14	5.3	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		14	5.3	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		14	5.3	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		14	5.3	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		14	5.3	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		14	5.3	ug/kg	1
Chrysene	218-01-9	8270D	ND		2.8	0.47	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		2.8	0.54	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		14	5.3	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		71	26	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		71	26	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		71	26	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		14	5.3	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		14	5.3	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		14	5.3	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		14	7.8	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		14	5.3	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		14	5.3	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		71	26	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		71	26	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		28	11	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		28	11	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		14	5.3	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		71	26	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		2.8	0.44	ug/kg	1
Fluorene	86-73-7	8270D	ND		2.8	0.60	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		14	5.3	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		14	5.3	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		71	26	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		14	5.3	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		2.8	1.1	ug/kg	1
Isophorone	78-59-1	8270D	ND		14	5.3	ug/kg	1

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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-003
Description: CMR-WB10-9.0-9.5-190621
Matrix: Solid
Date Sampled: 06/21/2019 0950
% Solids: 91.7 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/06/2019 2142	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	2.2	J	2.8	1.0	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		14	5.3	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		28	11	ug/kg	1
Naphthalene	91-20-3	8270D	ND		2.8	1.0	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		28	11	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		28	11	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		28	11	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		14	5.3	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		28	11	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		71	26	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		14	5.3	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		14	5.3	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		71	26	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		2.8	0.76	ug/kg	1
Phenol	108-95-2	8270D	ND		14	5.3	ug/kg	1
Pyrene	129-00-0	8270D	ND		2.8	0.53	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		35	11	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		71	11	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		71	26	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		14	5.3	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		14	5.3	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		58	33-102
2-Fluorophenol		51	35-115
Nitrobenzene-d5		60	22-109
Phenol-d5		51	33-122
Terphenyl-d14		83	41-120
2,4,6-Tribromophenol		74	30-117

LOQ = Limit of Quantitation
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-003
Description: CMR-WB10-9.0-9.5-190621
Matrix: Solid
Date Sampled: 06/21/2019 0950
% Solids: 91.7 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 1736	DAL1	06/25/2019 1759	20678

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		10	10	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	15		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		67	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-003
Description: CMR-WB10-9.0-9.5-190621
Matrix: Solid
Date Sampled: 06/21/2019 0950
% Solids: 91.7 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/07/2019 0034	DAL1	06/25/2019 1759	20679

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		62	40-140
2-Fluorobiphenyl (fractionation 1)		75	40-140
o - Terphenyl (aromatic)		67	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-003
Description: CMR-WB10-9.0-9.5-190621
Matrix: Solid
Date Sampled: 06/21/2019 0950
% Solids: 91.7 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1528	JJG		21739

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.2	0.85	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	2.5	J	4.2	0.85	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		106	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF24002-003
Description: CMR-WB10-9.0-9.5-190621
Matrix: Solid
Date Sampled: 06/21/2019 0950
% Solids: 91.7 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1528	JJG		21738

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.28	0.038	mg/kg	1
C9 - C10 Aromatics		Montana VPH	0.64	J	1.4	0.57	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.28	0.035	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.28	0.061	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.28	0.15	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.28	0.045	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.28	0.063	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.036	J	0.28	0.032	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF24002-003
Description: CMR-WB10-9.0-9.5-190621
Matrix: Solid
Date Sampled: 06/21/2019 0950
% Solids: 91.7 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1528	JJG		21737

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	4.9	J	8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		123	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-003
Description: CMR-WB10-9.0-9.5-190621
Matrix: Solid
Date Sampled: 06/21/2019 0950
% Solids: 91.7 06/24/2019 2310
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/02/2019 2153	BNW	07/01/2019 0831	21081
1	7471B	7471B	1	06/28/2019 1725	TJW	06/27/2019 1855	20850

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.54	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	1.5		0.54	0.22	mg/kg	1
Barium	7440-39-3	6020B	1400		1.4	0.34	mg/kg	1
Beryllium	7440-41-7	6020B	0.15		0.11	0.037	mg/kg	1
Cadmium	7440-43-9	6020B	1.3		0.14	0.027	mg/kg	1
Chromium	7440-47-3	6020B	28		1.4	0.60	mg/kg	1
Cobalt	7440-48-4	6020B	7.9		1.4	0.33	mg/kg	1
Copper	7440-50-8	6020B	14		1.4	0.35	mg/kg	1
Lead	7439-92-1	6020B	6.3		0.27	0.074	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.082	0.020	mg/kg	1
Nickel	7440-02-0	6020B	21		1.4	0.33	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.51	mg/kg	1
Silver	7440-22-4	6020B	ND		0.27	0.065	mg/kg	1
Vanadium	7440-62-2	6020B	76		1.4	0.27	mg/kg	1
Zinc	7440-66-6	6020B	56		2.7	0.54	mg/kg	1

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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-004
Description: TB-21-20190621
Matrix: Aqueous
Date Sampled: 06/21/2019
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/04/2019 0154	STM		21588

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF24002-004
Description: TB-21-20190621
Matrix: Aqueous
Date Sampled: 06/21/2019
Date Received: 06/24/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/04/2019 0154	STM		21588

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		81	70-130
Bromofluorobenzene		91	70-130
Toluene-d8		89	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21331-001
Batch: 21331
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	4.0	ug/kg	07/01/2019 1024
Benzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Bromochloromethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Bromoform	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Bromomethane (Methyl bromide)	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	07/01/2019 1024
Carbon disulfide	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Chlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Chloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Chloroform	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Chloromethane (Methyl chloride)	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Cyclohexane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Dichlorodifluoromethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,4-Dioxane	ND		1	250	25	ug/kg	07/01/2019 1024
Ethylbenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
2-Hexanone	ND		1	10	4.0	ug/kg	07/01/2019 1024
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Methyl acetate	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	07/01/2019 1024
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Methylene chloride	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Naphthalene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Styrene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Toluene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21331-001
Batch: 21331
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Trichloroethene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Vinyl chloride	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Xylenes (total)	ND		1	10	4.0	ug/kg	07/01/2019 1024
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
o - Xylenes	ND		1	5.0	2.0	ug/kg	07/01/2019 1024

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21331-002
Batch: 21331
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	94		1	94	60-140	07/01/2019 1001
Benzene	50	51		1	101	70-130	07/01/2019 1001
Bromochloromethane	50	50		1	99	70-130	07/01/2019 1001
Bromodichloromethane	50	51		1	102	70-130	07/01/2019 1001
Bromoform	50	50		1	100	70-130	07/01/2019 1001
Bromomethane (Methyl bromide)	50	48		1	96	70-130	07/01/2019 1001
2-Butanone (MEK)	100	93		1	93	60-140	07/01/2019 1001
Carbon disulfide	50	52		1	103	70-130	07/01/2019 1001
Carbon tetrachloride	50	50		1	100	70-130	07/01/2019 1001
Chlorobenzene	50	52		1	104	70-130	07/01/2019 1001
Chloroethane	50	51		1	103	70-130	07/01/2019 1001
Chloroform	50	50		1	100	70-130	07/01/2019 1001
Chloromethane (Methyl chloride)	50	46		1	91	60-140	07/01/2019 1001
Cyclohexane	50	47		1	94	70-130	07/01/2019 1001
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	93	70-130	07/01/2019 1001
Dibromochloromethane	50	51		1	102	70-130	07/01/2019 1001
1,2-Dibromoethane (EDB)	50	53		1	105	70-130	07/01/2019 1001
1,2-Dichlorobenzene	50	51		1	102	70-130	07/01/2019 1001
1,3-Dichlorobenzene	50	52		1	104	70-130	07/01/2019 1001
1,4-Dichlorobenzene	50	51		1	103	70-130	07/01/2019 1001
Dichlorodifluoromethane	50	41		1	82	60-140	07/01/2019 1001
1,1-Dichloroethane	50	52		1	103	70-130	07/01/2019 1001
1,2-Dichloroethane	50	51		1	101	70-130	07/01/2019 1001
1,1-Dichloroethene	50	50		1	100	70-130	07/01/2019 1001
cis-1,2-Dichloroethene	50	50		1	99	70-130	07/01/2019 1001
trans-1,2-Dichloroethene	50	50		1	101	70-130	07/01/2019 1001
1,2-Dichloropropane	50	51		1	102	70-130	07/01/2019 1001
cis-1,3-Dichloropropene	50	52		1	103	70-130	07/01/2019 1001
trans-1,3-Dichloropropene	50	53		1	106	70-130	07/01/2019 1001
1,4-Dioxane	500	490		1	99	60-140	07/01/2019 1001
Ethylbenzene	50	52		1	103	70-130	07/01/2019 1001
2-Hexanone	100	95		1	95	70-130	07/01/2019 1001
Isopropylbenzene	50	51		1	102	70-130	07/01/2019 1001
Methyl acetate	50	36		1	71	70-130	07/01/2019 1001
Methyl tertiary butyl ether (MTBE)	50	50		1	99	70-130	07/01/2019 1001
4-Methyl-2-pentanone	100	95		1	95	70-130	07/01/2019 1001
Methylcyclohexane	50	47		1	94	70-130	07/01/2019 1001
Methylene chloride	50	48		1	97	70-130	07/01/2019 1001
Naphthalene	50	47		1	94	70-130	07/01/2019 1001
Styrene	50	51		1	102	70-130	07/01/2019 1001
1,1,2,2-Tetrachloroethane	50	49		1	99	70-130	07/01/2019 1001
Tetrachloroethene	50	53		1	106	70-130	07/01/2019 1001
Toluene	50	50		1	101	70-130	07/01/2019 1001
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	98	70-130	07/01/2019 1001

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21331-002
Batch: 21331
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	100	70-130	07/01/2019 1001
1,2,4-Trichlorobenzene	50	49		1	99	70-130	07/01/2019 1001
1,1,1-Trichloroethane	50	50		1	100	70-130	07/01/2019 1001
1,1,2-Trichloroethane	50	50		1	101	70-130	07/01/2019 1001
Trichloroethene	50	51		1	102	70-130	07/01/2019 1001
Trichlorofluoromethane	50	47		1	95	70-130	07/01/2019 1001
Vinyl chloride	50	44		1	89	70-130	07/01/2019 1001
Xylenes (total)	100	100		1	104	70-130	07/01/2019 1001
m+p - Xylenes	50	52		1	105	70-130	07/01/2019 1001
o - Xylenes	50	52		1	103	70-130	07/01/2019 1001

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		102	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21588-001
Batch: 21588
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/04/2019 0046
Benzene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Bromoform	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/04/2019 0046
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/04/2019 0046
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Chloroethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Chloroform	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Cyclohexane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/04/2019 0046
1,4-Dioxane	ND		1	20	13	ug/L	07/04/2019 0046
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
2-Hexanone	ND		1	10	2.0	ug/L	07/04/2019 0046
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Methyl acetate	ND		1	1.0	0.40	ug/L	07/04/2019 0046
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/04/2019 0046
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/04/2019 0046
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/04/2019 0046
Methylene chloride	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Naphthalene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Styrene	ND		1	0.50	0.41	ug/L	07/04/2019 0046
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Toluene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/04/2019 0046

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21588-001
Batch: 21588
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Trichloroethene	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/04/2019 0046
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/04/2019 0046
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/04/2019 0046
o - Xylenes	ND		1	0.50	0.40	ug/L	07/04/2019 0046

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		86	70-130
Bromofluorobenzene		94	70-130
Toluene-d8		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21588-002
Batch: 21588
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	100		1	103	60-140	07/03/2019 2349
Benzene	50	49		1	97	70-130	07/03/2019 2349
Bromochloromethane	50	48		1	96	70-130	07/03/2019 2349
Bromodichloromethane	50	49		1	97	70-130	07/03/2019 2349
Bromoform	50	51		1	103	70-130	07/03/2019 2349
Bromomethane (Methyl bromide)	50	41		1	81	70-130	07/03/2019 2349
2-Butanone (MEK)	100	100		1	104	70-130	07/03/2019 2349
Carbon disulfide	50	44		1	88	70-130	07/03/2019 2349
Carbon tetrachloride	50	50		1	100	70-130	07/03/2019 2349
Chlorobenzene	50	48		1	97	70-130	07/03/2019 2349
Chloroethane	50	35	N	1	69	70-130	07/03/2019 2349
Chloroform	50	45		1	91	70-130	07/03/2019 2349
Chloromethane (Methyl chloride)	50	39		1	78	60-140	07/03/2019 2349
Cyclohexane	50	46		1	92	70-130	07/03/2019 2349
1,2-Dibromo-3-chloropropane (DBCP)	50	45		1	91	70-130	07/03/2019 2349
Dibromochloromethane	50	51		1	103	70-130	07/03/2019 2349
1,2-Dibromoethane (EDB)	50	49		1	99	70-130	07/03/2019 2349
1,2-Dichlorobenzene	50	48		1	97	70-130	07/03/2019 2349
1,3-Dichlorobenzene	50	49		1	98	70-130	07/03/2019 2349
1,4-Dichlorobenzene	50	47		1	93	70-130	07/03/2019 2349
Dichlorodifluoromethane	50	45		1	90	60-140	07/03/2019 2349
1,1-Dichloroethane	50	46		1	92	70-130	07/03/2019 2349
1,2-Dichloroethane	50	48		1	97	70-130	07/03/2019 2349
1,1-Dichloroethene	50	52		1	104	70-130	07/03/2019 2349
cis-1,2-Dichloroethene	50	47		1	95	70-130	07/03/2019 2349
trans-1,2-Dichloroethene	50	51		1	102	70-130	07/03/2019 2349
1,2-Dichloropropane	50	47		1	93	70-130	07/03/2019 2349
cis-1,3-Dichloropropene	50	50		1	99	70-130	07/03/2019 2349
trans-1,3-Dichloropropene	50	50		1	100	70-130	07/03/2019 2349
1,4-Dioxane	500	580		1	115	60-140	07/03/2019 2349
Ethylbenzene	50	50		1	100	70-130	07/03/2019 2349
2-Hexanone	100	87		1	87	70-130	07/03/2019 2349
Isopropylbenzene	50	54		1	108	70-130	07/03/2019 2349
Methyl acetate	50	37		1	75	70-130	07/03/2019 2349
Methyl tertiary butyl ether (MTBE)	50	46		1	92	70-130	07/03/2019 2349
4-Methyl-2-pentanone	100	91		1	91	70-130	07/03/2019 2349
Methylcyclohexane	50	55		1	109	70-130	07/03/2019 2349
Methylene chloride	50	42		1	85	70-130	07/03/2019 2349
Naphthalene	50	51		1	102	70-130	07/03/2019 2349
Styrene	50	52		1	103	70-130	07/03/2019 2349
1,1,2,2-Tetrachloroethane	50	49		1	98	70-130	07/03/2019 2349
Tetrachloroethene	50	53		1	105	70-130	07/03/2019 2349
Toluene	50	50		1	100	70-130	07/03/2019 2349
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	50		1	100	70-130	07/03/2019 2349

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21588-002
Batch: 21588
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	52		1	104	70-130	07/03/2019 2349
1,2,4-Trichlorobenzene	50	51		1	102	70-130	07/03/2019 2349
1,1,1-Trichloroethane	50	45		1	91	70-130	07/03/2019 2349
1,1,2-Trichloroethane	50	49		1	99	70-130	07/03/2019 2349
Trichloroethene	50	51		1	102	70-130	07/03/2019 2349
Trichlorofluoromethane	50	48		1	97	70-130	07/03/2019 2349
Vinyl chloride	50	41		1	81	70-130	07/03/2019 2349
Xylenes (total)	100	100		1	103	70-130	07/03/2019 2349
m+p - Xylenes	50	51		1	102	70-130	07/03/2019 2349
o - Xylenes	50	52		1	104	70-130	07/03/2019 2349

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		83	70-130
Bromofluorobenzene		94	70-130
Toluene-d8		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21695-001
Batch: 21695
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	07/02/2019 1740
Benzene	ND		1	250	100	ug/kg	07/02/2019 1740
Bromochloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Bromodichloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Bromoform	ND		1	250	100	ug/kg	07/02/2019 1740
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	07/02/2019 1740
2-Butanone (MEK)	ND		1	1000	200	ug/kg	07/02/2019 1740
Carbon disulfide	ND		1	250	100	ug/kg	07/02/2019 1740
Carbon tetrachloride	ND		1	250	100	ug/kg	07/02/2019 1740
Chlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Chloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Chloroform	ND		1	250	100	ug/kg	07/02/2019 1740
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	07/02/2019 1740
Cyclohexane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	07/02/2019 1740
Dibromochloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Dichlorodifluoromethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1-Dichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichloropropane	ND		1	250	100	ug/kg	07/02/2019 1740
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	07/02/2019 1740
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	07/02/2019 1740
1,4-Dioxane	ND		1	13000	1300	ug/kg	07/02/2019 1740
Ethylbenzene	ND		1	250	100	ug/kg	07/02/2019 1740
2-Hexanone	ND		1	500	200	ug/kg	07/02/2019 1740
Isopropylbenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Methyl acetate	ND		1	250	100	ug/kg	07/02/2019 1740
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	07/02/2019 1740
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	07/02/2019 1740
Methylcyclohexane	ND		1	250	100	ug/kg	07/02/2019 1740
Methylene chloride	ND		1	250	100	ug/kg	07/02/2019 1740
Naphthalene	ND		1	250	100	ug/kg	07/02/2019 1740
Styrene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Tetrachloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
Toluene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	07/02/2019 1740

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21695-001
Batch: 21695
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Trichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
Trichlorofluoromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Vinyl chloride	ND		1	250	100	ug/kg	07/02/2019 1740
Xylenes (total)	ND		1	500	200	ug/kg	07/02/2019 1740
m+p - Xylenes	ND		1	250	100	ug/kg	07/02/2019 1740
o - Xylenes	ND		1	250	100	ug/kg	07/02/2019 1740

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		105	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		106	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21695-002
Batch: 21695
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	5200		1	104	60-140	07/02/2019 1718
Benzene	2500	2500		1	101	70-130	07/02/2019 1718
Bromochloromethane	2500	2500		1	99	70-130	07/02/2019 1718
Bromodichloromethane	2500	2600		1	103	70-130	07/02/2019 1718
Bromoform	2500	2500		1	99	70-130	07/02/2019 1718
Bromomethane (Methyl bromide)	2500	1700	N	1	68	70-130	07/02/2019 1718
2-Butanone (MEK)	5000	5600		1	113	60-140	07/02/2019 1718
Carbon disulfide	2500	2200		1	89	70-130	07/02/2019 1718
Carbon tetrachloride	2500	2600		1	105	70-130	07/02/2019 1718
Chlorobenzene	2500	2600		1	105	70-130	07/02/2019 1718
Chloroethane	2500	2300		1	92	70-130	07/02/2019 1718
Chloroform	2500	2500		1	99	70-130	07/02/2019 1718
Chloromethane (Methyl chloride)	2500	1900		1	78	60-140	07/02/2019 1718
Cyclohexane	2500	2600		1	105	70-130	07/02/2019 1718
1,2-Dibromo-3-chloropropane (DBCP)	2500	2400		1	95	70-130	07/02/2019 1718
Dibromochloromethane	2500	2600		1	103	70-130	07/02/2019 1718
1,2-Dibromoethane (EDB)	2500	2700		1	107	70-130	07/02/2019 1718
1,2-Dichlorobenzene	2500	2700		1	106	70-130	07/02/2019 1718
1,3-Dichlorobenzene	2500	2700		1	108	70-130	07/02/2019 1718
1,4-Dichlorobenzene	2500	2700		1	107	70-130	07/02/2019 1718
Dichlorodifluoromethane	2500	1600		1	66	60-140	07/02/2019 1718
1,1-Dichloroethane	2500	2500		1	101	70-130	07/02/2019 1718
1,2-Dichloroethane	2500	2500		1	101	70-130	07/02/2019 1718
1,1-Dichloroethene	2500	2400		1	95	70-130	07/02/2019 1718
cis-1,2-Dichloroethene	2500	2500		1	98	70-130	07/02/2019 1718
trans-1,2-Dichloroethene	2500	2500		1	98	70-130	07/02/2019 1718
1,2-Dichloropropane	2500	2500		1	101	70-130	07/02/2019 1718
cis-1,3-Dichloropropene	2500	2600		1	105	70-130	07/02/2019 1718
trans-1,3-Dichloropropene	2500	2700		1	107	70-130	07/02/2019 1718
1,4-Dioxane	25000	25000		1	100	60-140	07/02/2019 1718
Ethylbenzene	2500	2700		1	107	70-130	07/02/2019 1718
2-Hexanone	5000	5600		1	113	70-130	07/02/2019 1718
Isopropylbenzene	2500	2700		1	106	70-130	07/02/2019 1718
Methyl acetate	2500	1900		1	74	70-130	07/02/2019 1718
Methyl tertiary butyl ether (MTBE)	2500	2400		1	97	70-130	07/02/2019 1718
4-Methyl-2-pentanone	5000	4800		1	96	70-130	07/02/2019 1718
Methylcyclohexane	2500	2900		1	118	70-130	07/02/2019 1718
Methylene chloride	2500	2200		1	88	70-130	07/02/2019 1718
Naphthalene	2500	2400		1	98	70-130	07/02/2019 1718
Styrene	2500	2700		1	106	70-130	07/02/2019 1718
1,1,2,2-Tetrachloroethane	2500	2600		1	105	70-130	07/02/2019 1718
Tetrachloroethene	2500	2800		1	112	70-130	07/02/2019 1718
Toluene	2500	2600		1	104	70-130	07/02/2019 1718
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	2900		1	115	70-130	07/02/2019 1718

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21695-002
Batch: 21695
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2700		1	106	70-130	07/02/2019 1718
1,2,4-Trichlorobenzene	2500	2700		1	108	70-130	07/02/2019 1718
1,1,1-Trichloroethane	2500	2400		1	98	70-130	07/02/2019 1718
1,1,2-Trichloroethane	2500	2600		1	103	70-130	07/02/2019 1718
Trichloroethene	2500	2600		1	102	70-130	07/02/2019 1718
Trichlorofluoromethane	2500	2600		1	102	70-130	07/02/2019 1718
Vinyl chloride	2500	2100		1	83	70-130	07/02/2019 1718
Xylenes (total)	5000	5300		1	106	70-130	07/02/2019 1718
m+p - Xylenes	2500	2700		1	107	70-130	07/02/2019 1718
o - Xylenes	2500	2600		1	105	70-130	07/02/2019 1718

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		98	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20811-001
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	07/06/2019 1905
Acenaphthylene	ND		1	2.7	0.95	ug/kg	07/06/2019 1905
Anthracene	ND		1	2.7	0.51	ug/kg	07/06/2019 1905
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	07/06/2019 1905
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	07/06/2019 1905
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	07/06/2019 1905
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	07/06/2019 1905
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	07/06/2019 1905
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
Carbazole	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	07/06/2019 1905
2-Chlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
Chrysene	ND		1	2.7	0.45	ug/kg	07/06/2019 1905
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	07/06/2019 1905
Dibenzofuran	ND		1	13	5.0	ug/kg	07/06/2019 1905
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	07/06/2019 1905
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
Diethylphthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
Dimethyl phthalate	ND		1	13	7.4	ug/kg	07/06/2019 1905
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	07/06/2019 1905
2,4-Dinitrophenol	ND		1	67	25	ug/kg	07/06/2019 1905
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	07/06/2019 1905
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	07/06/2019 1905
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	07/06/2019 1905
Fluoranthene	ND		1	2.7	0.42	ug/kg	07/06/2019 1905
Fluorene	ND		1	2.7	0.57	ug/kg	07/06/2019 1905
Hexachlorobenzene	ND		1	13	5.0	ug/kg	07/06/2019 1905
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	07/06/2019 1905
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	07/06/2019 1905
Hexachloroethane	ND		1	13	5.0	ug/kg	07/06/2019 1905
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	07/06/2019 1905
Isophorone	ND		1	13	5.0	ug/kg	07/06/2019 1905

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20811-001
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	07/06/2019 1905
2-Methylphenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
3+4-Methylphenol	ND		1	27	10	ug/kg	07/06/2019 1905
Naphthalene	ND		1	2.7	0.97	ug/kg	07/06/2019 1905
2-Nitroaniline	ND		1	27	10	ug/kg	07/06/2019 1905
3-Nitroaniline	ND		1	27	10	ug/kg	07/06/2019 1905
4-Nitroaniline	ND		1	27	10	ug/kg	07/06/2019 1905
Nitrobenzene	ND		1	13	5.0	ug/kg	07/06/2019 1905
2-Nitrophenol	ND		1	27	10	ug/kg	07/06/2019 1905
4-Nitrophenol	ND		1	67	25	ug/kg	07/06/2019 1905
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	07/06/2019 1905
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	07/06/2019 1905
Pentachlorophenol	ND		1	67	25	ug/kg	07/06/2019 1905
Phenanthrene	ND		1	2.7	0.72	ug/kg	07/06/2019 1905
Phenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
Pyrene	ND		1	2.7	0.50	ug/kg	07/06/2019 1905
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	07/06/2019 1905
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	07/06/2019 1905
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		58	33-102
2-Fluorophenol		54	35-115
Nitrobenzene-d5		61	22-109
Phenol-d5		55	33-122
Terphenyl-d14		88	41-120
2,4,6-Tribromophenol		85	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20811-002
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	80		1	60	12-111	07/06/2019 1930
Acenaphthylene	130	84		1	63	44-122	07/06/2019 1930
Anthracene	130	93		1	70	16-122	07/06/2019 1930
Benzo(a)anthracene	130	94		1	71	40-121	07/06/2019 1930
Benzo(a)pyrene	130	99		1	75	36-114	07/06/2019 1930
Benzo(b)fluoranthene	130	100		1	79	38-123	07/06/2019 1930
Benzo(g,h,i)perylene	130	110		1	80	43-120	07/06/2019 1930
Benzo(k)fluoranthene	130	97		1	73	40-126	07/06/2019 1930
4-Bromophenyl phenyl ether	130	88		1	66	30-130	07/06/2019 1930
Butyl benzyl phthalate	130	110		1	82	48-124	07/06/2019 1930
Carbazole	130	95		1	71	47-125	07/06/2019 1930
bis (2-Chloro-1-methylethyl) ether	130	80		1	60	41-113	07/06/2019 1930
4-Chloro-3-methyl phenol	130	81		1	61	48-120	07/06/2019 1930
bis(2-Chloroethoxy)methane	130	78		1	58	38-115	07/06/2019 1930
bis(2-Chloroethyl)ether	130	78		1	59	46-122	07/06/2019 1930
2-Chloronaphthalene	130	79		1	59	37-106	07/06/2019 1930
2-Chlorophenol	130	79		1	59	44-122	07/06/2019 1930
4-Chlorophenyl phenyl ether	130	82		1	61	32-107	07/06/2019 1930
Chrysene	130	96		1	73	41-124	07/06/2019 1930
Dibenzo(a,h)anthracene	130	110		1	84	38-125	07/06/2019 1930
Dibenzofuran	130	82		1	61	45-128	07/06/2019 1930
1,2-Dichlorobenzene	130	71		1	54	39-94	07/06/2019 1930
1,3-Dichlorobenzene	130	69		1	52	30-130	07/06/2019 1930
1,4-Dichlorobenzene	130	70		1	53	39-92	07/06/2019 1930
3,3'-Dichlorobenzidine	130	69		1	52	10-119	07/06/2019 1930
2,4-Dichlorophenol	130	78		1	58	30-96	07/06/2019 1930
Diethylphthalate	130	86		1	65	30-130	07/06/2019 1930
Dimethyl phthalate	130	87		1	65	24-127	07/06/2019 1930
2,4-Dimethylphenol	130	130		1	97	30-130	07/06/2019 1930
Di-n-butyl phthalate	130	90		1	68	35-108	07/06/2019 1930
4,6-Dinitro-2-methylphenol	130	110		1	81	53-150	07/06/2019 1930
2,4-Dinitrophenol	270	190		1	72	32-115	07/06/2019 1930
2,4-Dinitrotoluene	130	89		1	67	40-130	07/06/2019 1930
2,6-Dinitrotoluene	130	86		1	64	46-118	07/06/2019 1930
Di-n-octylphthalate	130	110		1	82	49-118	07/06/2019 1930
bis(2-Ethylhexyl)phthalate	130	120		1	88	33-123	07/06/2019 1930
Fluoranthene	130	88		1	66	26-133	07/06/2019 1930
Fluorene	130	82		1	62	19-108	07/06/2019 1930
Hexachlorobenzene	130	91		1	68	10-125	07/06/2019 1930
Hexachlorobutadiene	130	68		1	51	47-116	07/06/2019 1930
Hexachlorocyclopentadiene	670	340		1	50	48-127	07/06/2019 1930
Hexachloroethane	130	67		1	50	18-154	07/06/2019 1930
Indeno(1,2,3-c,d)pyrene	130	100		1	78	42-123	07/06/2019 1930
Isophorone	130	86		1	65	30-130	07/06/2019 1930

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20811-002
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	76		1	57	10-107	07/06/2019 1930
2-Methylphenol	130	81		1	61	33-103	07/06/2019 1930
3+4-Methylphenol	130	97		1	73	18-121	07/06/2019 1930
Naphthalene	130	76		1	57	10-112	07/06/2019 1930
2-Nitroaniline	130	100		1	76	46-128	07/06/2019 1930
3-Nitroaniline	130	54		1	41	30-130	07/06/2019 1930
4-Nitroaniline	130	83		1	63	51-129	07/06/2019 1930
Nitrobenzene	130	83		1	63	49-142	07/06/2019 1930
2-Nitrophenol	130	87		1	66	33-114	07/06/2019 1930
4-Nitrophenol	270	170		1	63	27-138	07/06/2019 1930
N-Nitrosodi-n-propylamine	130	88		1	66	45-112	07/06/2019 1930
N-Nitrosodiphenylamine (Diphenylamine)	130	99		1	74	49-123	07/06/2019 1930
Pentachlorophenol	270	190		1	70	36-108	07/06/2019 1930
Phenanthrene	130	88		1	66	16-123	07/06/2019 1930
Phenol	130	86		1	64	39-108	07/06/2019 1930
Pyrene	130	92		1	69	34-121	07/06/2019 1930
1,2,4,5-Tetrachlorobenzene	130	76		1	57	30-130	07/06/2019 1930
2,3,4,6-Tetrachlorophenol	130	90		1	68	53-125	07/06/2019 1930
1,2,4-Trichlorobenzene	130	73		1	55	30-130	07/06/2019 1930
2,4,5-Trichlorophenol	130	85		1	64	32-105	07/06/2019 1930
2,4,6-Trichlorophenol	130	84		1	63	31-102	07/06/2019 1930

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		60	33-102
2-Fluorophenol		61	35-115
Nitrobenzene-d5		64	22-109
Phenol-d5		62	33-122
Terphenyl-d14		80	41-120
2,4,6-Tribromophenol		82	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20678-001
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	07/06/2019 1238
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	07/06/2019 1238

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20678-002
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	40-140	07/06/2019 1308
C9 - C18 Aliphatics	30	19		1	65	40-140	07/06/2019 1308

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		75	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20678-003
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	0.64	40-140	25	07/06/2019 1338
C9 - C18 Aliphatics	30	19		1	64	2.1	40-140	25	07/06/2019 1338

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20679-001
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	07/06/2019 2036

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		72	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		85	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20679-002
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	68		1	81	40-140	07/06/2019 2105

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		92	40-140
o - Terphenyl (aromatic)		91	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20679-003
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	56		1	66	20	40-140	25	07/06/2019 2135

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		71	40-140
2-Fluorobiphenyl (fractionation 1)		73	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21737-001
Batch: 21737
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21737-002
Batch: 21737
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	21		1	109	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21737-003
Batch: 21737
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	107	2.5	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		85	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21738-001
Batch: 21738
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	07/03/2019 1348
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	07/03/2019 1348
Ethylbenzene	ND		1	0.25	0.031	mg/kg	07/03/2019 1348
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	07/03/2019 1348
Naphthalene	ND		1	0.25	0.13	mg/kg	07/03/2019 1348
Toluene	ND		1	0.25	0.040	mg/kg	07/03/2019 1348
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	07/03/2019 1348
o - Xylenes	ND		1	0.25	0.028	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		75	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21738-002
Batch: 21738
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	07/03/2019 1252
C9 - C10 Aromatics	1.3	1.3		1	104	70-130	07/03/2019 1252
Ethylbenzene	1.3	1.2		1	96	70-130	07/03/2019 1252
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	07/03/2019 1252
Naphthalene	1.3	1.0		1	80	70-130	07/03/2019 1252
Toluene	1.3	1.2		1	96	70-130	07/03/2019 1252
m+p - Xylenes	2.5	2.5		1	100	70-130	07/03/2019 1252
o - Xylenes	1.3	1.3		1	104	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21738-003
Batch: 21738
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
C9 - C10 Aromatics	1.3	1.2		1	96	8.0	70-130	25	07/03/2019 1320
Ethylbenzene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
Methyl tertiary butyl ether (MTBE)	1.3	1.0		1	80	9.5	70-130	25	07/03/2019 1320
Naphthalene	1.3	1.0		1	80	0.00	70-130	25	07/03/2019 1320
Toluene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
m+p - Xylenes	2.5	2.5		1	100	0.00	70-130	25	07/03/2019 1320
o - Xylenes	1.3	1.2		1	96	8.0	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - MB

Sample ID: UQ21739-001
Batch: 21739
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/03/2019 1348
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - LCS

Sample ID: UQ21739-002
Batch: 21739
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.4		1	109	70-130	07/03/2019 1252
C9 - C12 Aliphatics, Adjusted	3.8	4.5		1	120	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21739-003
Batch: 21739
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.3		1	107	2.1	70-130	25	07/03/2019 1320
C9 - C12 Aliphatics, Adjusted	3.8	4.2		1	112	7.0	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - MB

Sample ID: UQ21081-001
Batch: 21081
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	07/02/2019 2048
Arsenic	ND		1	0.50	0.20	mg/kg	07/02/2019 2048
Barium	ND		1	1.3	0.31	mg/kg	07/02/2019 2048
Beryllium	ND		1	0.10	0.034	mg/kg	07/02/2019 2048
Cadmium	ND		1	0.13	0.025	mg/kg	07/02/2019 2048
Chromium	ND		1	1.3	0.55	mg/kg	07/02/2019 2048
Cobalt	ND		1	1.3	0.30	mg/kg	07/02/2019 2048
Copper	ND		1	1.3	0.33	mg/kg	07/05/2019 1117
Lead	ND		1	0.25	0.068	mg/kg	07/02/2019 2048
Nickel	ND		1	1.3	0.30	mg/kg	07/02/2019 2048
Selenium	ND		1	1.3	0.47	mg/kg	07/02/2019 2048
Silver	ND		1	0.25	0.060	mg/kg	07/02/2019 2048
Vanadium	ND		1	1.3	0.25	mg/kg	07/02/2019 2048
Zinc	ND		1	2.5	0.50	mg/kg	07/02/2019 2048

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - LCS

Sample ID: UQ21081-002
Batch: 21081
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	48		1	96	80-120	07/02/2019 2054
Arsenic	50	50		1	101	80-120	07/02/2019 2054
Barium	50	48		1	96	80-120	07/02/2019 2054
Beryllium	50	48		1	96	80-120	07/02/2019 2054
Cadmium	50	48		1	96	80-120	07/02/2019 2054
Chromium	50	51		1	103	80-120	07/02/2019 2054
Cobalt	50	52		1	104	80-120	07/02/2019 2054
Copper	50	51		1	102	80-120	07/05/2019 1123
Lead	50	50		1	100	80-120	07/02/2019 2054
Nickel	50	51		1	101	80-120	07/02/2019 2054
Selenium	50	44		1	87	80-120	07/02/2019 2054
Silver	50	51		1	103	80-120	07/02/2019 2054
Vanadium	50	50		1	100	80-120	07/02/2019 2054
Zinc	50	44		1	87	80-120	07/02/2019 2054

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20850-001
Batch: 20850
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/27/2019 1855

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/28/2019 1634

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20850-002
Batch: 20850
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/27/2019 1855

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.88		1	105	80-120	06/28/2019 1637

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody

and

Miscellaneous Documents

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106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

Chain of Custody Record

Number 92781

Client: RAMBOLL US CORP	Report to Contact: Melissa Wilson, Daniel Drake	Telephone No. / E-mail: mwilson@ramboll.com, DDrake@ramboll.com
Address: 7500 College Blvd. #925	Sampler's Signature: X	Quote No.
City: Overland Park State: KS Zip Code: 66210	Printed Name: Andrew Hardwick, Brooks Bailey, Liz Borucki	Analysis (Attach list if more space is needed)
Project Name: CMR-RAIM-West Rail		Page 1 of 1
Project No.: 1690012344-003	P.O. No.	UF24002

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Matrix	No. of Containers by Preservative Type	VOL	SVOL	GRO	VPH	Metals	Remarks / Cooler I.D.
CMR-WB10-3.0-4.0-190621	6/21/19	0940	G, X	2, 4, 2	X	X	X	X	X	Cooler 2
CMR-WB10-6.0-7.0-190621		0945	G, X	2, 4, 2						Cooler 2
CMR-WB10-9.0-9.5-190621		0950	G, X	2, 4, 2						Cooler 2
TB-21	—	—	N/A, X	2						Cooler 2 / TRIP BLANK

AFH 6/21/19

Turn Around Time Required (Prior lab approval required for expedited TAT.)
☒ Standard ☐ Rush (Specify)

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☒ Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by: Andrew Hardwick	6/21/2019	16:00	1. Received by		
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by: FedEx	Date 6-24-19	Time 0941	4. Laboratory received by: Erin Brown	Date 6-24-19	Time 0941

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack
Receipt Temp: 1.7 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

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Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: ETB / 6/24/19 Lot #: UF24002

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

1.7 / 1.7 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☐ Yes	☑ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: ETB Date: 6/24/19

Comments:

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF25037, 2 Groundwater Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF25037 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB03S-190622	UF25037-001
CMR-WB02S-190622	UF25037-002
TB-22-20190622	UF25037-003

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

MS/MSD Recoveries
For the VOC and SVOC analysis suites MS/MSD results were reported. Recoveries were largely within criteria with the exception of 2-methylphenol, 3&4-methylphenol, and phenol. These out of criteria recoveries indicate a possible bias to results. Therefore, all 2-methylphenol, 3&4-methylphenol, and phenol results were flagged as estimated (J, UJ).

Blank Detections
During analysis, acetone was detected in trip blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All acetone results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF25037

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 2 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UF25037

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 2 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	Bis(2-ethylhexyl)phthalate detected in method blank. No project detections. No action taken. Acetone detected in trip blank. Project sample detections of acetone validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to sample dilution, no action taken.	No issues
Matrix Spike/Matrix Spike Duplicate	2-Methylphenol, 3&4-methylphenol, and phenol recovered low in MS/MSD sample. All 2-methylphenol, 3&4-methylphenol, and phenol results validated as estimated (J, UJ).	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out of high for acetone. See above.	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/a
Other Non-conformances	CCV out of criteria high for acetone. See above.	No other non-conformances noted.
Overall Assessment of Data	All 2-methylphenol, 3&4-methylphenol, and phenol results validated as estimated (J, UJ). Project sample detections of acetone validated as non-detect (U).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM West Rail

Project Number: 1690012344-003

Lot Number:**UF25037**

Date Completed:07/09/2019

07/10/2019 1:26 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF25037

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21644 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections above the LOQ for this compound in the samples associated with this batch; therefore, data quality is not impacted.

The continuing calibration verification (CCV) associated with samples -001, -002, and -003 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections above the LOQ for this compound in the associated samples; therefore, data quality is not impacted.

Semivolatiles
The method blank associated with batch 21123 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. There were no detections for this compound in the samples associated with this method blank.

The LCS associated with batch 21123 had phenol recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -001 had mutliple compounds recovered outside of the acceptance limits. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Samples -001 and -002 were diluted 5X and 10X, respectively, due to the sample matrix. The reporting limits have been raised accordingly.

Sample Summary
Ramboll US Corporation
Lot Number: UF25037

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB03S-190622	Aqueous	06/22/2019 1327	06/25/2019
002	CMR-WB02S-190622	Aqueous	06/22/2019 1605	06/25/2019
003	TB-22-20190622	Aqueous	06/22/2019	06/25/2019

(3 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF25037

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB03S-190622	Aqueous	Acetone	8260B	7.3	J	ug/L	5
001	CMR-WB03S-190622	Aqueous	C9 - C12 Aliphatics,	Montana VPH	15	J	ug/L	11
001	CMR-WB03S-190622	Aqueous	C9 - C10 Aromatics	Montana VPH	16	J	ug/L	12
001	CMR-WB03S-190622	Aqueous	Arsenic	6020B	3.4		ug/L	14
001	CMR-WB03S-190622	Aqueous	Barium	6020B	120		ug/L	14
001	CMR-WB03S-190622	Aqueous	Copper	6020B	5.8		ug/L	14
001	CMR-WB03S-190622	Aqueous	Mercury	7470A	0.00016	J	mg/L	14
001	CMR-WB03S-190622	Aqueous	Nickel	6020B	8.5		ug/L	14
001	CMR-WB03S-190622	Aqueous	Zinc	6020B	9.9	J	ug/L	14
002	CMR-WB02S-190622	Aqueous	Benzene	8260B	330		ug/L	15
002	CMR-WB02S-190622	Aqueous	Cyclohexane	8260B	42		ug/L	15
002	CMR-WB02S-190622	Aqueous	Ethylbenzene	8260B	330		ug/L	15
002	CMR-WB02S-190622	Aqueous	Isopropylbenzene	8260B	26		ug/L	15
002	CMR-WB02S-190622	Aqueous	Methyl tertiary butyl ether	8260B	6.3		ug/L	15
002	CMR-WB02S-190622	Aqueous	Methylcyclohexane	8260B	29		ug/L	15
002	CMR-WB02S-190622	Aqueous	Naphthalene	8260B	11		ug/L	15
002	CMR-WB02S-190622	Aqueous	Toluene	8260B	2.5		ug/L	15
002	CMR-WB02S-190622	Aqueous	Xylenes (total)	8260B	98		ug/L	16
002	CMR-WB02S-190622	Aqueous	m+p - Xylenes	8260B	92		ug/L	16
002	CMR-WB02S-190622	Aqueous	o - Xylenes	8260B	6.5		ug/L	16
002	CMR-WB02S-190622	Aqueous	2-Methylnaphthalene	8270D	3.4		ug/L	18
002	CMR-WB02S-190622	Aqueous	Naphthalene	8270D	6.0		ug/L	18
002	CMR-WB02S-190622	Aqueous	C9 - C18 Aliphatics	Montana EPH	270		ug/L	19
002	CMR-WB02S-190622	Aqueous	C11 - C22 Aromatics	Montana EPH	180		ug/L	20
002	CMR-WB02S-190622	Aqueous	C5 - C8 Aliphatics,	Montana VPH	190	J	ug/L	21
002	CMR-WB02S-190622	Aqueous	C9 - C12 Aliphatics,	Montana VPH	530		ug/L	21
002	CMR-WB02S-190622	Aqueous	Benzene	Montana VPH	310		ug/L	22
002	CMR-WB02S-190622	Aqueous	C9 - C10 Aromatics	Montana VPH	890		ug/L	22
002	CMR-WB02S-190622	Aqueous	Ethylbenzene	Montana VPH	300		ug/L	22
002	CMR-WB02S-190622	Aqueous	Naphthalene	Montana VPH	17	J	ug/L	22
002	CMR-WB02S-190622	Aqueous	m+p - Xylenes	Montana VPH	87		ug/L	22
002	CMR-WB02S-190622	Aqueous	o - Xylenes	Montana VPH	7.0	J	ug/L	22
002	CMR-WB02S-190622	Aqueous	TPH	Montana VPH	2600		ug/L	23
002	CMR-WB02S-190622	Aqueous	Arsenic	6020B	65		ug/L	24
002	CMR-WB02S-190622	Aqueous	Barium	6020B	900		ug/L	24
002	CMR-WB02S-190622	Aqueous	Cobalt	6020B	2.2	J	ug/L	24
002	CMR-WB02S-190622	Aqueous	Nickel	6020B	6.0		ug/L	24
002	CMR-WB02S-190622	Aqueous	Zinc	6020B	69		ug/L	24
003	TB-22-20190622	Aqueous	Acetone	8260B	4.5	J	ug/L	25

(39 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-001
Description: CMR-WB03S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1327
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1351	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	7.3	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-001
Description: CMR-WB03S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1327
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1351	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		93	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-001
Description: CMR-WB03S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1327
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	07/07/2019 0535	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.80	0.20	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.80	0.20	ug/L	1
Anthracene	120-12-7	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.80	0.20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.80	0.20	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		4.0	0.75	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		20	1.1	ug/L	1
Carbazole	86-74-8	8270D	ND		4.0	0.20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		4.0	0.85	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		4.0	1.3	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		4.0	0.30	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		4.0	0.80	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		4.0	0.75	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		4.0	0.75	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		4.0	0.80	ug/L	1
Chrysene	218-01-9	8270D	ND		0.80	0.20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.80	0.20	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		4.0	0.80	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4.0	0.85	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4.0	0.90	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4.0	0.80	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		20	4.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		4.0	0.95	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		20	0.95	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		20	0.90	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		4.0	0.75	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		20	2.1	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		20	4.5	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		20	6.6	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		8.0	1.8	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		8.0	1.7	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		20	2.4	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		20	1.9	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.80	0.20	ug/L	1
Fluorene	86-73-7	8270D	ND		0.80	0.20	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		4.0	0.75	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		4.0	0.85	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		20	5.5	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		4.0	0.85	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.80	0.20	ug/L	1
Isophorone	78-59-1	8270D	ND		4.0	1.1	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-001
Description: CMR-WB03S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1327
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	07/07/2019 0535	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.80	0.20	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		4.0	1.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		8.0	2.3	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.80	0.20	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		8.0	3.3	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		8.0	0.75	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		8.0	6.6	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		4.0	0.85	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		8.0	2.2	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		20	10	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		4.0	1.4	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		4.0	2.5	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		20	6.7	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.80	0.20	ug/L	1
Phenol	108-95-2	8270D	ND		4.0	0.95	ug/L	1
Pyrene	129-00-0	8270D	ND		0.80	0.20	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		4.0	1.3	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4.0	2.8	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4.0	1.9	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		4.0	0.95	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		4.0	1.1	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		50	37-129
2-Fluorophenol		33	24-127
Nitrobenzene-d5		51	38-127
Phenol-d5		33	28-128
Terphenyl-d14		74	10-148
2,4,6-Tribromophenol		79	35-144

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25037-001
Description: CMR-WB03S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1327
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 1631	CHG	06/27/2019 1005	20903

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		65	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25037-001
Description: CMR-WB03S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1327
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 2235	CHG	06/27/2019 1005	20904

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		56	40-140
2-Fluorobiphenyl (fractionation 1)		91	40-140
o - Terphenyl (aromatic)		78	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25037-001
Description: CMR-WB03S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1327
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1433	JJG		21450

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	15	J	75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25037-001
Description: CMR-WB03S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1327
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1433	JJG		21449

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	16	J	25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		95	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25037-001
Description: CMR-WB03S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1327
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1433	JJG		21447

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		101	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-001
Description: CMR-WB03S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1327
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1524	TJW	06/26/2019 1259	20716
1	3005A	6020B	1	07/02/2019 1700	BNW	06/27/2019 0834	20900
2	3005A	6020B	1	07/05/2019 1158	LLL	06/27/2019 0834	20900

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	3.4		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	120		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	5.8		5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	0.00016	J	0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	8.5		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	9.9	J	10	2.5	ug/L	2

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-002
Description: CMR-WB02S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1605
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	07/05/2019 1805	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		50	10	ug/L	1
Benzene	71-43-2	8260B	330		2.5	2.0	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		2.5	2.0	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		2.5	2.0	ug/L	1
Bromoform	75-25-2	8260B	ND		2.5	2.0	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.5	2.0	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		50	10	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		2.5	2.0	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		2.5	2.0	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		2.5	2.0	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.5	2.0	ug/L	1
Chloroform	67-66-3	8260B	ND		2.5	2.0	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		2.5	2.0	ug/L	1
Cyclohexane	110-82-7	8260B	42		2.5	2.0	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		2.5	2.0	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		2.5	2.0	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		2.5	2.0	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		2.5	2.0	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		2.5	2.0	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.5	2.0	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		2.5	2.0	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		2.5	2.0	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		2.5	2.0	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		2.5	2.0	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		2.5	2.0	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		2.5	0.55	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		100	67	ug/L	1
Ethylbenzene	100-41-4	8260B	330		2.5	2.0	ug/L	1
2-Hexanone	591-78-6	8260B	ND		50	10	ug/L	1
Isopropylbenzene	98-82-8	8260B	26		2.5	2.0	ug/L	1
Methyl acetate	79-20-9	8260B	ND		5.0	2.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	6.3		2.5	2.0	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		50	10	ug/L	1
Methylcyclohexane	108-87-2	8260B	29		25	2.0	ug/L	1
Methylene chloride	75-09-2	8260B	ND		2.5	2.0	ug/L	1
Naphthalene	91-20-3	8260B	11		2.5	2.0	ug/L	1
Styrene	100-42-5	8260B	ND		2.5	2.1	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		2.5	2.0	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		2.5	2.0	ug/L	1
Toluene	108-88-3	8260B	2.5		2.5	2.0	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.0	2.1	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-002
Description: CMR-WB02S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1605
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	07/05/2019 1805	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		2.5	2.0	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		2.5	2.0	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		2.5	2.0	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		2.5	2.0	ug/L	1
Trichloroethene	79-01-6	8260B	ND		2.5	2.0	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		2.5	2.0	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		2.5	2.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	98		5.0	2.0	ug/L	1
m+p - Xylenes	179601-23-1	8260B	92		2.5	2.0	ug/L	1
o - Xylenes	95-47-6	8260B	6.5		2.5	2.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		100	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-002
Description: CMR-WB02S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1605
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	07/06/2019 2020	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		1.6	0.40	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		1.6	0.40	ug/L	1
Anthracene	120-12-7	8270D	ND		1.6	0.40	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		1.6	0.40	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		1.6	0.40	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		1.6	0.40	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		8.0	1.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		40	2.1	ug/L	1
Carbazole	86-74-8	8270D	ND		8.0	0.40	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		8.0	1.7	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		8.0	2.6	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		8.0	0.60	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		8.0	1.6	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		8.0	1.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		8.0	1.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		8.0	1.6	ug/L	1
Chrysene	218-01-9	8270D	ND		1.6	0.40	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		1.6	0.40	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		8.0	1.6	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		8.0	1.7	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		8.0	1.8	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		8.0	1.6	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		40	8.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		8.0	1.9	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		40	1.9	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		40	1.8	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		8.0	1.5	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		40	4.2	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		40	8.9	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		40	13	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		16	3.6	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		16	3.4	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		40	4.8	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		40	3.8	ug/L	1
Fluoranthene	206-44-0	8270D	ND		1.6	0.40	ug/L	1
Fluorene	86-73-7	8270D	ND		1.6	0.40	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		8.0	1.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		8.0	1.7	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		40	11	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		8.0	1.7	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		1.6	0.40	ug/L	1
Isophorone	78-59-1	8270D	ND		8.0	2.2	ug/L	1

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DL = Detection Limit
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W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-002
Description: CMR-WB02S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1605
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	07/06/2019 2020	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	3.4		1.6	0.40	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		8.0	2.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		16	4.6	ug/L	1
Naphthalene	91-20-3	8270D	6.0		1.6	0.40	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		16	6.6	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		16	1.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		16	13	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		8.0	1.7	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		16	4.4	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		40	21	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		8.0	2.8	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		8.0	5.0	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		40	13	ug/L	1
Phenanthrene	85-01-8	8270D	ND		1.6	0.40	ug/L	1
Phenol	108-95-2	8270D	ND		8.0	1.9	ug/L	1
Pyrene	129-00-0	8270D	ND		1.6	0.40	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		8.0	2.5	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		8.0	5.5	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		8.0	3.7	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		8.0	1.9	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		8.0	2.2	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		63	37-129
2-Fluorophenol		32	24-127
Nitrobenzene-d5		69	38-127
Phenol-d5		46	28-128
Terphenyl-d14		76	10-148
2,4,6-Tribromophenol		89	35-144

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DL = Detection Limit
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25037-002
Description: CMR-WB02S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1605
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 1702	CHG	06/27/2019 1005	20903

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	270		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		72	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25037-002
Description: CMR-WB02S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1605
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 2304	CHG	06/27/2019 1005	20904

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	180		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		69	40-140
2-Fluorobiphenyl (fractionation 1)		83	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25037-002
Description: CMR-WB02S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1605
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/02/2019 1501	JJG		21450

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	190	J	380	75	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	530		380	75	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		83	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25037-002
Description: CMR-WB02S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1605
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/02/2019 1501	JJG		21449

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	310		25	2.6	ug/L	1
C9 - C10 Aromatics		Montana VPH	890		130	25	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	300		25	3.1	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		25	6.0	ug/L	1
Naphthalene	91-20-3	Montana VPH	17	J	25	3.5	ug/L	1
Toluene	108-88-3	Montana VPH	ND		25	2.7	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	87		25	6.0	ug/L	1
o - Xylenes	95-47-6	Montana VPH	7.0	J	25	2.9	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		79	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25037-002
Description: CMR-WB02S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1605
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/02/2019 1501	JJG		21447

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	2600		880	180	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-002
Description: CMR-WB02S-190622
Matrix: Aqueous
Date Sampled: 06/22/2019 1605
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1526	TJW	06/26/2019 1259	20716
1	3005A	6020B	1	07/02/2019 1706	BNW	06/27/2019 0834	20900
2	3005A	6020B	1	07/05/2019 1204	LLL	06/27/2019 0834	20900

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	65		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	900		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	2.2	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	ND		5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	6.0		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	69		10	2.5	ug/L	2

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DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-003
Description: TB-22-20190622
Matrix: Aqueous
Date Sampled: 06/22/2019
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1147	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	4.5	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25037-003
Description: TB-22-20190622
Matrix: Aqueous
Date Sampled: 06/22/2019
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1147	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		99	70-130

LOQ = Limit of Quantitation
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ND = Not detected at or above the DL
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J = Estimated result < LOQ and ≥ DL
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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21644-001
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/05/2019 1110
Benzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromoform	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/05/2019 1110
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloroform	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Cyclohexane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/05/2019 1110
1,4-Dioxane	ND		1	20	13	ug/L	07/05/2019 1110
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
2-Hexanone	ND		1	10	2.0	ug/L	07/05/2019 1110
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Methyl acetate	ND		1	1.0	0.40	ug/L	07/05/2019 1110
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/05/2019 1110
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/05/2019 1110
Methylene chloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Naphthalene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Styrene	ND		1	0.50	0.41	ug/L	07/05/2019 1110
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Toluene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/05/2019 1110

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21644-001
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Trichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/05/2019 1110
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/05/2019 1110
o - Xylenes	ND		1	0.50	0.40	ug/L	07/05/2019 1110

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		99	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21644-002
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	160	N	1	159	60-140	07/05/2019 1011
Benzene	50	48		1	95	70-130	07/05/2019 1011
Bromochloromethane	50	44		1	87	70-130	07/05/2019 1011
Bromodichloromethane	50	46		1	92	70-130	07/05/2019 1011
Bromoform	50	53		1	107	70-130	07/05/2019 1011
Bromomethane (Methyl bromide)	50	45		1	90	70-130	07/05/2019 1011
2-Butanone (MEK)	100	130		1	126	70-130	07/05/2019 1011
Carbon disulfide	50	49		1	99	70-130	07/05/2019 1011
Carbon tetrachloride	50	42		1	84	70-130	07/05/2019 1011
Chlorobenzene	50	50		1	99	70-130	07/05/2019 1011
Chloroethane	50	46		1	92	70-130	07/05/2019 1011
Chloroform	50	43		1	87	70-130	07/05/2019 1011
Chloromethane (Methyl chloride)	50	41		1	83	60-140	07/05/2019 1011
Cyclohexane	50	36		1	73	70-130	07/05/2019 1011
1,2-Dibromo-3-chloropropane (DBCP)	50	49		1	98	70-130	07/05/2019 1011
Dibromochloromethane	50	50		1	101	70-130	07/05/2019 1011
1,2-Dibromoethane (EDB)	50	49		1	99	70-130	07/05/2019 1011
1,2-Dichlorobenzene	50	49		1	99	70-130	07/05/2019 1011
1,3-Dichlorobenzene	50	50		1	100	70-130	07/05/2019 1011
1,4-Dichlorobenzene	50	49		1	98	70-130	07/05/2019 1011
Dichlorodifluoromethane	50	39		1	77	60-140	07/05/2019 1011
1,1-Dichloroethane	50	44		1	88	70-130	07/05/2019 1011
1,2-Dichloroethane	50	45		1	90	70-130	07/05/2019 1011
1,1-Dichloroethene	50	44		1	87	70-130	07/05/2019 1011
cis-1,2-Dichloroethene	50	43		1	87	70-130	07/05/2019 1011
trans-1,2-Dichloroethene	50	44		1	88	70-130	07/05/2019 1011
1,2-Dichloropropane	50	47		1	94	70-130	07/05/2019 1011
cis-1,3-Dichloropropene	50	50		1	100	70-130	07/05/2019 1011
trans-1,3-Dichloropropene	50	50		1	99	70-130	07/05/2019 1011
1,4-Dioxane	500	530		1	106	60-140	07/05/2019 1011
Ethylbenzene	50	50		1	99	70-130	07/05/2019 1011
2-Hexanone	100	110		1	108	70-130	07/05/2019 1011
Isopropylbenzene	50	50		1	100	70-130	07/05/2019 1011
Methyl acetate	50	36		1	72	70-130	07/05/2019 1011
Methyl tertiary butyl ether (MTBE)	50	47		1	93	70-130	07/05/2019 1011
4-Methyl-2-pentanone	100	92		1	92	70-130	07/05/2019 1011
Methylcyclohexane	50	45		1	89	70-130	07/05/2019 1011
Methylene chloride	50	46		1	92	70-130	07/05/2019 1011
Naphthalene	50	49		1	98	70-130	07/05/2019 1011
Styrene	50	51		1	102	70-130	07/05/2019 1011
1,1,2,2-Tetrachloroethane	50	48		1	95	70-130	07/05/2019 1011
Tetrachloroethene	50	50		1	99	70-130	07/05/2019 1011
Toluene	50	48		1	96	70-130	07/05/2019 1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	43		1	86	70-130	07/05/2019 1011

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21644-002
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	101	70-130	07/05/2019 1011
1,2,4-Trichlorobenzene	50	50		1	101	70-130	07/05/2019 1011
1,1,1-Trichloroethane	50	43		1	86	70-130	07/05/2019 1011
1,1,2-Trichloroethane	50	48		1	96	70-130	07/05/2019 1011
Trichloroethene	50	47		1	95	70-130	07/05/2019 1011
Trichlorofluoromethane	50	41		1	81	70-130	07/05/2019 1011
Vinyl chloride	50	37		1	74	70-130	07/05/2019 1011
Xylenes (total)	100	99		1	99	70-130	07/05/2019 1011
m+p - Xylenes	50	49		1	98	70-130	07/05/2019 1011
o - Xylenes	50	50		1	100	70-130	07/05/2019 1011

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	70-130
Bromofluorobenzene		98	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21123-001
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Acenaphthylene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	07/05/2019 1135
Carbazole	ND		1	0.80	0.040	ug/L	07/05/2019 1135
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	07/05/2019 1135
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	07/05/2019 1135
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	07/05/2019 1135
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	07/05/2019 1135
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	07/05/2019 1135
2-Chlorophenol	ND		1	0.80	0.15	ug/L	07/05/2019 1135
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	07/05/2019 1135
Chrysene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Dibenzofuran	ND		1	0.80	0.16	ug/L	07/05/2019 1135
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	07/05/2019 1135
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	07/05/2019 1135
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	07/05/2019 1135
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
Diethylphthalate	ND		1	4.0	0.19	ug/L	07/05/2019 1135
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	07/05/2019 1135
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	07/05/2019 1135
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	07/05/2019 1135
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	07/05/2019 1135
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	07/05/2019 1135
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	07/05/2019 1135
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	07/05/2019 1135
bis(2-Ethylhexyl)phthalate	0.62	J	1	4.0	0.38	ug/L	07/05/2019 1135
Fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Fluorene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	07/05/2019 1135
Hexachloroethane	ND		1	0.80	0.17	ug/L	07/05/2019 1135
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Isophorone	ND		1	0.80	0.22	ug/L	07/05/2019 1135

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21123-001
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
2-Methylphenol	ND		1	0.80	0.21	ug/L	07/05/2019 1135
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	07/05/2019 1135
Naphthalene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
2-Nitroaniline	ND		1	1.6	0.66	ug/L	07/05/2019 1135
3-Nitroaniline	ND		1	1.6	0.15	ug/L	07/05/2019 1135
4-Nitroaniline	ND		1	1.6	1.3	ug/L	07/05/2019 1135
Nitrobenzene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
2-Nitrophenol	ND		1	1.6	0.44	ug/L	07/05/2019 1135
4-Nitrophenol	ND		1	4.0	2.1	ug/L	07/05/2019 1135
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	07/05/2019 1135
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	07/05/2019 1135
Pentachlorophenol	ND		1	4.0	1.3	ug/L	07/05/2019 1135
Phenanthrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Phenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
Pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	07/05/2019 1135
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	07/05/2019 1135
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	07/05/2019 1135
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	07/05/2019 1135

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		64	37-129
2-Fluorophenol		44	24-127
Nitrobenzene-d5		68	38-127
Phenol-d5		40	28-128
Terphenyl-d14		95	10-148
2,4,6-Tribromophenol		56	35-144

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LOD = Limit of Detection

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21123-002
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.7		1	59	30-122	07/06/2019 2045
Acenaphthylene	8.0	5.1		1	63	30-130	07/06/2019 2045
Anthracene	8.0	5.6		1	70	30-123	07/06/2019 2045
Benzo(a)anthracene	8.0	5.9		1	74	40-125	07/06/2019 2045
Benzo(a)pyrene	8.0	5.9		1	74	40-128	07/06/2019 2045
Benzo(b)fluoranthene	8.0	6.8		1	85	30-130	07/06/2019 2045
Benzo(g,h,i)perylene	8.0	6.0		1	75	30-130	07/06/2019 2045
Benzo(k)fluoranthene	8.0	6.0		1	76	30-130	07/06/2019 2045
4-Bromophenyl phenyl ether	8.0	5.3		1	67	30-124	07/06/2019 2045
Butyl benzyl phthalate	8.0	6.3		1	79	54-135	07/06/2019 2045
Carbazole	8.0	5.8		1	72	45-101	07/06/2019 2045
bis (2-Chloro-1-methylethyl) ether	8.0	6.2		1	77	42-124	07/06/2019 2045
4-Chloro-3-methyl phenol	8.0	4.7		1	58	30-123	07/06/2019 2045
bis(2-Chloroethoxy)methane	8.0	4.8		1	60	44-127	07/06/2019 2045
bis(2-Chloroethyl)ether	8.0	5.6		1	70	46-120	07/06/2019 2045
2-Chloronaphthalene	8.0	4.8		1	60	46-100	07/06/2019 2045
2-Chlorophenol	8.0	4.2		1	52	50-117	07/06/2019 2045
4-Chlorophenyl phenyl ether	8.0	4.9		1	61	30-121	07/06/2019 2045
Chrysene	8.0	6.2		1	78	30-130	07/06/2019 2045
Dibenzo(a,h)anthracene	8.0	6.3		1	78	30-130	07/06/2019 2045
Dibenzofuran	8.0	4.8		1	61	30-118	07/06/2019 2045
1,2-Dichlorobenzene	8.0	4.3		1	53	32-111	07/06/2019 2045
1,3-Dichlorobenzene	8.0	4.2		1	52	28-110	07/06/2019 2045
1,4-Dichlorobenzene	8.0	4.3		1	53	29-112	07/06/2019 2045
3,3'-Dichlorobenzidine	8.0	4.1		1	52	10-126	07/06/2019 2045
2,4-Dichlorophenol	8.0	4.5		1	56	30-121	07/06/2019 2045
Diethylphthalate	8.0	5.7		1	72	40-125	07/06/2019 2045
Dimethyl phthalate	8.0	5.6		1	71	40-127	07/06/2019 2045
2,4-Dimethylphenol	8.0	5.9		1	74	20-125	07/06/2019 2045
Di-n-butyl phthalate	8.0	6.1		1	76	40-127	07/06/2019 2045
4,6-Dinitro-2-methylphenol	8.0	6.3		1	78	56-128	07/06/2019 2045
2,4-Dinitrophenol	16	8.9		1	56	11-126	07/06/2019 2045
2,4-Dinitrotoluene	8.0	5.7		1	71	59-127	07/06/2019 2045
2,6-Dinitrotoluene	8.0	5.4		1	67	59-126	07/06/2019 2045
Di-n-octylphthalate	8.0	4.2		1	53	50-136	07/06/2019 2045
bis(2-Ethylhexyl)phthalate	8.0	5.4		1	67	56-128	07/06/2019 2045
Fluoranthene	8.0	5.6		1	71	40-128	07/06/2019 2045
Fluorene	8.0	5.0		1	62	30-124	07/06/2019 2045
Hexachlorobenzene	8.0	5.6		1	70	30-125	07/06/2019 2045
Hexachlorobutadiene	8.0	4.1		1	51	24-110	07/06/2019 2045
Hexachlorocyclopentadiene	40	17		1	42	16-96	07/06/2019 2045
Hexachloroethane	8.0	4.0		1	51	31-110	07/06/2019 2045
Indeno(1,2,3-c,d)pyrene	8.0	5.8		1	72	30-130	07/06/2019 2045
Isophorone	8.0	5.3		1	66	57-123	07/06/2019 2045

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21123-002
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.6		1	58	40-132	07/06/2019 2045
2-Methylphenol	8.0	6.2		1	78	56-119	07/06/2019 2045
3+4-Methylphenol	8.0	5.8		1	73	53-119	07/06/2019 2045
Naphthalene	8.0	4.6		1	58	30-130	07/06/2019 2045
2-Nitroaniline	8.0	5.9		1	73	60-124	07/06/2019 2045
3-Nitroaniline	8.0	5.8		1	72	43-123	07/06/2019 2045
4-Nitroaniline	8.0	6.0		1	76	30-135	07/06/2019 2045
Nitrobenzene	8.0	5.0		1	63	51-122	07/06/2019 2045
2-Nitrophenol	8.0	5.4		1	68	51-118	07/06/2019 2045
4-Nitrophenol	16	10		1	65	53-130	07/06/2019 2045
N-Nitrosodi-n-propylamine	8.0	5.9		1	73	54-127	07/06/2019 2045
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.6		1	69	30-123	07/06/2019 2045
Pentachlorophenol	16	11		1	67	42-131	07/06/2019 2045
Phenanthrene	8.0	5.3		1	66	40-123	07/06/2019 2045
Phenol	8.0	3.8	N	1	47	49-117	07/06/2019 2045
Pyrene	8.0	6.2		1	77	40-126	07/06/2019 2045
1,2,4,5-Tetrachlorobenzene	8.0	4.4		1	55	30-130	07/06/2019 2045
2,3,4,6-Tetrachlorophenol	8.0	5.3		1	66	30-130	07/06/2019 2045
1,2,4-Trichlorobenzene	8.0	4.4		1	55	20-90	07/06/2019 2045
2,4,5-Trichlorophenol	8.0	4.8		1	60	30-123	07/06/2019 2045
2,4,6-Trichlorophenol	8.0	5.1		1	64	30-125	07/06/2019 2045

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		62	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		65	38-127
Phenol-d5		48	28-128
Terphenyl-d14		90	10-148
2,4,6-Tribromophenol		81	35-144

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF25037-001MS
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	ND	16	7.6		5	47	30-122	07/07/2019 0600
Acenaphthylene	ND	16	7.7		5	48	30-130	07/07/2019 0600
Anthracene	ND	16	10		5	62	30-123	07/07/2019 0600
Benzo(a)anthracene	ND	16	11		5	68	40-125	07/07/2019 0600
Benzo(a)pyrene	ND	16	9.4		5	59	40-128	07/07/2019 0600
Benzo(b)fluoranthene	ND	16	12		5	78	30-130	07/07/2019 0600
Benzo(g,h,i)perylene	ND	16	7.0		5	44	30-130	07/07/2019 0600
Benzo(k)fluoranthene	ND	16	11		5	71	30-130	07/07/2019 0600
4-Bromophenyl phenyl ether	ND	16	9.7		5	60	30-124	07/07/2019 0600
Butyl benzyl phthalate	ND	16	11		5	70	54-135	07/07/2019 0600
Carbazole	ND	16	11		5	70	45-101	07/07/2019 0600
bis (2-Chloro-1-methylethyl) ether	ND	16	11		5	71	42-124	07/07/2019 0600
4-Chloro-3-methyl phenol	ND	16	7.6		5	48	30-123	07/07/2019 0600
bis(2-Chloroethoxy)methane	ND	16	7.0		5	44	44-127	07/07/2019 0600
bis(2-Chloroethyl)ether	ND	16	8.2		5	51	46-120	07/07/2019 0600
2-Chloronaphthalene	ND	16	7.1	N	5	45	46-100	07/07/2019 0600
2-Chlorophenol	ND	16	5.9	N	5	37	50-117	07/07/2019 0600
4-Chlorophenyl phenyl ether	ND	16	8.0		5	50	30-121	07/07/2019 0600
Chrysene	ND	16	11		5	70	30-130	07/07/2019 0600
Dibenzo(a,h)anthracene	ND	16	7.2		5	45	30-130	07/07/2019 0600
Dibenzofuran	ND	16	8.0		5	50	30-118	07/07/2019 0600
1,2-Dichlorobenzene	ND	16	5.6		5	35	32-111	07/07/2019 0600
1,3-Dichlorobenzene	ND	16	5.7		5	36	28-110	07/07/2019 0600
1,4-Dichlorobenzene	ND	16	6.2		5	39	29-112	07/07/2019 0600
3,3'-Dichlorobenzidine	ND	16	ND	N	5	0.00	10-126	07/07/2019 0600
2,4-Dichlorophenol	ND	16	6.1		5	38	30-121	07/07/2019 0600
Diethylphthalate	ND	16	10		5	64	40-125	07/07/2019 0600
Dimethyl phthalate	ND	16	9.2		5	57	40-127	07/07/2019 0600
2,4-Dimethylphenol	ND	16	12		5	73	20-125	07/07/2019 0600
Di-n-butyl phthalate	ND	16	11		5	70	40-127	07/07/2019 0600
4,6-Dinitro-2-methylphenol	ND	16	19		5	116	56-128	07/07/2019 0600
2,4-Dinitrophenol	ND	32	44	N	5	136	30-130	07/07/2019 0600
2,4-Dinitrotoluene	ND	16	14		5	89	59-127	07/07/2019 0600
2,6-Dinitrotoluene	ND	16	13		5	82	59-126	07/07/2019 0600
Di-n-octylphthalate	ND	16	13		5	80	50-136	07/07/2019 0600
bis(2-Ethylhexyl)phthalate	ND	16	11		5	69	56-128	07/07/2019 0600
Fluoranthene	ND	16	10		5	65	40-128	07/07/2019 0600
Fluorene	ND	16	8.0		5	50	30-124	07/07/2019 0600
Hexachlorobenzene	ND	16	8.9		5	55	30-125	07/07/2019 0600
Hexachlorobutadiene	ND	16	5.7		5	36	30-130	07/07/2019 0600
Hexachlorocyclopentadiene	ND	80	19		5	24	16-96	07/07/2019 0600
Hexachloroethane	ND	16	7.7		5	48	31-110	07/07/2019 0600
Indeno(1,2,3-c,d)pyrene	ND	16	6.7		5	42	30-130	07/07/2019 0600
Isophorone	ND	16	7.2	N	5	45	57-123	07/07/2019 0600

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF25037-001MS
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	ND	16	6.6		5	41	40-132	07/07/2019 0600
2-Methylphenol	ND	16	5.9	N	5	37	56-119	07/07/2019 0600
3+4-Methylphenol	ND	16	8.7		5	54	53-119	07/07/2019 0600
Naphthalene	ND	16	7.0		5	44	30-130	07/07/2019 0600
2-Nitroaniline	ND	16	8.3	N	5	52	60-124	07/07/2019 0600
3-Nitroaniline	ND	16	4.0	N	5	25	43-123	07/07/2019 0600
4-Nitroaniline	ND	16	12		5	75	30-135	07/07/2019 0600
Nitrobenzene	ND	16	7.6	N	5	48	51-122	07/07/2019 0600
2-Nitrophenol	ND	16	7.7	N	5	48	51-118	07/07/2019 0600
4-Nitrophenol	ND	32	17		5	54	53-130	07/07/2019 0600
N-Nitrosodi-n-propylamine	ND	16	9.1		5	57	54-127	07/07/2019 0600
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	8.9		5	55	30-123	07/07/2019 0600
Pentachlorophenol	ND	32	20		5	62	42-131	07/07/2019 0600
Phenanthrene	ND	16	9.8		5	61	40-123	07/07/2019 0600
Phenol	ND	16	5.1	N	5	32	49-117	07/07/2019 0600
Pyrene	ND	16	11		5	68	40-126	07/07/2019 0600
1,2,4,5-Tetrachlorobenzene	ND	16	6.1		5	38	30-130	07/07/2019 0600
2,3,4,6-Tetrachlorophenol	ND	16	8.7		5	54	30-130	07/07/2019 0600
1,2,4-Trichlorobenzene	ND	16	6.1		5	38	20-90	07/07/2019 0600
2,4,5-Trichlorophenol	ND	16	7.7		5	48	30-123	07/07/2019 0600
2,4,6-Trichlorophenol	ND	16	7.3		5	46	30-125	07/07/2019 0600

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		46	37-129
2-Fluorophenol		29	24-127
Nitrobenzene-d5		48	38-127
Phenol-d5		30	28-128
Terphenyl-d14		49	10-148
2,4,6-Tribromophenol		71	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF25037-001MD
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acenaphthene	ND	16	8.6		5	54	13	30-122	40	07/07/2019 0626
Acenaphthylene	ND	16	8.7		5	54	12	30-130	40	07/07/2019 0626
Anthracene	ND	16	9.8		5	61	1.7	30-123	40	07/07/2019 0626
Benzo(a)anthracene	ND	16	11		5	70	3.8	40-125	40	07/07/2019 0626
Benzo(a)pyrene	ND	16	9.4		5	59	0.046	40-128	40	07/07/2019 0626
Benzo(b)fluoranthene	ND	16	12		5	76	2.4	30-130	40	07/07/2019 0626
Benzo(g,h,i)perylene	ND	16	6.4		5	40	8.8	30-130	40	07/07/2019 0626
Benzo(k)fluoranthene	ND	16	11		5	72	1.7	30-130	40	07/07/2019 0626
4-Bromophenyl phenyl ether	ND	16	9.2		5	57	5.0	30-124	40	07/07/2019 0626
Butyl benzyl phthalate	ND	16	11		5	71	1.8	54-135	40	07/07/2019 0626
Carbazole	ND	16	11		5	70	0.17	45-101	40	07/07/2019 0626
bis (2-Chloro-1-methylethyl) ether	ND	16	12		5	75	5.3	42-124	40	07/07/2019 0626
4-Chloro-3-methyl phenol	ND	16	7.9		5	49	3.2	30-123	40	07/07/2019 0626
bis(2-Chloroethoxy)methane	ND	16	8.3		5	52	17	44-127	40	07/07/2019 0626
bis(2-Chloroethyl)ether	ND	16	8.7		5	55	6.0	46-120	40	07/07/2019 0626
2-Chloronaphthalene	ND	16	8.3		5	52	16	46-100	40	07/07/2019 0626
2-Chlorophenol	ND	16	6.7	N	5	42	13	50-117	40	07/07/2019 0626
4-Chlorophenyl phenyl ether	ND	16	8.8		5	55	9.2	30-121	40	07/07/2019 0626
Chrysene	ND	16	11		5	72	2.2	30-130	40	07/07/2019 0626
Dibenzo(a,h)anthracene	ND	16	6.6		5	42	7.8	30-130	40	07/07/2019 0626
Dibenzofuran	ND	16	9.0		5	56	12	30-118	40	07/07/2019 0626
1,2-Dichlorobenzene	ND	16	6.6		5	41	16	32-111	20	07/07/2019 0626
1,3-Dichlorobenzene	ND	16	6.7		5	42	15	28-110	20	07/07/2019 0626
1,4-Dichlorobenzene	ND	16	6.9		5	43	11	29-112	20	07/07/2019 0626
3,3'-Dichlorobenzidine	ND	16	ND	N	5	0.00	0.00	10-126	40	07/07/2019 0626
2,4-Dichlorophenol	ND	16	7.2		5	45	16	30-121	40	07/07/2019 0626
Diethylphthalate	ND	16	11		5	69	6.8	40-125	40	07/07/2019 0626
Dimethyl phthalate	ND	16	9.9		5	62	7.9	40-127	40	07/07/2019 0626
2,4-Dimethylphenol	ND	16	12		5	74	1.9	20-125	40	07/07/2019 0626
Di-n-butyl phthalate	ND	16	11		5	71	1.4	40-127	40	07/07/2019 0626
4,6-Dinitro-2-methylphenol	ND	16	18		5	115	1.3	56-128	40	07/07/2019 0626
2,4-Dinitrophenol	ND	32	44	N	5	139	2.1	30-130	40	07/07/2019 0626
2,4-Dinitrotoluene	ND	16	14		5	87	2.4	59-127	40	07/07/2019 0626
2,6-Dinitrotoluene	ND	16	13		5	82	0.57	59-126	40	07/07/2019 0626
Di-n-octylphthalate	ND	16	12		5	76	5.3	50-136	40	07/07/2019 0626
bis(2-Ethylhexyl)phthalate	ND	16	10		5	65	6.1	56-128	40	07/07/2019 0626
Fluoranthene	ND	16	10		5	65	1.0	40-128	40	07/07/2019 0626
Fluorene	ND	16	8.8		5	55	9.5	30-124	40	07/07/2019 0626
Hexachlorobenzene	ND	16	8.9		5	56	0.47	30-125	40	07/07/2019 0626
Hexachlorobutadiene	ND	16	7.0		5	44	20	30-130	40	07/07/2019 0626
Hexachlorocyclopentadiene	ND	80	22		5	28	15	16-96	40	07/07/2019 0626
Hexachloroethane	ND	16	7.8		5	49	1.4	31-110	40	07/07/2019 0626
Indeno(1,2,3-c,d)pyrene	ND	16	6.4		5	40	5.5	30-130	40	07/07/2019 0626
Isophorone	ND	16	8.7	N	5	55	19	57-123	40	07/07/2019 0626

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF25037-001MD
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
2-Methylnaphthalene	ND	16	8.1		5	51	20	40-132	40	07/07/2019 0626
2-Methylphenol	ND	16	6.0	N	5	37	0.39	56-119	40	07/07/2019 0626
3+4-Methylphenol	ND	16	7.2	N	5	45	19	53-119	40	07/07/2019 0626
Naphthalene	ND	16	8.6		5	54	20	30-130	40	07/07/2019 0626
2-Nitroaniline	ND	16	9.0	N	5	56	8.3	60-124	40	07/07/2019 0626
3-Nitroaniline	ND	16	5.0	N	5	31	22	43-123	40	07/07/2019 0626
4-Nitroaniline	ND	16	13		5	83	11	30-135	40	07/07/2019 0626
Nitrobenzene	ND	16	8.1		5	51	6.0	51-122	40	07/07/2019 0626
2-Nitrophenol	ND	16	8.5		5	53	9.7	51-118	40	07/07/2019 0626
4-Nitrophenol	ND	32	17		5	53	1.4	53-130	40	07/07/2019 0626
N-Nitrosodi-n-propylamine	ND	16	9.5		5	59	3.8	54-127	40	07/07/2019 0626
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	8.1		5	50	9.5	30-123	40	07/07/2019 0626
Pentachlorophenol	ND	32	21		5	64	2.9	42-131	40	07/07/2019 0626
Phenanthrene	ND	16	9.9		5	62	0.73	40-123	40	07/07/2019 0626
Phenol	ND	16	5.3	N	5	33	5.0	49-117	40	07/07/2019 0626
Pyrene	ND	16	11		5	71	4.4	40-126	40	07/07/2019 0626
1,2,4,5-Tetrachlorobenzene	ND	16	7.1		5	45	15	30-130	40	07/07/2019 0626
2,3,4,6-Tetrachlorophenol	ND	16	9.5		5	59	9.2	30-130	40	07/07/2019 0626
1,2,4-Trichlorobenzene	ND	16	7.2		5	45	16	20-90	40	07/07/2019 0626
2,4,5-Trichlorophenol	ND	16	8.5		5	53	9.9	30-123	40	07/07/2019 0626
2,4,6-Trichlorophenol	ND	16	7.6		5	47	3.6	30-125	40	07/07/2019 0626

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		52	37-129
2-Fluorophenol		36	24-127
Nitrobenzene-d5		54	38-127
Phenol-d5		35	28-128
Terphenyl-d14		40	10-148
2,4,6-Tribromophenol		71	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
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Montana EPH (aliphatics) - MB

Sample ID: UQ20903-001
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	06/28/2019 1501
C9 - C18 Aliphatics	ND		1	100	100	ug/L	06/28/2019 1501

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20903-002
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	300		1	75	40-140	06/28/2019 1531
C9 - C18 Aliphatics	300	160		1	52	40-140	06/28/2019 1531

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		67	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20903-003
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	320		1	80	6.8	40-140	25	06/28/2019 1601
C9 - C18 Aliphatics	300	160		1	55	5.0	40-140	25	06/28/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		73	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20904-001
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	06/28/2019 2105

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		97	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		81	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20904-002
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	560		1	66	40-140	06/28/2019 2135

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		91	40-140
o - Terphenyl (aromatic)		72	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20904-003
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	620		1	73	9.8	40-140	25	06/28/2019 2205

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		64	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		79	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21447-001
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21447-002
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	400		1	108	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21447-003
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	400		1	106	2.0	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21449-001
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	07/02/2019 1208
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	07/02/2019 1208
Ethylbenzene	ND		1	5.0	0.62	ug/L	07/02/2019 1208
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	07/02/2019 1208
Naphthalene	ND		1	5.0	0.70	ug/L	07/02/2019 1208
Toluene	ND		1	5.0	0.53	ug/L	07/02/2019 1208
m+p - Xylenes	ND		1	5.0	1.2	ug/L	07/02/2019 1208
o - Xylenes	ND		1	5.0	0.58	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aromatics) - LCS

Sample ID: UQ21449-002
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	26		1	103	70-130	07/02/2019 1112
C9 - C10 Aromatics	25	27		1	106	70-130	07/02/2019 1112
Ethylbenzene	25	26		1	103	70-130	07/02/2019 1112
Methyl tertiary butyl ether (MTBE)	25	24		1	96	70-130	07/02/2019 1112
Naphthalene	25	24		1	95	70-130	07/02/2019 1112
Toluene	25	25		1	101	70-130	07/02/2019 1112
m+p - Xylenes	50	52		1	104	70-130	07/02/2019 1112
o - Xylenes	25	25		1	101	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aromatics) - LCSD

Sample ID: UQ21449-003
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	26		1	102	0.78	70-130	25	07/02/2019 1140
C9 - C10 Aromatics	25	25		1	99	6.6	70-130	25	07/02/2019 1140
Ethylbenzene	25	25		1	101	2.0	70-130	25	07/02/2019 1140
Methyl tertiary butyl ether (MTBE)	25	25		1	101	5.7	70-130	25	07/02/2019 1140
Naphthalene	25	23		1	93	2.1	70-130	25	07/02/2019 1140
Toluene	25	25		1	100	1.6	70-130	25	07/02/2019 1140
m+p - Xylenes	50	50		1	101	3.1	70-130	25	07/02/2019 1140
o - Xylenes	25	25		1	99	2.0	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - MB

Sample ID: UQ21450-001
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/02/2019 1208
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - LCS

Sample ID: UQ21450-002
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	112	70-130	07/02/2019 1112
C9 - C12 Aliphatics, Adjusted	75	79		1	105	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21450-003
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	110	1.8	70-130	25	07/02/2019 1140
C9 - C12 Aliphatics, Adjusted	75	77		1	103	1.7	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - MB

Sample ID: UQ20900-001
Batch: 20900
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/27/2019 834

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	07/02/2019 1543
Arsenic	ND		1	2.0	1.3	ug/L	07/02/2019 1543
Barium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Beryllium	ND		1	0.40	0.15	ug/L	07/02/2019 1543
Cadmium	ND		1	0.50	0.13	ug/L	07/02/2019 1543
Chromium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Cobalt	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Copper	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Lead	ND		1	1.0	0.25	ug/L	07/02/2019 1543
Nickel	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Selenium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Silver	ND		1	1.0	0.25	ug/L	07/02/2019 1543
Vanadium	ND		1	5.0	2.5	ug/L	07/02/2019 1543
Zinc	ND		1	10	2.5	ug/L	07/02/2019 1543

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - LCS

Sample ID: UQ20900-002
Batch: 20900
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/27/2019 834

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	96		1	96	80-120	07/02/2019 1549
Arsenic	100	100		1	103	80-120	07/02/2019 1549
Barium	100	98		1	98	80-120	07/02/2019 1549
Beryllium	100	99		1	99	80-120	07/02/2019 1549
Cadmium	100	96		1	96	80-120	07/02/2019 1549
Chromium	100	100		1	101	80-120	07/02/2019 1549
Cobalt	100	100		1	102	80-120	07/02/2019 1549
Copper	100	98		1	98	80-120	07/02/2019 1549
Lead	100	100		1	100	80-120	07/02/2019 1549
Nickel	100	100		1	101	80-120	07/02/2019 1549
Selenium	100	98		1	98	80-120	07/02/2019 1549
Silver	100	100		1	102	80-120	07/02/2019 1549
Vanadium	100	100		1	100	80-120	07/02/2019 1549
Zinc	100	96		1	96	80-120	07/02/2019 1549

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20716-001
Batch: 20716
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/27/2019 1438

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20716-002
Batch: 20716
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	97	80-120	06/27/2019 1446

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Chain of Custody

and

Miscellaneous Documents

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

SHEALY

Chain of Custody Record

Number

Client: Ramboll US Corporation	Report to Contact: Daniel Price/Michael Wilson	Telephone No. / E-mail: (214) 906-4870/dprice@ramboll.com (316) 440-2505/mwilson@ramboll.com	Quote No.
Address: 7500 College Boulevard Suite 1905	Sampler's Signature: X Brooks Bailey, Andrew Hardwick, Elizabeth Borucki	Analysis (Attach list if more space is needed)	Page: 1 of 1
City: Overland Park / State: KS / Zip Code: 66210			
Project Name: CMR RIAIM East Rail			UF25037 KMN2
Project Number: 1690012344-003	P.O. No.		

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH	Remarks / Cooler I.D.
CMR-WB03S-190622	6/22/2019	13:27	G	X			2		1	7				X	X	X	X	X	Cooler 001
CMR-WB02S-190622	6/22/2019	16:05	G	X			2		1	7				X	X	X	X	X	Cooler 001
TB-22	NA	NA	G	X						2				X					Trip Blank/Cooler 001

Turn Around Time Required (Prior lab approval required for expedited TAT): [X] Standard [ ] Rush (Please Specify)

Sample Disposal: [ ] Return to Client [ ] Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks): [ ] Non-Hazardous [ ] Flammable [ ] Skin Irr. [ ] SCS prev. [X] Unknown

QC Requirements

	Date	Time		Date	Time
1. Relinquished by: Brooks Bailey	6/24/2019	17:45	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: Fed Ex	6-25-19	0919	4. Laboratory Received by: L Hite	6-25-19	0919

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY Received on Ice (Check): [X] Y [ ] N [ ] Ice Pack

Receipt Temp. 2.5 °C

Document Number: ME002OW-01

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 06-25-2019 Lot #: UF25037

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: LKH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

2.5 / 2.5 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.

Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) 003(2) were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: LKH Date: 06-25-2019

Comments:

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF25038, 4 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF25038 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB01-1.5-2.0-190622	UF25038-001
CMR-WB01-3.0-4.0-190622	UF25038-002
CMR-WB01-6.0-6.5-190622	UF25038-003
CMR-WB01-6.0-6.5-190622-DUP	UF25038-004
TB-24-20190622	UF25038-005

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

MS/MSD Recoveries
For the metals analysis suites MS/MSD results were reported. Recoveries were largely within criteria with the exception of beryllium. These out of criteria recoveries indicate a possible bias to results. Therefore, all beryllium results were flagged as estimated (J, UJ).

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of methyl acetate and bromomethane. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methyl acetate and bromomethane results have been validated as estimated.

Blank Detections
During analysis, acetone was detected in trip blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All acetone results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF25038

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	MS/MSD recoveries out for multiple metals, likely due to high native sample concentrations. Beryllium out of criteria with acceptable spike. All beryllium results validated as estimated (J, UJ).
Laboratory Control Sample	No issues
Duplicate Samples	One field duplicate submitted. RPDs acceptable, no action taken.
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All beryllium results validated as estimated (J, UJ).

SDG No. UF25038

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Solid, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	Acetone detected in trip blank sample. Acetone detections validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to sample dilution, no action taken.	Surrogates out die to matrix interference/dilution, no action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out of high for acetone. See above. LCS out low for methyl acetate and bromomethane. All methyl acetate and bromomethane results validated as estimated (J, UJ).	No issues
Field Duplicates	One FD submitted. RPDs show acceptable agreement. No action taken.	One FD submitted. RPDs show acceptable agreement. No action taken.
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/a
Other Non-conformances	CCV out of criteria high for acetone. See above.	No other non-conformances noted.
Overall Assessment of Data	All methyl acetate and bromomethane results validated as estimated (J, UJ). Acetone detections validated as non-detect (U).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM West Rail

Project Number: 1690012344-003

Lot Number:**UF25038**

Date Completed:07/11/2019

07/12/2019 11:20 AM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

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Case Narrative
Ramboll US Corporation
Lot Number: UF25038

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21644 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections above the LOQ for this compound in the samples associated with this batch; therefore, data quality is not impacted.

The LCS associated with batch 21458 had methyl acetate recovered marginally outside of the acceptance limits. The LCS associated with batch 21460 had bromomethane recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

The continuing calibration verification (CCV) associated with sample -005 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections above the LOQ for this compound in the associated samples; therefore, data quality is not impacted.

Sample -004 had the surrogate recovered outside of the acceptance limits due to sample dilution. Sample -003 was analyzed high level due to the sample matrix. The reporting limits have been raised accordingly.

Semivolatiles
Samples -001, -003, and -004 were diluted 5X, 50X, and 50X, respectively, due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Sample -002 was diluted 25X due to the sample matrix. The reporting limits have been raised accordingly. The associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana EPH
Sample -003 was diluted 10X due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
Samples -002, -003, and -004 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene and MTBE, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS. Samples -002, -003 and -004 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -004 had multiple metals recovered outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample Summary
Ramboll US Corporation
Lot Number: UF25038

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB01-1.5-2.0-190622	Solid	06/22/2019 1540	06/25/2019
002	CMR-WB01-3.0-4.0-190622	Solid	06/22/2019 1545	06/25/2019
003	CMR-WB01-6.0-6.5-190622	Solid	06/22/2019 1550	06/25/2019
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	06/22/2019 1555	06/25/2019
005	TB-24-20190622	Aqueous	06/22/2019	06/25/2019

(5 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF25038

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB01-1.5-2.0-190622	Solid	Acetone	8260B	51		ug/kg	9
001	CMR-WB01-1.5-2.0-190622	Solid	Anthracene	8270D	36		ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	Benzo(a)anthracene	8270D	110		ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	Benzo(a)pyrene	8270D	68		ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	Benzo(b)fluoranthene	8270D	240		ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	Benzo(g,h,i)perylene	8270D	59		ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	Benzo(k)fluoranthene	8270D	66		ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	Carbazole	8270D	29	J	ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	Chrysene	8270D	170		ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	Dibenzofuran	8270D	61	J	ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	2,4-Dichlorophenol	8270D	38	J	ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	Fluoranthene	8270D	190		ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	Indeno(1,2,3-c,d)pyrene	8270D	51		ug/kg	11
001	CMR-WB01-1.5-2.0-190622	Solid	2-Methylnaphthalene	8270D	100		ug/kg	12
001	CMR-WB01-1.5-2.0-190622	Solid	Naphthalene	8270D	90		ug/kg	12
001	CMR-WB01-1.5-2.0-190622	Solid	Phenanthrene	8270D	220		ug/kg	12
001	CMR-WB01-1.5-2.0-190622	Solid	Pyrene	8270D	200		ug/kg	12
001	CMR-WB01-1.5-2.0-190622	Solid	C9 - C12 Aliphatics,	Montana VPH	2.3	J	mg/kg	15
001	CMR-WB01-1.5-2.0-190622	Solid	m+p - Xylenes	Montana VPH	0.13	J	mg/kg	16
001	CMR-WB01-1.5-2.0-190622	Solid	o - Xylenes	Montana VPH	0.11	J	mg/kg	16
001	CMR-WB01-1.5-2.0-190622	Solid	TPH	Montana VPH	4.8	J	mg/kg	17
001	CMR-WB01-1.5-2.0-190622	Solid	Antimony	6020B	3.0		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Arsenic	6020B	180		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Barium	6020B	160		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Beryllium	6020B	0.29		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Cadmium	6020B	23		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Chromium	6020B	13		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Cobalt	6020B	14		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Copper	6020B	1300		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Lead	6020B	1200		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Mercury	7471B	1.3		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Nickel	6020B	24		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Selenium	6020B	0.67	J	mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Silver	6020B	7.7		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Vanadium	6020B	31		mg/kg	18
001	CMR-WB01-1.5-2.0-190622	Solid	Zinc	6020B	7700		mg/kg	18
002	CMR-WB01-3.0-4.0-190622	Solid	Acetone	8260B	20		ug/kg	19
002	CMR-WB01-3.0-4.0-190622	Solid	Benzo(a)pyrene	8270D	61	J	ug/kg	21
002	CMR-WB01-3.0-4.0-190622	Solid	C19 - C36 Aliphatics	Montana EPH	360		mg/kg	23
002	CMR-WB01-3.0-4.0-190622	Solid	C9 - C18 Aliphatics	Montana EPH	650		mg/kg	23
002	CMR-WB01-3.0-4.0-190622	Solid	C11 - C22 Aromatics	Montana EPH	110		mg/kg	24
002	CMR-WB01-3.0-4.0-190622	Solid	C9 - C12 Aliphatics,	Montana VPH	31		mg/kg	25
002	CMR-WB01-3.0-4.0-190622	Solid	C9 - C10 Aromatics	Montana VPH	29		mg/kg	26
002	CMR-WB01-3.0-4.0-190622	Solid	Naphthalene	Montana VPH	1.3		mg/kg	26
002	CMR-WB01-3.0-4.0-190622	Solid	o - Xylenes	Montana VPH	0.044	J	mg/kg	26

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-WB01-3.0-4.0-190622	Solid	TPH	Montana VPH	61		mg/kg	27
002	CMR-WB01-3.0-4.0-190622	Solid	Antimony	6020B	0.25	J	mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Arsenic	6020B	14		mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Barium	6020B	150		mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Beryllium	6020B	0.12		mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Cadmium	6020B	0.50		mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Chromium	6020B	12		mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Cobalt	6020B	5.1		mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Copper	6020B	67		mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Lead	6020B	7.5		mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Nickel	6020B	9.6		mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Silver	6020B	0.15	J	mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Vanadium	6020B	34		mg/kg	28
002	CMR-WB01-3.0-4.0-190622	Solid	Zinc	6020B	68		mg/kg	28
003	CMR-WB01-6.0-6.5-190622	Solid	Cyclohexane	8260B	3300		ug/kg	29
003	CMR-WB01-6.0-6.5-190622	Solid	Ethylbenzene	8260B	12000		ug/kg	29
003	CMR-WB01-6.0-6.5-190622	Solid	Isopropylbenzene	8260B	3500		ug/kg	29
003	CMR-WB01-6.0-6.5-190622	Solid	Methylcyclohexane	8260B	11000		ug/kg	29
003	CMR-WB01-6.0-6.5-190622	Solid	2-Methylnaphthalene	8270D	1100		ug/kg	32
003	CMR-WB01-6.0-6.5-190622	Solid	Naphthalene	8270D	820		ug/kg	32
003	CMR-WB01-6.0-6.5-190622	Solid	C19 - C36 Aliphatics	Montana EPH	2500		mg/kg	33
003	CMR-WB01-6.0-6.5-190622	Solid	C9 - C18 Aliphatics	Montana EPH	6300		mg/kg	33
003	CMR-WB01-6.0-6.5-190622	Solid	C11 - C22 Aromatics	Montana EPH	890		mg/kg	34
003	CMR-WB01-6.0-6.5-190622	Solid	C5 - C8 Aliphatics,	Montana VPH	260		mg/kg	35
003	CMR-WB01-6.0-6.5-190622	Solid	C9 - C12 Aliphatics,	Montana VPH	730		mg/kg	35
003	CMR-WB01-6.0-6.5-190622	Solid	C9 - C10 Aromatics	Montana VPH	520		mg/kg	36
003	CMR-WB01-6.0-6.5-190622	Solid	Ethylbenzene	Montana VPH	23		mg/kg	36
003	CMR-WB01-6.0-6.5-190622	Solid	Naphthalene	Montana VPH	17		mg/kg	36
003	CMR-WB01-6.0-6.5-190622	Solid	o - Xylenes	Montana VPH	17		mg/kg	36
003	CMR-WB01-6.0-6.5-190622	Solid	TPH	Montana VPH	1700		mg/kg	37
003	CMR-WB01-6.0-6.5-190622	Solid	Arsenic	6020B	3.8		mg/kg	38
003	CMR-WB01-6.0-6.5-190622	Solid	Barium	6020B	130		mg/kg	38
003	CMR-WB01-6.0-6.5-190622	Solid	Beryllium	6020B	0.089	J	mg/kg	38
003	CMR-WB01-6.0-6.5-190622	Solid	Cadmium	6020B	0.092	J	mg/kg	38
003	CMR-WB01-6.0-6.5-190622	Solid	Chromium	6020B	8.8		mg/kg	38
003	CMR-WB01-6.0-6.5-190622	Solid	Cobalt	6020B	3.3		mg/kg	38
003	CMR-WB01-6.0-6.5-190622	Solid	Copper	6020B	5.2		mg/kg	38
003	CMR-WB01-6.0-6.5-190622	Solid	Lead	6020B	5.8		mg/kg	38
003	CMR-WB01-6.0-6.5-190622	Solid	Nickel	6020B	7.2		mg/kg	38
003	CMR-WB01-6.0-6.5-190622	Solid	Vanadium	6020B	19		mg/kg	38
003	CMR-WB01-6.0-6.5-190622	Solid	Zinc	6020B	25		mg/kg	38
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Cyclohexane	8260B	4400		ug/kg	39
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Ethylbenzene	8260B	17000		ug/kg	39
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Isopropylbenzene	8260B	5100		ug/kg	39
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Methylcyclohexane	8260B	14000		ug/kg	39
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Anthracene	8270D	130	J	ug/kg	41
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Dibenzofuran	8270D	390	J	ug/kg	41
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	2-Methylnaphthalene	8270D	1000		ug/kg	42

Detection Summary (Continued)

Lot Number: UF25038

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Naphthalene	8270D	600		ug/kg	42
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Phenanthrene	8270D	170		ug/kg	42
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	C19 - C36 Aliphatics	Montana EPH	2000		mg/kg	43
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	C9 - C18 Aliphatics	Montana EPH	4800		mg/kg	43
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	C11 - C22 Aromatics	Montana EPH	1200		mg/kg	44
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	C5 - C8 Aliphatics,	Montana VPH	250		mg/kg	45
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	C9 - C12 Aliphatics,	Montana VPH	690		mg/kg	45
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	C9 - C10 Aromatics	Montana VPH	580		mg/kg	46
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Ethylbenzene	Montana VPH	29		mg/kg	46
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Naphthalene	Montana VPH	32		mg/kg	46
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	o - Xylenes	Montana VPH	19		mg/kg	46
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	TPH	Montana VPH	1700		mg/kg	47
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Arsenic	6020B	3.9		mg/kg	48
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Barium	6020B	130		mg/kg	48
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Beryllium	6020B	0.10	J	mg/kg	48
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Cadmium	6020B	0.087	J	mg/kg	48
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Chromium	6020B	10		mg/kg	48
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Cobalt	6020B	3.6		mg/kg	48
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Copper	6020B	5.5		mg/kg	48
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Lead	6020B	5.7		mg/kg	48
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Nickel	6020B	7.9		mg/kg	48
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Vanadium	6020B	20		mg/kg	48
004	CMR-WB01-6.0-6.5-190622-DUP	Solid	Zinc	6020B	25		mg/kg	48
005	TB-24-20190622	Aqueous	Acetone	8260B	2.2	J	ug/L	49

(117 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-001
Description: CMR-WB01-1.5-2.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1540
% Solids: 84.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	07/05/2019 1711	JM1		21696	4.86

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	51		24	9.8	ug/kg	2
Benzene	71-43-2	8260B	ND		6.1	2.4	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		6.1	2.4	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		6.1	2.4	ug/kg	2
Bromoform	75-25-2	8260B	ND		6.1	2.4	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		6.1	3.7	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		24	4.9	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		6.1	2.4	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		6.1	2.4	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		6.1	2.4	ug/kg	2
Chloroethane	75-00-3	8260B	ND		6.1	2.4	ug/kg	2
Chloroform	67-66-3	8260B	ND		6.1	2.4	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		6.1	3.7	ug/kg	2
Cyclohexane	110-82-7	8260B	ND		6.1	2.4	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		6.1	2.4	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		6.1	2.4	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		6.1	2.4	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		6.1	2.4	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		6.1	2.4	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		6.1	2.4	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		6.1	3.7	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		6.1	2.4	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		6.1	2.4	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		6.1	2.4	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		6.1	2.4	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		6.1	2.4	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		6.1	2.4	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		6.1	2.4	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		6.1	2.4	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		300	30	ug/kg	2
Ethylbenzene	100-41-4	8260B	ND		6.1	2.4	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		12	4.9	ug/kg	2
Isopropylbenzene	98-82-8	8260B	ND		6.1	2.4	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		6.1	2.4	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		6.1	2.4	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		12	4.9	ug/kg	2
Methylcyclohexane	108-87-2	8260B	ND		6.1	2.4	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		6.1	2.4	ug/kg	2
Naphthalene	91-20-3	8260B	ND		6.1	2.4	ug/kg	2
Styrene	100-42-5	8260B	ND		6.1	2.4	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		6.1	2.4	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		6.1	2.4	ug/kg	2
Toluene	108-88-3	8260B	ND		6.1	2.4	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		6.1	2.4	ug/kg	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-001
Description: CMR-WB01-1.5-2.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1540
% Solids: 84.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	07/05/2019 1711	JM1		21696	4.86

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		6.1	2.4	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		6.1	2.4	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		6.1	2.4	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		6.1	2.4	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		6.1	2.4	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		6.1	2.4	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		6.1	3.7	ug/kg	2
Xylenes (total)	1330-20-7	8260B	ND		12	4.9	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	ND		6.1	2.4	ug/kg	2
o - Xylenes	95-47-6	8260B	ND		6.1	2.4	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		96	53-142
Bromofluorobenzene		90	47-138
Toluene-d8		117	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-001
Description: CMR-WB01-1.5-2.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1540
% Solids: 84.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	07/07/2019 0213	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		16	4.9	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		16	5.6	ug/kg	1
Anthracene	120-12-7	8270D	36		16	3.0	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	110		16	3.5	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	68		16	3.9	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	240		16	2.9	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	59		16	3.8	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	66		16	2.8	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		76	29	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		76	29	ug/kg	1
Carbazole	86-74-8	8270D	29	J	76	29	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		76	29	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		76	29	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		76	29	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		76	29	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		76	29	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		76	29	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		76	29	ug/kg	1
Chrysene	218-01-9	8270D	170		16	2.6	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		16	3.0	ug/kg	1
Dibenzofuran	132-64-9	8270D	61	J	76	29	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		390	150	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		390	150	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		390	150	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		76	29	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	38	J	76	29	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		76	29	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		76	43	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		76	29	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		76	29	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		390	150	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		390	150	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		160	58	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		160	58	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		76	29	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		390	150	ug/kg	1
Fluoranthene	206-44-0	8270D	190		16	2.5	ug/kg	1
Fluorene	86-73-7	8270D	ND		16	3.3	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		76	29	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		76	29	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		390	150	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		76	29	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	51		16	5.8	ug/kg	1
Isophorone	78-59-1	8270D	ND		76	29	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-001
Description: CMR-WB01-1.5-2.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1540
% Solids: 84.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	07/07/2019 0213	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	100		16	5.8	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		76	29	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		160	58	ug/kg	1
Naphthalene	91-20-3	8270D	90		16	5.7	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		160	58	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		160	58	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		160	58	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		76	29	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		160	58	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		390	150	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		76	29	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		76	29	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		390	150	ug/kg	1
Phenanthrene	85-01-8	8270D	220		16	4.2	ug/kg	1
Phenol	108-95-2	8270D	ND		76	29	ug/kg	1
Pyrene	129-00-0	8270D	200		16	2.9	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		190	58	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		390	58	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		390	150	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		76	29	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		76	29	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		46	33-102
2-Fluorophenol	N	34	35-115
Nitrobenzene-d5		37	22-109
Phenol-d5	N	31	33-122
Terphenyl-d14		57	41-120
2,4,6-Tribromophenol		49	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-001
Description: CMR-WB01-1.5-2.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1540
% Solids: 84.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 1806	DAL1	06/25/2019 1759	20678

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-001
Description: CMR-WB01-1.5-2.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1540
% Solids: 84.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/07/2019 0104	DAL1	06/25/2019 1759	20679

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		63	40-140
2-Fluorobiphenyl (fractionation 1)		79	40-140
o - Terphenyl (aromatic)		76	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-001
Description: CMR-WB01-1.5-2.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1540
% Solids: 84.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1556	JJG		21739

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		5.6	1.1	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	2.3	J	5.6	1.1	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-001
Description: CMR-WB01-1.5-2.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1540
% Solids: 84.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1556	JJG		21738

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.37	0.050	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.9	0.74	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.37	0.046	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.37	0.080	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.37	0.19	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.37	0.059	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	0.13	J	0.37	0.083	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.11	J	0.37	0.042	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		81	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25038-001
Description: CMR-WB01-1.5-2.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1540
% Solids: 84.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1556	JJG		21737

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	4.8	J	8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		93	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-001
Description: CMR-WB01-1.5-2.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1540
% Solids: 84.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/02/2019 2159	BNW	07/01/2019 0831	21081
1	7471B	7471B	1	06/28/2019 1735	TJW	06/27/2019 1855	20850
2	3050B	6020B	3	07/05/2019 1129	LLL	07/01/2019 0831	21081
4	3050B	6020B	20	07/10/2019 2305	BNW	07/01/2019 0831	21081

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	3.0		0.57	0.23	mg/kg	1
Arsenic	7440-38-2	6020B	180		0.57	0.23	mg/kg	1
Barium	7440-39-3	6020B	160		1.5	0.35	mg/kg	1
Beryllium	7440-41-7	6020B	0.29		0.11	0.039	mg/kg	1
Cadmium	7440-43-9	6020B	23		0.15	0.029	mg/kg	1
Chromium	7440-47-3	6020B	13		1.5	0.63	mg/kg	1
Cobalt	7440-48-4	6020B	14		1.5	0.34	mg/kg	1
Copper	7440-50-8	6020B	1300		4.5	1.1	mg/kg	2
Lead	7439-92-1	6020B	1200		0.86	0.23	mg/kg	2
Mercury	7439-97-6	7471B	1.3		0.090	0.022	mg/kg	1
Nickel	7440-02-0	6020B	24		1.5	0.34	mg/kg	1
Selenium	7782-49-2	6020B	0.67	J	1.5	0.54	mg/kg	1
Silver	7440-22-4	6020B	7.7		0.29	0.069	mg/kg	1
Vanadium	7440-62-2	6020B	31		1.5	0.29	mg/kg	1
Zinc	7440-66-6	6020B	7700		57	11	mg/kg	4

LOQ = Limit of Quantitation
B = Detected in the method blank
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N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-002
Description: CMR-WB01-3.0-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1545
% Solids: 85.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/02/2019 1453	JM1		21458	5.78

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	20		20	8.1	ug/kg	1
Benzene	71-43-2	8260B	ND		5.1	2.0	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		5.1	2.0	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		5.1	2.0	ug/kg	1
Bromoform	75-25-2	8260B	ND		5.1	2.0	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.1	3.0	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		20	4.0	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		5.1	2.0	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		5.1	2.0	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		5.1	2.0	ug/kg	1
Chloroethane	75-00-3	8260B	ND		5.1	2.0	ug/kg	1
Chloroform	67-66-3	8260B	ND		5.1	2.0	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.1	3.0	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		5.1	2.0	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.1	2.0	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		5.1	2.0	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.1	2.0	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.1	2.0	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.1	2.0	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.1	2.0	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		5.1	3.0	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		5.1	2.0	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		5.1	2.0	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		5.1	2.0	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.1	2.0	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.1	2.0	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		5.1	2.0	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.1	2.0	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.1	2.0	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		250	25	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		5.1	2.0	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		10	4.0	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		5.1	2.0	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		5.1	2.0	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.1	2.0	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	4.0	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		5.1	2.0	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		5.1	2.0	ug/kg	1
Naphthalene	91-20-3	8260B	ND		5.1	2.0	ug/kg	1
Styrene	100-42-5	8260B	ND		5.1	2.0	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.1	2.0	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		5.1	2.0	ug/kg	1
Toluene	108-88-3	8260B	ND		5.1	2.0	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.1	2.0	ug/kg	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-002
Description: CMR-WB01-3.0-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1545
% Solids: 85.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/02/2019 1453	JM1		21458	5.78

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.1	2.0	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.1	2.0	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.1	2.0	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.1	2.0	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		5.1	2.0	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		5.1	2.0	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		5.1	3.0	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		10	4.0	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		5.1	2.0	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		5.1	2.0	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		92	53-142
Bromofluorobenzene		95	47-138
Toluene-d8		105	68-124

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-002
Description: CMR-WB01-3.0-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1545
% Solids: 85.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	07/06/2019 2231	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		78	24	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		78	27	ug/kg	1
Anthracene	120-12-7	8270D	ND		78	15	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		78	17	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	61	J	78	19	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		78	14	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		78	19	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		78	14	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		380	140	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		380	140	ug/kg	1
Carbazole	86-74-8	8270D	ND		380	140	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		380	140	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		380	140	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		380	140	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		380	140	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		380	140	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		380	140	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		380	140	ug/kg	1
Chrysene	218-01-9	8270D	ND		78	13	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		78	15	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		380	140	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		1900	720	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		1900	720	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		1900	720	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		380	140	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		380	140	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		380	140	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		380	210	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		380	140	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		380	140	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		1900	720	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		1900	720	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		780	290	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		780	290	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		380	140	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		1900	720	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		78	12	ug/kg	1
Fluorene	86-73-7	8270D	ND		78	16	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		380	140	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		380	140	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		1900	720	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		380	140	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		78	29	ug/kg	1
Isophorone	78-59-1	8270D	ND		380	140	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-002
Description: CMR-WB01-3.0-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1545
% Solids: 85.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	07/06/2019 2231	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		78	29	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		380	140	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		780	290	ug/kg	1
Naphthalene	91-20-3	8270D	ND		78	28	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		780	290	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		780	290	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		780	290	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		380	140	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		780	290	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		1900	720	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		380	140	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		380	140	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		1900	720	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		78	21	ug/kg	1
Phenol	108-95-2	8270D	ND		380	140	ug/kg	1
Pyrene	129-00-0	8270D	ND		78	14	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		950	290	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		1900	290	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		1900	720	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		380	140	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		380	140	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		44	33-102
2-Fluorophenol	N	25	35-115
Nitrobenzene-d5		61	22-109
Phenol-d5	N	24	33-122
Terphenyl-d14		63	41-120
2,4,6-Tribromophenol		40	30-117

LOQ = Limit of Quantitation
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-002
Description: CMR-WB01-3.0-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1545
% Solids: 85.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 1836	DAL1	06/25/2019 1759	20678

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	360		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	650		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		49	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-002
Description: CMR-WB01-3.0-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1545
% Solids: 85.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/07/2019 0134	DAL1	06/25/2019 1759	20679

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	110		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		60	40-140
2-Fluorobiphenyl (fractionation 1)		59	40-140
o - Terphenyl (aromatic)		67	40-140

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-002
Description: CMR-WB01-3.0-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1545
% Solids: 85.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1624	JJG		21739

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.5	0.89	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	31		4.5	0.89	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	444	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
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J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-002
Description: CMR-WB01-3.0-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1545
% Solids: 85.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1624	JJG		21738

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.30	0.041	mg/kg	1
C9 - C10 Aromatics		Montana VPH	29		1.5	0.60	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.30	0.037	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.30	0.064	mg/kg	1
Naphthalene	91-20-3	Montana VPH	1.3		0.30	0.16	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.30	0.048	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.30	0.067	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.044	J	0.30	0.033	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	223	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25038-002
Description: CMR-WB01-3.0-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 1545
% Solids: 85.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1624	JJG		21737

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	61		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	466	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB01-3.0-4.0-190622
Date Sampled: 06/22/2019 1545
Date Received: 06/25/2019

Laboratory ID: UF25038-002
Matrix: Solid
% Solids: 85.5 06/26/2019 0028

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/02/2019 2205	BNW	07/01/2019 0831	21081
1	7471B	7471B	1	06/28/2019 1737	TJW	06/27/2019 1855	20850

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.25	J	0.54	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	14		0.54	0.21	mg/kg	1
Barium	7440-39-3	6020B	150		1.4	0.33	mg/kg	1
Beryllium	7440-41-7	6020B	0.12		0.11	0.037	mg/kg	1
Cadmium	7440-43-9	6020B	0.50		0.14	0.027	mg/kg	1
Chromium	7440-47-3	6020B	12		1.4	0.59	mg/kg	1
Cobalt	7440-48-4	6020B	5.1		1.4	0.32	mg/kg	1
Copper	7440-50-8	6020B	67		1.4	0.35	mg/kg	1
Lead	7439-92-1	6020B	7.5		0.27	0.073	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.094	0.023	mg/kg	1
Nickel	7440-02-0	6020B	9.6		1.4	0.32	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.51	mg/kg	1
Silver	7440-22-4	6020B	0.15	J	0.27	0.064	mg/kg	1
Vanadium	7440-62-2	6020B	34		1.4	0.27	mg/kg	1
Zinc	7440-66-6	6020B	68		2.7	0.54	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-003
Description: CMR-WB01-6.0-6.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1550
% Solids: 83.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	4	07/02/2019 1825	JM1		21460	5.14

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		5400	1100	ug/kg	1
Benzene	71-43-2	8260B	ND		1400	540	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		1400	540	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		1400	540	ug/kg	1
Bromoform	75-25-2	8260B	ND		1400	540	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		1400	540	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		5400	1100	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		1400	540	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		1400	540	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		1400	540	ug/kg	1
Chloroethane	75-00-3	8260B	ND		1400	540	ug/kg	1
Chloroform	67-66-3	8260B	ND		1400	540	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1400	540	ug/kg	1
Cyclohexane	110-82-7	8260B	3300		1400	540	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1400	540	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		1400	540	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1400	540	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1400	540	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1400	540	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1400	540	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		1400	540	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		1400	540	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		1400	540	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		1400	540	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1400	540	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1400	540	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		1400	540	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1400	540	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1400	540	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		68000	6800	ug/kg	1
Ethylbenzene	100-41-4	8260B	12000		1400	540	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		2700	1100	ug/kg	1
Isopropylbenzene	98-82-8	8260B	3500		1400	540	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		1400	540	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1400	540	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		2700	1100	ug/kg	1
Methylcyclohexane	108-87-2	8260B	11000		1400	540	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		1400	540	ug/kg	1
Naphthalene	91-20-3	8260B	ND		1400	540	ug/kg	1
Styrene	100-42-5	8260B	ND		1400	540	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1400	540	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		1400	540	ug/kg	1
Toluene	108-88-3	8260B	ND		1400	540	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1400	540	ug/kg	1

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J = Estimated result < LOQ and ≥ DL
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Description: CMR-WB01-6.0-6.5-190622
Date Sampled: 06/22/2019 1550
Date Received: 06/25/2019

Laboratory ID: UF25038-003
Matrix: Solid
% Solids: 83.6 06/26/2019 0028

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	4	07/02/2019 1825	JM1		21460	5.14

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		1400	540	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1400	540	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1400	540	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1400	540	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		1400	540	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		1400	540	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		1400	540	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		2700	1100	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		1400	540	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		1400	540	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		98	53-142
Bromofluorobenzene		100	47-138
Toluene-d8		110	68-124

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DL = Detection Limit
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Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-003
Description: CMR-WB01-6.0-6.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1550
% Solids: 83.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	07/07/2019 0304	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		160	49	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		160	56	ug/kg	1
Anthracene	120-12-7	8270D	ND		160	30	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		160	35	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		160	39	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		160	30	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		160	39	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		160	29	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		770	300	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		770	300	ug/kg	1
Carbazole	86-74-8	8270D	ND		770	300	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		770	300	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		770	300	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		770	300	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		770	300	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		770	300	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		770	300	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		770	300	ug/kg	1
Chrysene	218-01-9	8270D	ND		160	27	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		160	30	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		770	300	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4000	1500	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4000	1500	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4000	1500	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		770	300	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		770	300	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		770	300	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		770	440	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		770	300	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		770	300	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4000	1500	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4000	1500	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1600	590	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1600	590	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		770	300	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4000	1500	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		160	25	ug/kg	1
Fluorene	86-73-7	8270D	ND		160	34	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		770	300	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		770	300	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4000	1500	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		770	300	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		160	59	ug/kg	1
Isophorone	78-59-1	8270D	ND		770	300	ug/kg	1

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-003
Description: CMR-WB01-6.0-6.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1550
% Solids: 83.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	07/07/2019 0304	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	1100		160	59	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		770	300	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1600	590	ug/kg	1
Naphthalene	91-20-3	8270D	820		160	58	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1600	590	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1600	590	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1600	590	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		770	300	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1600	590	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		4000	1500	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		770	300	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		770	300	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		4000	1500	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		160	43	ug/kg	1
Phenol	108-95-2	8270D	ND		770	300	ug/kg	1
Pyrene	129-00-0	8270D	ND		160	30	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		2000	590	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4000	590	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4000	1500	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		770	300	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		770	300	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl	N	119	33-102
2-Fluorophenol		41	35-115
Nitrobenzene-d5	N	165	22-109
Phenol-d5		53	33-122
Terphenyl-d14		101	41-120
2,4,6-Tribromophenol		100	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-003
Description: CMR-WB01-6.0-6.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1550
% Solids: 83.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	10	07/06/2019 1906	DAL1	06/25/2019 1759	20678

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	2500		120	120	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	6300		120	120	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		87	40-140

LOQ = Limit of Quantitation
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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-003
Description: CMR-WB01-6.0-6.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1550
% Solids: 83.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	10	07/07/2019 0204	DAL1	06/25/2019 1759	20679

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	890		120	120	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)	N	156	40-140
2-Fluorobiphenyl (fractionation 1)		137	40-140
o - Terphenyl (aromatic)		126	40-140

LOQ = Limit of Quantitation
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W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-003
Description: CMR-WB01-6.0-6.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1550
% Solids: 83.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	5	07/05/2019 1937	JJG		21820

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	260		24	4.8	mg/kg	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	730		24	4.8	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-003
Description: CMR-WB01-6.0-6.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1550
% Solids: 83.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	5	07/05/2019 1937	JJG		21819

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		1.6	0.22	mg/kg	2
C9 - C10 Aromatics		Montana VPH	520		8.0	3.2	mg/kg	2
Ethylbenzene	100-41-4	Montana VPH	23		1.6	0.20	mg/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		1.6	0.34	mg/kg	2
Naphthalene	91-20-3	Montana VPH	17		1.6	0.83	mg/kg	2
Toluene	108-88-3	Montana VPH	ND		1.6	0.26	mg/kg	2
m+p - Xylenes	179601-23-1	Montana VPH	ND		1.6	0.36	mg/kg	2
o - Xylenes	95-47-6	Montana VPH	17		1.6	0.18	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	464	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25038-003
Description: CMR-WB01-6.0-6.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1550
% Solids: 83.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	5	07/05/2019 1937	JJG		21818

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1700		45	8.8	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB01-6.0-6.5-190622
Date Sampled: 06/22/2019 1550
Date Received: 06/25/2019

Laboratory ID: UF25038-003
Matrix: Solid
% Solids: 83.6 06/26/2019 0028

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/02/2019 2211	BNW	07/01/2019 0831	21081
1	7471B	7471B	1	06/28/2019 1740	TJW	06/27/2019 1855	20850

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.56	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	3.8		0.56	0.22	mg/kg	1
Barium	7440-39-3	6020B	130		1.5	0.35	mg/kg	1
Beryllium	7440-41-7	6020B	0.089	J	0.11	0.038	mg/kg	1
Cadmium	7440-43-9	6020B	0.092	J	0.15	0.028	mg/kg	1
Chromium	7440-47-3	6020B	8.8		1.5	0.62	mg/kg	1
Cobalt	7440-48-4	6020B	3.3		1.5	0.34	mg/kg	1
Copper	7440-50-8	6020B	5.2		1.5	0.36	mg/kg	1
Lead	7439-92-1	6020B	5.8		0.28	0.076	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.088	0.021	mg/kg	1
Nickel	7440-02-0	6020B	7.2		1.5	0.34	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.5	0.53	mg/kg	1
Silver	7440-22-4	6020B	ND		0.28	0.067	mg/kg	1
Vanadium	7440-62-2	6020B	19		1.5	0.28	mg/kg	1
Zinc	7440-66-6	6020B	25		2.8	0.56	mg/kg	1

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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-004
Description: CMR-WB01-6.0-6.5-190622-DUP
Matrix: Solid
Date Sampled: 06/22/2019 1555
% Solids: 85.2 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	4	07/02/2019 1848	JM1		21460	5.28

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		5100	1000	ug/kg	1
Benzene	71-43-2	8260B	ND		1300	510	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		1300	510	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		1300	510	ug/kg	1
Bromoform	75-25-2	8260B	ND		1300	510	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		1300	510	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		5100	1000	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		1300	510	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		1300	510	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		1300	510	ug/kg	1
Chloroethane	75-00-3	8260B	ND		1300	510	ug/kg	1
Chloroform	67-66-3	8260B	ND		1300	510	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1300	510	ug/kg	1
Cyclohexane	110-82-7	8260B	4400		1300	510	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1300	510	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		1300	510	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1300	510	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1300	510	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1300	510	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1300	510	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		1300	510	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		1300	510	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		1300	510	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		1300	510	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1300	510	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1300	510	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		1300	510	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1300	510	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1300	510	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		64000	6400	ug/kg	1
Ethylbenzene	100-41-4	8260B	17000		1300	510	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		2600	1000	ug/kg	1
Isopropylbenzene	98-82-8	8260B	5100		1300	510	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		1300	510	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1300	510	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		2600	1000	ug/kg	1
Methylcyclohexane	108-87-2	8260B	14000		1300	510	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		1300	510	ug/kg	1
Naphthalene	91-20-3	8260B	ND		1300	510	ug/kg	1
Styrene	100-42-5	8260B	ND		1300	510	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1300	510	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		1300	510	ug/kg	1
Toluene	108-88-3	8260B	ND		1300	510	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1300	510	ug/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-004
Description: CMR-WB01-6.0-6.5-190622-DUP
Matrix: Solid
Date Sampled: 06/22/2019 1555
% Solids: 85.2 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	4	07/02/2019 1848	JM1		21460	5.28

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		1300	510	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1300	510	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1300	510	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1300	510	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		1300	510	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		1300	510	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		1300	510	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		2600	1000	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		1300	510	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		1300	510	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		113	53-142
Bromofluorobenzene		113	47-138
Toluene-d8	N	130	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-004
Description: CMR-WB01-6.0-6.5-190622-DUP
Matrix: Solid
Date Sampled: 06/22/2019 1555
% Solids: 85.2 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	07/06/2019 2320	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		150	46	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		150	53	ug/kg	1
Anthracene	120-12-7	8270D	130	J	150	28	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		150	33	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		150	37	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		150	28	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		150	36	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		150	27	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		720	280	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		720	280	ug/kg	1
Carbazole	86-74-8	8270D	ND		720	280	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		720	280	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		720	280	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		720	280	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		720	280	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		720	280	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		720	280	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		720	280	ug/kg	1
Chrysene	218-01-9	8270D	ND		150	25	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		150	28	ug/kg	1
Dibenzofuran	132-64-9	8270D	390	J	720	280	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		3700	1400	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		3700	1400	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		3700	1400	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		720	280	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		720	280	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		720	280	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		720	410	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		720	280	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		720	280	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		3700	1400	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		3700	1400	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1500	560	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1500	560	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		720	280	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		3700	1400	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		150	23	ug/kg	1
Fluorene	86-73-7	8270D	ND		150	32	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		720	280	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		720	280	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		3700	1400	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		720	280	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		150	56	ug/kg	1
Isophorone	78-59-1	8270D	ND		720	280	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-004
Description: CMR-WB01-6.0-6.5-190622-DUP
Matrix: Solid
Date Sampled: 06/22/2019 1555
% Solids: 85.2 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	07/06/2019 2320	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	1000		150	55	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		720	280	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1500	560	ug/kg	1
Naphthalene	91-20-3	8270D	600		150	54	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1500	560	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1500	560	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1500	560	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		720	280	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1500	560	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		3700	1400	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		720	280	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		720	280	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		3700	1400	ug/kg	1
Phenanthrene	85-01-8	8270D	170		150	40	ug/kg	1
Phenol	108-95-2	8270D	ND		720	280	ug/kg	1
Pyrene	129-00-0	8270D	ND		150	28	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		1800	560	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		3700	560	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		3700	1400	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		720	280	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		720	280	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		77	33-102
2-Fluorophenol		45	35-115
Nitrobenzene-d5	N	298	22-109
Phenol-d5	N	147	33-122
Terphenyl-d14		102	41-120
2,4,6-Tribromophenol		72	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-004
Description: CMR-WB01-6.0-6.5-190622-DUP
Matrix: Solid
Date Sampled: 06/22/2019 1555
% Solids: 85.2 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	10	07/06/2019 1936	DAL1	06/25/2019 1759	20678

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	2000		110	110	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	4800		110	110	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		63	40-140

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-004
Description: CMR-WB01-6.0-6.5-190622-DUP
Matrix: Solid
Date Sampled: 06/22/2019 1555
% Solids: 85.2 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	10	07/07/2019 0234	DAL1	06/25/2019 1759	20679

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	1200		110	110	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)	N	145	40-140
2-Fluorobiphenyl (fractionation 1)	N	172	40-140
o - Terphenyl (aromatic)		111	40-140

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-004
Description: CMR-WB01-6.0-6.5-190622-DUP
Matrix: Solid
Date Sampled: 06/22/2019 1555
% Solids: 85.2 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	5	07/05/2019 2005	JJG		21820

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	250		23	4.6	mg/kg	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	690		23	4.6	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25038-004
Description: CMR-WB01-6.0-6.5-190622-DUP
Matrix: Solid
Date Sampled: 06/22/2019 1555
% Solids: 85.2 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	07/03/2019 1720	JJG		21738

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		1.2	0.17	mg/kg	1
C9 - C10 Aromatics		Montana VPH	580		6.1	2.4	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	29		1.2	0.15	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		1.2	0.26	mg/kg	1
Naphthalene	91-20-3	Montana VPH	32		1.2	0.63	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		1.2	0.19	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		1.2	0.27	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	19		1.2	0.14	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	515	70-130

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25038-004
Description: CMR-WB01-6.0-6.5-190622-DUP
Matrix: Solid
Date Sampled: 06/22/2019 1555
% Solids: 85.2 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	5	07/05/2019 2005	JJG		21818

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1700		45	8.8	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB01-6.0-6.5-190622-DUP
Date Sampled: 06/22/2019 1555
Date Received: 06/25/2019

Laboratory ID: UF25038-004
Matrix: Solid
% Solids: 85.2 06/26/2019 0028

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/02/2019 2217	BNW	07/01/2019 0831	21081
1	7471B	7471B	1	06/28/2019 1743	TJW	06/27/2019 1855	20850

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.55	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	3.9		0.55	0.22	mg/kg	1
Barium	7440-39-3	6020B	130		1.4	0.34	mg/kg	1
Beryllium	7440-41-7	6020B	0.10	J	0.11	0.038	mg/kg	1
Cadmium	7440-43-9	6020B	0.087	J	0.14	0.028	mg/kg	1
Chromium	7440-47-3	6020B	10		1.4	0.61	mg/kg	1
Cobalt	7440-48-4	6020B	3.6		1.4	0.33	mg/kg	1
Copper	7440-50-8	6020B	5.5		1.4	0.36	mg/kg	1
Lead	7439-92-1	6020B	5.7		0.28	0.075	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.095	0.023	mg/kg	1
Nickel	7440-02-0	6020B	7.9		1.4	0.33	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.52	mg/kg	1
Silver	7440-22-4	6020B	ND		0.28	0.066	mg/kg	1
Vanadium	7440-62-2	6020B	20		1.4	0.28	mg/kg	1
Zinc	7440-66-6	6020B	25		2.8	0.55	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-005
Description: TB-24-20190622
Matrix: Aqueous
Date Sampled: 06/22/2019
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1212	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	2.2	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25038-005
Description: TB-24-20190622
Matrix: Aqueous
Date Sampled: 06/22/2019
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1212	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		96	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21458-001
Batch: 21458
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	07/02/2019 1000
Benzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Bromochloromethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Bromoform	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	07/02/2019 1000
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	07/02/2019 1000
Carbon disulfide	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Chlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Chloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Chloroform	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	07/02/2019 1000
Cyclohexane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	07/02/2019 1000
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,4-Dioxane	ND		1	250	25	ug/kg	07/02/2019 1000
Ethylbenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
2-Hexanone	ND		1	10	4.0	ug/kg	07/02/2019 1000
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Methyl acetate	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	07/02/2019 1000
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Methylene chloride	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Naphthalene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Styrene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Toluene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21458-001
Batch: 21458
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Trichloroethene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Vinyl chloride	ND		1	5.0	3.0	ug/kg	07/02/2019 1000
Xylenes (total)	ND		1	10	4.0	ug/kg	07/02/2019 1000
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
o - Xylenes	ND		1	5.0	2.0	ug/kg	07/02/2019 1000

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		97	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21458-002
Batch: 21458
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	100		1	101	60-140	07/02/2019 0937
Benzene	50	49		1	98	70-130	07/02/2019 0937
Bromochloromethane	50	48		1	96	70-130	07/02/2019 0937
Bromodichloromethane	50	49		1	99	70-130	07/02/2019 0937
Bromoform	50	50		1	100	70-130	07/02/2019 0937
Bromomethane (Methyl bromide)	50	45		1	90	70-130	07/02/2019 0937
2-Butanone (MEK)	100	100		1	101	60-140	07/02/2019 0937
Carbon disulfide	50	50		1	100	70-130	07/02/2019 0937
Carbon tetrachloride	50	49		1	97	70-130	07/02/2019 0937
Chlorobenzene	50	50		1	101	70-130	07/02/2019 0937
Chloroethane	50	51		1	103	70-130	07/02/2019 0937
Chloroform	50	48		1	97	70-130	07/02/2019 0937
Chloromethane (Methyl chloride)	50	45		1	90	60-140	07/02/2019 0937
Cyclohexane	50	41		1	81	70-130	07/02/2019 0937
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	94	70-130	07/02/2019 0937
Dibromochloromethane	50	49		1	99	70-130	07/02/2019 0937
1,2-Dibromoethane (EDB)	50	50		1	100	70-130	07/02/2019 0937
1,2-Dichlorobenzene	50	50		1	100	70-130	07/02/2019 0937
1,3-Dichlorobenzene	50	51		1	102	70-130	07/02/2019 0937
1,4-Dichlorobenzene	50	50		1	101	70-130	07/02/2019 0937
Dichlorodifluoromethane	50	36		1	73	60-140	07/02/2019 0937
1,1-Dichloroethane	50	50		1	100	70-130	07/02/2019 0937
1,2-Dichloroethane	50	49		1	97	70-130	07/02/2019 0937
1,1-Dichloroethene	50	48		1	97	70-130	07/02/2019 0937
cis-1,2-Dichloroethene	50	48		1	96	70-130	07/02/2019 0937
trans-1,2-Dichloroethene	50	49		1	98	70-130	07/02/2019 0937
1,2-Dichloropropane	50	49		1	98	70-130	07/02/2019 0937
cis-1,3-Dichloropropene	50	50		1	100	70-130	07/02/2019 0937
trans-1,3-Dichloropropene	50	51		1	101	70-130	07/02/2019 0937
1,4-Dioxane	500	470		1	93	60-140	07/02/2019 0937
Ethylbenzene	50	51		1	101	70-130	07/02/2019 0937
2-Hexanone	100	110		1	108	70-130	07/02/2019 0937
Isopropylbenzene	50	51		1	102	70-130	07/02/2019 0937
Methyl acetate	50	34	N	1	68	70-130	07/02/2019 0937
Methyl tertiary butyl ether (MTBE)	50	48		1	97	70-130	07/02/2019 0937
4-Methyl-2-pentanone	100	91		1	91	70-130	07/02/2019 0937
Methylcyclohexane	50	43		1	85	70-130	07/02/2019 0937
Methylene chloride	50	46		1	92	70-130	07/02/2019 0937
Naphthalene	50	49		1	98	70-130	07/02/2019 0937
Styrene	50	50		1	101	70-130	07/02/2019 0937
1,1,2,2-Tetrachloroethane	50	47		1	95	70-130	07/02/2019 0937
Tetrachloroethene	50	52		1	104	70-130	07/02/2019 0937
Toluene	50	48		1	97	70-130	07/02/2019 0937
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	45		1	89	70-130	07/02/2019 0937

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21458-002
Batch: 21458
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	53		1	106	70-130	07/02/2019 0937
1,2,4-Trichlorobenzene	50	52		1	104	70-130	07/02/2019 0937
1,1,1-Trichloroethane	50	49		1	98	70-130	07/02/2019 0937
1,1,2-Trichloroethane	50	48		1	97	70-130	07/02/2019 0937
Trichloroethene	50	50		1	99	70-130	07/02/2019 0937
Trichlorofluoromethane	50	44		1	88	70-130	07/02/2019 0937
Vinyl chloride	50	44		1	88	70-130	07/02/2019 0937
Xylenes (total)	100	100		1	101	70-130	07/02/2019 0937
m+p - Xylenes	50	51		1	102	70-130	07/02/2019 0937
o - Xylenes	50	50		1	100	70-130	07/02/2019 0937

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21460-001
Batch: 21460
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	07/02/2019 1740
Benzene	ND		1	250	100	ug/kg	07/02/2019 1740
Bromochloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Bromodichloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Bromoform	ND		1	250	100	ug/kg	07/02/2019 1740
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	07/02/2019 1740
2-Butanone (MEK)	ND		1	1000	200	ug/kg	07/02/2019 1740
Carbon disulfide	ND		1	250	100	ug/kg	07/02/2019 1740
Carbon tetrachloride	ND		1	250	100	ug/kg	07/02/2019 1740
Chlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Chloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Chloroform	ND		1	250	100	ug/kg	07/02/2019 1740
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	07/02/2019 1740
Cyclohexane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	07/02/2019 1740
Dibromochloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Dichlorodifluoromethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1-Dichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichloropropane	ND		1	250	100	ug/kg	07/02/2019 1740
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	07/02/2019 1740
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	07/02/2019 1740
1,4-Dioxane	ND		1	13000	1300	ug/kg	07/02/2019 1740
Ethylbenzene	ND		1	250	100	ug/kg	07/02/2019 1740
2-Hexanone	ND		1	500	200	ug/kg	07/02/2019 1740
Isopropylbenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Methyl acetate	ND		1	250	100	ug/kg	07/02/2019 1740
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	07/02/2019 1740
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	07/02/2019 1740
Methylcyclohexane	ND		1	250	100	ug/kg	07/02/2019 1740
Methylene chloride	ND		1	250	100	ug/kg	07/02/2019 1740
Naphthalene	ND		1	250	100	ug/kg	07/02/2019 1740
Styrene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Tetrachloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
Toluene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	07/02/2019 1740

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21460-001
Batch: 21460
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Trichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
Trichlorofluoromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Vinyl chloride	ND		1	250	100	ug/kg	07/02/2019 1740
Xylenes (total)	ND		1	500	200	ug/kg	07/02/2019 1740
m+p - Xylenes	ND		1	250	100	ug/kg	07/02/2019 1740
o - Xylenes	ND		1	250	100	ug/kg	07/02/2019 1740

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		105	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		106	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21460-002
Batch: 21460
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	5200		1	104	60-140	07/02/2019 1718
Benzene	2500	2500		1	101	70-130	07/02/2019 1718
Bromochloromethane	2500	2500		1	99	70-130	07/02/2019 1718
Bromodichloromethane	2500	2600		1	103	70-130	07/02/2019 1718
Bromoform	2500	2500		1	99	70-130	07/02/2019 1718
Bromomethane (Methyl bromide)	2500	1700	N	1	68	70-130	07/02/2019 1718
2-Butanone (MEK)	5000	5600		1	113	60-140	07/02/2019 1718
Carbon disulfide	2500	2200		1	89	70-130	07/02/2019 1718
Carbon tetrachloride	2500	2600		1	105	70-130	07/02/2019 1718
Chlorobenzene	2500	2600		1	105	70-130	07/02/2019 1718
Chloroethane	2500	2300		1	92	70-130	07/02/2019 1718
Chloroform	2500	2500		1	99	70-130	07/02/2019 1718
Chloromethane (Methyl chloride)	2500	1900		1	78	60-140	07/02/2019 1718
Cyclohexane	2500	2600		1	105	70-130	07/02/2019 1718
1,2-Dibromo-3-chloropropane (DBCP)	2500	2400		1	95	70-130	07/02/2019 1718
Dibromochloromethane	2500	2600		1	103	70-130	07/02/2019 1718
1,2-Dibromoethane (EDB)	2500	2700		1	107	70-130	07/02/2019 1718
1,2-Dichlorobenzene	2500	2700		1	106	70-130	07/02/2019 1718
1,3-Dichlorobenzene	2500	2700		1	108	70-130	07/02/2019 1718
1,4-Dichlorobenzene	2500	2700		1	107	70-130	07/02/2019 1718
Dichlorodifluoromethane	2500	1600		1	66	60-140	07/02/2019 1718
1,1-Dichloroethane	2500	2500		1	101	70-130	07/02/2019 1718
1,2-Dichloroethane	2500	2500		1	101	70-130	07/02/2019 1718
1,1-Dichloroethene	2500	2400		1	95	70-130	07/02/2019 1718
cis-1,2-Dichloroethene	2500	2500		1	98	70-130	07/02/2019 1718
trans-1,2-Dichloroethene	2500	2500		1	98	70-130	07/02/2019 1718
1,2-Dichloropropane	2500	2500		1	101	70-130	07/02/2019 1718
cis-1,3-Dichloropropene	2500	2600		1	105	70-130	07/02/2019 1718
trans-1,3-Dichloropropene	2500	2700		1	107	70-130	07/02/2019 1718
1,4-Dioxane	25000	25000		1	100	60-140	07/02/2019 1718
Ethylbenzene	2500	2700		1	107	70-130	07/02/2019 1718
2-Hexanone	5000	5600		1	113	70-130	07/02/2019 1718
Isopropylbenzene	2500	2700		1	106	70-130	07/02/2019 1718
Methyl acetate	2500	1900		1	74	70-130	07/02/2019 1718
Methyl tertiary butyl ether (MTBE)	2500	2400		1	97	70-130	07/02/2019 1718
4-Methyl-2-pentanone	5000	4800		1	96	70-130	07/02/2019 1718
Methylcyclohexane	2500	2900		1	118	70-130	07/02/2019 1718
Methylene chloride	2500	2200		1	88	70-130	07/02/2019 1718
Naphthalene	2500	2400		1	98	70-130	07/02/2019 1718
Styrene	2500	2700		1	106	70-130	07/02/2019 1718
1,1,2,2-Tetrachloroethane	2500	2600		1	105	70-130	07/02/2019 1718
Tetrachloroethene	2500	2800		1	112	70-130	07/02/2019 1718
Toluene	2500	2600		1	104	70-130	07/02/2019 1718
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	2900		1	115	70-130	07/02/2019 1718

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21460-002
Batch: 21460
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2700		1	106	70-130	07/02/2019 1718
1,2,4-Trichlorobenzene	2500	2700		1	108	70-130	07/02/2019 1718
1,1,1-Trichloroethane	2500	2400		1	98	70-130	07/02/2019 1718
1,1,2-Trichloroethane	2500	2600		1	103	70-130	07/02/2019 1718
Trichloroethene	2500	2600		1	102	70-130	07/02/2019 1718
Trichlorofluoromethane	2500	2600		1	102	70-130	07/02/2019 1718
Vinyl chloride	2500	2100		1	83	70-130	07/02/2019 1718
Xylenes (total)	5000	5300		1	106	70-130	07/02/2019 1718
m+p - Xylenes	2500	2700		1	107	70-130	07/02/2019 1718
o - Xylenes	2500	2600		1	105	70-130	07/02/2019 1718

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		98	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21644-001
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/05/2019 1110
Benzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromoform	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/05/2019 1110
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloroform	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Cyclohexane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/05/2019 1110
1,4-Dioxane	ND		1	20	13	ug/L	07/05/2019 1110
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
2-Hexanone	ND		1	10	2.0	ug/L	07/05/2019 1110
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Methyl acetate	ND		1	1.0	0.40	ug/L	07/05/2019 1110
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/05/2019 1110
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/05/2019 1110
Methylene chloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Naphthalene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Styrene	ND		1	0.50	0.41	ug/L	07/05/2019 1110
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Toluene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/05/2019 1110

LOQ = Limit of Quantitation
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N = Recovery is out of criteria
+ = RPD is out of criteria

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21644-001
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Trichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/05/2019 1110
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/05/2019 1110
o - Xylenes	ND		1	0.50	0.40	ug/L	07/05/2019 1110

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		99	70-130

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21644-002
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	160	N	1	159	60-140	07/05/2019 1011
Benzene	50	48		1	95	70-130	07/05/2019 1011
Bromochloromethane	50	44		1	87	70-130	07/05/2019 1011
Bromodichloromethane	50	46		1	92	70-130	07/05/2019 1011
Bromoform	50	53		1	107	70-130	07/05/2019 1011
Bromomethane (Methyl bromide)	50	45		1	90	70-130	07/05/2019 1011
2-Butanone (MEK)	100	130		1	126	70-130	07/05/2019 1011
Carbon disulfide	50	49		1	99	70-130	07/05/2019 1011
Carbon tetrachloride	50	42		1	84	70-130	07/05/2019 1011
Chlorobenzene	50	50		1	99	70-130	07/05/2019 1011
Chloroethane	50	46		1	92	70-130	07/05/2019 1011
Chloroform	50	43		1	87	70-130	07/05/2019 1011
Chloromethane (Methyl chloride)	50	41		1	83	60-140	07/05/2019 1011
Cyclohexane	50	36		1	73	70-130	07/05/2019 1011
1,2-Dibromo-3-chloropropane (DBCP)	50	49		1	98	70-130	07/05/2019 1011
Dibromochloromethane	50	50		1	101	70-130	07/05/2019 1011
1,2-Dibromoethane (EDB)	50	49		1	99	70-130	07/05/2019 1011
1,2-Dichlorobenzene	50	49		1	99	70-130	07/05/2019 1011
1,3-Dichlorobenzene	50	50		1	100	70-130	07/05/2019 1011
1,4-Dichlorobenzene	50	49		1	98	70-130	07/05/2019 1011
Dichlorodifluoromethane	50	39		1	77	60-140	07/05/2019 1011
1,1-Dichloroethane	50	44		1	88	70-130	07/05/2019 1011
1,2-Dichloroethane	50	45		1	90	70-130	07/05/2019 1011
1,1-Dichloroethene	50	44		1	87	70-130	07/05/2019 1011
cis-1,2-Dichloroethene	50	43		1	87	70-130	07/05/2019 1011
trans-1,2-Dichloroethene	50	44		1	88	70-130	07/05/2019 1011
1,2-Dichloropropane	50	47		1	94	70-130	07/05/2019 1011
cis-1,3-Dichloropropene	50	50		1	100	70-130	07/05/2019 1011
trans-1,3-Dichloropropene	50	50		1	99	70-130	07/05/2019 1011
1,4-Dioxane	500	530		1	106	60-140	07/05/2019 1011
Ethylbenzene	50	50		1	99	70-130	07/05/2019 1011
2-Hexanone	100	110		1	108	70-130	07/05/2019 1011
Isopropylbenzene	50	50		1	100	70-130	07/05/2019 1011
Methyl acetate	50	36		1	72	70-130	07/05/2019 1011
Methyl tertiary butyl ether (MTBE)	50	47		1	93	70-130	07/05/2019 1011
4-Methyl-2-pentanone	100	92		1	92	70-130	07/05/2019 1011
Methylcyclohexane	50	45		1	89	70-130	07/05/2019 1011
Methylene chloride	50	46		1	92	70-130	07/05/2019 1011
Naphthalene	50	49		1	98	70-130	07/05/2019 1011
Styrene	50	51		1	102	70-130	07/05/2019 1011
1,1,2,2-Tetrachloroethane	50	48		1	95	70-130	07/05/2019 1011
Tetrachloroethene	50	50		1	99	70-130	07/05/2019 1011
Toluene	50	48		1	96	70-130	07/05/2019 1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	43		1	86	70-130	07/05/2019 1011

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21644-002
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	101	70-130	07/05/2019 1011
1,2,4-Trichlorobenzene	50	50		1	101	70-130	07/05/2019 1011
1,1,1-Trichloroethane	50	43		1	86	70-130	07/05/2019 1011
1,1,2-Trichloroethane	50	48		1	96	70-130	07/05/2019 1011
Trichloroethene	50	47		1	95	70-130	07/05/2019 1011
Trichlorofluoromethane	50	41		1	81	70-130	07/05/2019 1011
Vinyl chloride	50	37		1	74	70-130	07/05/2019 1011
Xylenes (total)	100	99		1	99	70-130	07/05/2019 1011
m+p - Xylenes	50	49		1	98	70-130	07/05/2019 1011
o - Xylenes	50	50		1	100	70-130	07/05/2019 1011

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	70-130
Bromofluorobenzene		98	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21696-001
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	07/05/2019 0950
Benzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Bromochloromethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Bromoform	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	07/05/2019 0950
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	07/05/2019 0950
Carbon disulfide	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Chlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Chloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Chloroform	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	07/05/2019 0950
Cyclohexane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	07/05/2019 0950
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,4-Dioxane	ND		1	250	25	ug/kg	07/05/2019 0950
Ethylbenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
2-Hexanone	ND		1	10	4.0	ug/kg	07/05/2019 0950
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Methyl acetate	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	07/05/2019 0950
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Methylene chloride	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Naphthalene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Styrene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Toluene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21696-001
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Trichloroethene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Vinyl chloride	ND		1	5.0	3.0	ug/kg	07/05/2019 0950
Xylenes (total)	ND		1	10	4.0	ug/kg	07/05/2019 0950
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
o - Xylenes	ND		1	5.0	2.0	ug/kg	07/05/2019 0950

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21696-002
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	110		1	105	60-140	07/05/2019 0928
Benzene	50	49		1	99	70-130	07/05/2019 0928
Bromochloromethane	50	48		1	97	70-130	07/05/2019 0928
Bromodichloromethane	50	49		1	98	70-130	07/05/2019 0928
Bromoform	50	51		1	101	70-130	07/05/2019 0928
Bromomethane (Methyl bromide)	50	50		1	100	70-130	07/05/2019 0928
2-Butanone (MEK)	100	100		1	104	60-140	07/05/2019 0928
Carbon disulfide	50	53		1	106	70-130	07/05/2019 0928
Carbon tetrachloride	50	49		1	98	70-130	07/05/2019 0928
Chlorobenzene	50	50		1	100	70-130	07/05/2019 0928
Chloroethane	50	50		1	99	70-130	07/05/2019 0928
Chloroform	50	49		1	98	70-130	07/05/2019 0928
Chloromethane (Methyl chloride)	50	45		1	91	60-140	07/05/2019 0928
Cyclohexane	50	47		1	94	70-130	07/05/2019 0928
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	93	70-130	07/05/2019 0928
Dibromochloromethane	50	50		1	99	70-130	07/05/2019 0928
1,2-Dibromoethane (EDB)	50	51		1	101	70-130	07/05/2019 0928
1,2-Dichlorobenzene	50	51		1	102	70-130	07/05/2019 0928
1,3-Dichlorobenzene	50	51		1	101	70-130	07/05/2019 0928
1,4-Dichlorobenzene	50	51		1	102	70-130	07/05/2019 0928
Dichlorodifluoromethane	50	46		1	92	60-140	07/05/2019 0928
1,1-Dichloroethane	50	49		1	97	70-130	07/05/2019 0928
1,2-Dichloroethane	50	48		1	96	70-130	07/05/2019 0928
1,1-Dichloroethene	50	50		1	99	70-130	07/05/2019 0928
cis-1,2-Dichloroethene	50	48		1	96	70-130	07/05/2019 0928
trans-1,2-Dichloroethene	50	48		1	97	70-130	07/05/2019 0928
1,2-Dichloropropane	50	48		1	95	70-130	07/05/2019 0928
cis-1,3-Dichloropropene	50	51		1	101	70-130	07/05/2019 0928
trans-1,3-Dichloropropene	50	51		1	103	70-130	07/05/2019 0928
1,4-Dioxane	500	500		1	101	60-140	07/05/2019 0928
Ethylbenzene	50	50		1	101	70-130	07/05/2019 0928
2-Hexanone	100	110		1	113	70-130	07/05/2019 0928
Isopropylbenzene	50	51		1	101	70-130	07/05/2019 0928
Methyl acetate	50	37		1	74	70-130	07/05/2019 0928
Methyl tertiary butyl ether (MTBE)	50	49		1	99	70-130	07/05/2019 0928
4-Methyl-2-pentanone	100	92		1	92	70-130	07/05/2019 0928
Methylcyclohexane	50	51		1	102	70-130	07/05/2019 0928
Methylene chloride	50	47		1	93	70-130	07/05/2019 0928
Naphthalene	50	49		1	98	70-130	07/05/2019 0928
Styrene	50	51		1	103	70-130	07/05/2019 0928
1,1,2,2-Tetrachloroethane	50	47		1	94	70-130	07/05/2019 0928
Tetrachloroethene	50	50		1	101	70-130	07/05/2019 0928
Toluene	50	48		1	96	70-130	07/05/2019 0928
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	51		1	101	70-130	07/05/2019 0928

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21696-002
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	52		1	104	70-130	07/05/2019 0928
1,2,4-Trichlorobenzene	50	52		1	104	70-130	07/05/2019 0928
1,1,1-Trichloroethane	50	48		1	96	70-130	07/05/2019 0928
1,1,2-Trichloroethane	50	49		1	97	70-130	07/05/2019 0928
Trichloroethene	50	50		1	99	70-130	07/05/2019 0928
Trichlorofluoromethane	50	49		1	98	70-130	07/05/2019 0928
Vinyl chloride	50	45		1	90	70-130	07/05/2019 0928
Xylenes (total)	100	100		1	101	70-130	07/05/2019 0928
m+p - Xylenes	50	51		1	101	70-130	07/05/2019 0928
o - Xylenes	50	51		1	102	70-130	07/05/2019 0928

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		86	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20811-001
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	07/06/2019 1905
Acenaphthylene	ND		1	2.7	0.95	ug/kg	07/06/2019 1905
Anthracene	ND		1	2.7	0.51	ug/kg	07/06/2019 1905
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	07/06/2019 1905
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	07/06/2019 1905
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	07/06/2019 1905
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	07/06/2019 1905
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	07/06/2019 1905
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
Carbazole	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	07/06/2019 1905
2-Chlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
Chrysene	ND		1	2.7	0.45	ug/kg	07/06/2019 1905
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	07/06/2019 1905
Dibenzofuran	ND		1	13	5.0	ug/kg	07/06/2019 1905
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	07/06/2019 1905
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
Diethylphthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
Dimethyl phthalate	ND		1	13	7.4	ug/kg	07/06/2019 1905
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	07/06/2019 1905
2,4-Dinitrophenol	ND		1	67	25	ug/kg	07/06/2019 1905
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	07/06/2019 1905
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	07/06/2019 1905
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	07/06/2019 1905
Fluoranthene	ND		1	2.7	0.42	ug/kg	07/06/2019 1905
Fluorene	ND		1	2.7	0.57	ug/kg	07/06/2019 1905
Hexachlorobenzene	ND		1	13	5.0	ug/kg	07/06/2019 1905
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	07/06/2019 1905
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	07/06/2019 1905
Hexachloroethane	ND		1	13	5.0	ug/kg	07/06/2019 1905
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	07/06/2019 1905
Isophorone	ND		1	13	5.0	ug/kg	07/06/2019 1905

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20811-001
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	07/06/2019 1905
2-Methylphenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
3+4-Methylphenol	ND		1	27	10	ug/kg	07/06/2019 1905
Naphthalene	ND		1	2.7	0.97	ug/kg	07/06/2019 1905
2-Nitroaniline	ND		1	27	10	ug/kg	07/06/2019 1905
3-Nitroaniline	ND		1	27	10	ug/kg	07/06/2019 1905
4-Nitroaniline	ND		1	27	10	ug/kg	07/06/2019 1905
Nitrobenzene	ND		1	13	5.0	ug/kg	07/06/2019 1905
2-Nitrophenol	ND		1	27	10	ug/kg	07/06/2019 1905
4-Nitrophenol	ND		1	67	25	ug/kg	07/06/2019 1905
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	07/06/2019 1905
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	07/06/2019 1905
Pentachlorophenol	ND		1	67	25	ug/kg	07/06/2019 1905
Phenanthrene	ND		1	2.7	0.72	ug/kg	07/06/2019 1905
Phenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
Pyrene	ND		1	2.7	0.50	ug/kg	07/06/2019 1905
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	07/06/2019 1905
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	07/06/2019 1905
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		58	33-102
2-Fluorophenol		54	35-115
Nitrobenzene-d5		61	22-109
Phenol-d5		55	33-122
Terphenyl-d14		88	41-120
2,4,6-Tribromophenol		85	30-117

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20811-002
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	80		1	60	12-111	07/06/2019 1930
Acenaphthylene	130	84		1	63	44-122	07/06/2019 1930
Anthracene	130	93		1	70	16-122	07/06/2019 1930
Benzo(a)anthracene	130	94		1	71	40-121	07/06/2019 1930
Benzo(a)pyrene	130	99		1	75	36-114	07/06/2019 1930
Benzo(b)fluoranthene	130	100		1	79	38-123	07/06/2019 1930
Benzo(g,h,i)perylene	130	110		1	80	43-120	07/06/2019 1930
Benzo(k)fluoranthene	130	97		1	73	40-126	07/06/2019 1930
4-Bromophenyl phenyl ether	130	88		1	66	30-130	07/06/2019 1930
Butyl benzyl phthalate	130	110		1	82	48-124	07/06/2019 1930
Carbazole	130	95		1	71	47-125	07/06/2019 1930
bis (2-Chloro-1-methylethyl) ether	130	80		1	60	41-113	07/06/2019 1930
4-Chloro-3-methyl phenol	130	81		1	61	48-120	07/06/2019 1930
bis(2-Chloroethoxy)methane	130	78		1	58	38-115	07/06/2019 1930
bis(2-Chloroethyl)ether	130	78		1	59	46-122	07/06/2019 1930
2-Chloronaphthalene	130	79		1	59	37-106	07/06/2019 1930
2-Chlorophenol	130	79		1	59	44-122	07/06/2019 1930
4-Chlorophenyl phenyl ether	130	82		1	61	32-107	07/06/2019 1930
Chrysene	130	96		1	73	41-124	07/06/2019 1930
Dibenzo(a,h)anthracene	130	110		1	84	38-125	07/06/2019 1930
Dibenzofuran	130	82		1	61	45-128	07/06/2019 1930
1,2-Dichlorobenzene	130	71		1	54	39-94	07/06/2019 1930
1,3-Dichlorobenzene	130	69		1	52	30-130	07/06/2019 1930
1,4-Dichlorobenzene	130	70		1	53	39-92	07/06/2019 1930
3,3'-Dichlorobenzidine	130	69		1	52	10-119	07/06/2019 1930
2,4-Dichlorophenol	130	78		1	58	30-96	07/06/2019 1930
Diethylphthalate	130	86		1	65	30-130	07/06/2019 1930
Dimethyl phthalate	130	87		1	65	24-127	07/06/2019 1930
2,4-Dimethylphenol	130	130		1	97	30-130	07/06/2019 1930
Di-n-butyl phthalate	130	90		1	68	35-108	07/06/2019 1930
4,6-Dinitro-2-methylphenol	130	110		1	81	53-150	07/06/2019 1930
2,4-Dinitrophenol	270	190		1	72	32-115	07/06/2019 1930
2,4-Dinitrotoluene	130	89		1	67	40-130	07/06/2019 1930
2,6-Dinitrotoluene	130	86		1	64	46-118	07/06/2019 1930
Di-n-octylphthalate	130	110		1	82	49-118	07/06/2019 1930
bis(2-Ethylhexyl)phthalate	130	120		1	88	33-123	07/06/2019 1930
Fluoranthene	130	88		1	66	26-133	07/06/2019 1930
Fluorene	130	82		1	62	19-108	07/06/2019 1930
Hexachlorobenzene	130	91		1	68	10-125	07/06/2019 1930
Hexachlorobutadiene	130	68		1	51	47-116	07/06/2019 1930
Hexachlorocyclopentadiene	670	340		1	50	48-127	07/06/2019 1930
Hexachloroethane	130	67		1	50	18-154	07/06/2019 1930
Indeno(1,2,3-c,d)pyrene	130	100		1	78	42-123	07/06/2019 1930
Isophorone	130	86		1	65	30-130	07/06/2019 1930

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20811-002
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	76		1	57	10-107	07/06/2019 1930
2-Methylphenol	130	81		1	61	33-103	07/06/2019 1930
3+4-Methylphenol	130	97		1	73	18-121	07/06/2019 1930
Naphthalene	130	76		1	57	10-112	07/06/2019 1930
2-Nitroaniline	130	100		1	76	46-128	07/06/2019 1930
3-Nitroaniline	130	54		1	41	30-130	07/06/2019 1930
4-Nitroaniline	130	83		1	63	51-129	07/06/2019 1930
Nitrobenzene	130	83		1	63	49-142	07/06/2019 1930
2-Nitrophenol	130	87		1	66	33-114	07/06/2019 1930
4-Nitrophenol	270	170		1	63	27-138	07/06/2019 1930
N-Nitrosodi-n-propylamine	130	88		1	66	45-112	07/06/2019 1930
N-Nitrosodiphenylamine (Diphenylamine)	130	99		1	74	49-123	07/06/2019 1930
Pentachlorophenol	270	190		1	70	36-108	07/06/2019 1930
Phenanthrene	130	88		1	66	16-123	07/06/2019 1930
Phenol	130	86		1	64	39-108	07/06/2019 1930
Pyrene	130	92		1	69	34-121	07/06/2019 1930
1,2,4,5-Tetrachlorobenzene	130	76		1	57	30-130	07/06/2019 1930
2,3,4,6-Tetrachlorophenol	130	90		1	68	53-125	07/06/2019 1930
1,2,4-Trichlorobenzene	130	73		1	55	30-130	07/06/2019 1930
2,4,5-Trichlorophenol	130	85		1	64	32-105	07/06/2019 1930
2,4,6-Trichlorophenol	130	84		1	63	31-102	07/06/2019 1930

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		60	33-102
2-Fluorophenol		61	35-115
Nitrobenzene-d5		64	22-109
Phenol-d5		62	33-122
Terphenyl-d14		80	41-120
2,4,6-Tribromophenol		82	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20678-001
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	07/06/2019 1238
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	07/06/2019 1238

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20678-002
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	40-140	07/06/2019 1308
C9 - C18 Aliphatics	30	19		1	65	40-140	07/06/2019 1308

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		75	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20678-003
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	0.64	40-140	25	07/06/2019 1338
C9 - C18 Aliphatics	30	19		1	64	2.1	40-140	25	07/06/2019 1338

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20679-001
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	07/06/2019 2036

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		72	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		85	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20679-002
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	68		1	81	40-140	07/06/2019 2105

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		92	40-140
o - Terphenyl (aromatic)		91	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20679-003
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	56		1	66	20	40-140	25	07/06/2019 2135

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		71	40-140
2-Fluorobiphenyl (fractionation 1)		73	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - MB

Sample ID: UQ21737-001
Batch: 21737
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21737-002
Batch: 21737
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	21		1	109	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21737-003
Batch: 21737
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	107	2.5	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		85	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21738-001
Batch: 21738
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	07/03/2019 1348
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	07/03/2019 1348
Ethylbenzene	ND		1	0.25	0.031	mg/kg	07/03/2019 1348
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	07/03/2019 1348
Naphthalene	ND		1	0.25	0.13	mg/kg	07/03/2019 1348
Toluene	ND		1	0.25	0.040	mg/kg	07/03/2019 1348
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	07/03/2019 1348
o - Xylenes	ND		1	0.25	0.028	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		75	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21738-002
Batch: 21738
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	07/03/2019 1252
C9 - C10 Aromatics	1.3	1.3		1	104	70-130	07/03/2019 1252
Ethylbenzene	1.3	1.2		1	96	70-130	07/03/2019 1252
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	07/03/2019 1252
Naphthalene	1.3	1.0		1	80	70-130	07/03/2019 1252
Toluene	1.3	1.2		1	96	70-130	07/03/2019 1252
m+p - Xylenes	2.5	2.5		1	100	70-130	07/03/2019 1252
o - Xylenes	1.3	1.3		1	104	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21738-003
Batch: 21738
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
C9 - C10 Aromatics	1.3	1.2		1	96	8.0	70-130	25	07/03/2019 1320
Ethylbenzene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
Methyl tertiary butyl ether (MTBE)	1.3	1.0		1	80	9.5	70-130	25	07/03/2019 1320
Naphthalene	1.3	1.0		1	80	0.00	70-130	25	07/03/2019 1320
Toluene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
m+p - Xylenes	2.5	2.5		1	100	0.00	70-130	25	07/03/2019 1320
o - Xylenes	1.3	1.2		1	96	8.0	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21739-001
Batch: 21739
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/03/2019 1348
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21739-002
Batch: 21739
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.4		1	109	70-130	07/03/2019 1252
C9 - C12 Aliphatics, Adjusted	3.8	4.5		1	120	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21739-003
Batch: 21739
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.3		1	107	2.1	70-130	25	07/03/2019 1320
C9 - C12 Aliphatics, Adjusted	3.8	4.2		1	112	7.0	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21818-001
Batch: 21818
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21818-002
Batch: 21818
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	21		1	109	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21818-003
Batch: 21818
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	107	2.5	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		85	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21819-001
Batch: 21819
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	07/03/2019 1348
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	07/03/2019 1348
Ethylbenzene	ND		1	0.25	0.031	mg/kg	07/03/2019 1348
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	07/03/2019 1348
Naphthalene	ND		1	0.25	0.13	mg/kg	07/03/2019 1348
Toluene	ND		1	0.25	0.040	mg/kg	07/03/2019 1348
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	07/03/2019 1348
o - Xylenes	ND		1	0.25	0.028	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		75	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21819-002
Batch: 21819
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	07/03/2019 1252
C9 - C10 Aromatics	1.3	1.3		1	104	70-130	07/03/2019 1252
Ethylbenzene	1.3	1.2		1	96	70-130	07/03/2019 1252
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	07/03/2019 1252
Naphthalene	1.3	1.0		1	80	70-130	07/03/2019 1252
Toluene	1.3	1.2		1	96	70-130	07/03/2019 1252
m+p - Xylenes	2.5	2.5		1	100	70-130	07/03/2019 1252
o - Xylenes	1.3	1.3		1	104	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21819-003
Batch: 21819
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
C9 - C10 Aromatics	1.3	1.2		1	96	8.0	70-130	25	07/03/2019 1320
Ethylbenzene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
Methyl tertiary butyl ether (MTBE)	1.3	1.0		1	80	9.5	70-130	25	07/03/2019 1320
Naphthalene	1.3	1.0		1	80	0.00	70-130	25	07/03/2019 1320
Toluene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
m+p - Xylenes	2.5	2.5		1	100	0.00	70-130	25	07/03/2019 1320
o - Xylenes	1.3	1.2		1	96	8.0	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21820-001
Batch: 21820
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/03/2019 1348
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21820-002
Batch: 21820
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.4		1	109	70-130	07/03/2019 1252
C9 - C12 Aliphatics, Adjusted	3.8	4.5		1	120	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21820-003
Batch: 21820
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.3		1	107	2.1	70-130	25	07/03/2019 1320
C9 - C12 Aliphatics, Adjusted	3.8	4.2		1	112	7.0	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ21081-001
Batch: 21081
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	07/02/2019 2048
Arsenic	ND		1	0.50	0.20	mg/kg	07/02/2019 2048
Barium	ND		1	1.3	0.31	mg/kg	07/02/2019 2048
Beryllium	ND		1	0.10	0.034	mg/kg	07/02/2019 2048
Cadmium	ND		1	0.13	0.025	mg/kg	07/02/2019 2048
Chromium	ND		1	1.3	0.55	mg/kg	07/02/2019 2048
Cobalt	ND		1	1.3	0.30	mg/kg	07/02/2019 2048
Copper	ND		1	1.3	0.33	mg/kg	07/05/2019 1117
Lead	ND		1	0.25	0.068	mg/kg	07/02/2019 2048
Nickel	ND		1	1.3	0.30	mg/kg	07/02/2019 2048
Selenium	ND		1	1.3	0.47	mg/kg	07/02/2019 2048
Silver	ND		1	0.25	0.060	mg/kg	07/02/2019 2048
Vanadium	ND		1	1.3	0.25	mg/kg	07/02/2019 2048
Zinc	ND		1	2.5	0.50	mg/kg	07/02/2019 2048

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ21081-002
Batch: 21081
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	48		1	96	80-120	07/02/2019 2054
Arsenic	50	50		1	101	80-120	07/02/2019 2054
Barium	50	48		1	96	80-120	07/02/2019 2054
Beryllium	50	48		1	96	80-120	07/02/2019 2054
Cadmium	50	48		1	96	80-120	07/02/2019 2054
Chromium	50	51		1	103	80-120	07/02/2019 2054
Cobalt	50	52		1	104	80-120	07/02/2019 2054
Copper	50	51		1	102	80-120	07/05/2019 1123
Lead	50	50		1	100	80-120	07/02/2019 2054
Nickel	50	51		1	101	80-120	07/02/2019 2054
Selenium	50	44		1	87	80-120	07/02/2019 2054
Silver	50	51		1	103	80-120	07/02/2019 2054
Vanadium	50	50		1	100	80-120	07/02/2019 2054
Zinc	50	44		1	87	80-120	07/02/2019 2054

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UF25038-004MS
Batch: 21081
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	ND	57	52		1	92	75-125	07/02/2019 2223
Arsenic	3.9	57	65		1	108	75-125	07/02/2019 2223
Barium	130	57	250	N	1	203	75-125	07/02/2019 2223
Beryllium	0.10	57	14	N	1	24	75-125	07/02/2019 2223
Cadmium	0.087	57	59		1	105	75-125	07/02/2019 2223
Chromium	10	57	75		1	114	75-125	07/02/2019 2223
Cobalt	3.6	57	63		1	104	75-125	07/02/2019 2223
Copper	5.5	57	58		1	93	75-125	07/02/2019 2223
Lead	5.7	57	71		1	115	75-125	07/02/2019 2223
Nickel	7.9	57	65		1	102	75-125	07/02/2019 2223
Selenium	ND	57	54		1	96	75-125	07/02/2019 2223
Silver	ND	57	61		1	108	75-125	07/02/2019 2223
Vanadium	20	57	91	N	1	126	75-125	07/02/2019 2223
Zinc	25	57	79		1	95	75-125	07/02/2019 2223

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF25038-004MD
Batch: 21081
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Antimony	ND	52	42	+	1	81	22	75-125	20	07/02/2019 2229
Arsenic	3.9	52	55		1	99	16	75-125	20	07/02/2019 2229
Barium	130	52	280	N	1	278	11	75-125	20	07/02/2019 2229
Beryllium	0.10	52	10	N,+	1	20	27	75-125	20	07/02/2019 2229
Cadmium	0.087	52	51		1	99	14	75-125	20	07/02/2019 2229
Chromium	10	52	67		1	110	11	75-125	20	07/02/2019 2229
Cobalt	3.6	52	55		1	99	13	75-125	20	07/02/2019 2229
Copper	5.5	52	51		1	89	12	75-125	20	07/02/2019 2229
Lead	5.7	52	61		1	108	14	75-125	20	07/02/2019 2229
Nickel	7.9	52	58		1	97	12	75-125	20	07/02/2019 2229
Selenium	ND	52	46		1	90	15	75-125	20	07/02/2019 2229
Silver	ND	52	52		1	100	16	75-125	20	07/02/2019 2229
Vanadium	20	52	85	N	1	126	6.8	75-125	20	07/02/2019 2229
Zinc	25	52	74		1	95	6.2	75-125	20	07/02/2019 2229

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20850-001
Batch: 20850
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/27/2019 1855

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/28/2019 1634

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20850-002
Batch: 20850
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/27/2019 1855

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.88		1	105	80-120	06/28/2019 1637

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody
and
Miscellaneous Documents

Chain of Custody Record

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

Number

Client: Ramboll US Corporation
Report to Contact: Daniel Price/Michael Wilson
Telephone No. / E-mail: [illegible]
Quote No.:
Address: 7600 College Boulevard Suite 1905
City: Overland Park State: KS Zip Code: 66210
Sampler's Signature: x [signature] Brooke Bailey, Andrew Hardwick, Elizabeth Borucki
Project Name: CMR RIAIM ~~East~~ West Rail
Project Number: 1690012344-003
P.O No.:
Analysis (Attach list if more space is needed)
Page 1 of 1

UF25038
KMN2

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH					Remarks / Cooler I.D.
CMR-WB01-1.5-2.0-190622	6/22/2019	15:40	G		X			2					1	2	X	X	X	X	X					Cooler 003
CMR-WB01-3.0-4.0-190622	6/22/2019	15:45	G		X			2					1	2	X	X	X	X	X					Cooler 003
CMR-WB01-6.0-6.5-190622	6/22/2019	15:50	G		X			2					1	2	X	X	X	X	X					Cooler 003
CMR-WB01-6.0-6.5-190622-DUP	6/22/2019	15:55	G		X			2					1	2	X	X	X	X	X					Cooler 003
TB-24	NA	NA	G	X							2				X									Trip Blank/Cooler 003

Turn Around Time Required (Prior lab approval required for expedited TAT): [X] Standard [ ] Rush (Please Specify)

Sample Disposal: [ ] Return to Client [ ] Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks): [ ] Non-Hazardous [ ] Flammable [ ] Skin Irritant [ ] SDS provided [X] Unknown

QC Requirements:

Relinquished by	Date	Time	Received by	Date	Time
1. [signature]	6/24/2019	17:45	1.		
2.			2.		
3.			3.		
4. Fed EX	6-25-19	0919	4. Laboratory Received by [signature]	6-25-19	0919

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) [✓] Y [ ] N [ ] Ice Pack
Receipt Temp. 3.6 °C

Document Number: ME0020W-01

Shealy Environmental Services, Inc
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 06-25-2019 Lot #: UF25038

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

3.6 / 3.6 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) 005(2) were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JSH Date: 06-25-2019

Comments:

MEMO

Date: **July 23, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF25040, 2 Groundwater Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF25040 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB01S-190624	UF25040-001
CMR-WB01D-190624	UF25040-002
TB-23-20190624	UF25040-003

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of phenol. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all phenol results have been validated as estimated.

Blank Detections
During analysis, acetone and bis(2-ethylhexyl)phthalate was detected in trip and method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All acetone and bis(2-ethylhexyl)phthalate results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF25040

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 2 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples, no action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UF25040

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 2 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	Bis(2-ethylhexyl)phthalate detected in method blank. All project sample detections of bis(2-ethylhexyl)phthalate validated as non-detect (U). Acetone detected in trip blank. All project sample detections of acetone validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to sample dilution, no action taken.	Surrogates out die to matrix interference/dilution, no action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out of high for acetone. See above. LCS out low for phenol. All phenol results validated as estimated (J, UJ).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/a
Other Non-conformances	CCV out of criteria high for acetone. See above.	No other non-conformances noted.
Overall Assessment of Data	All phenol results validated as estimated (J, UJ). All project sample detections of acetone validated as non-detect (U). All project sample detections of bis(2-ethylhexyl)phthalate validated as non-detect (U).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM West Rail

Project Number: 1690012344-003

Lot Number:**UF25040**

Date Completed:07/09/2019

07/10/2019 1:26 PM
Approved and released by:
Project Manager: Kelly M. Nance

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF25040

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21644 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections above the LOQ for this compound in the samples associated with this batch; therefore, data quality is not impacted.

The continuing calibration verification (CCV) associated with samples -001, -002, and -003 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections above the LOQ for this compound in the associated samples; therefore, data quality is not impacted.

Semivolatiles
The method blank associated with batch 21123 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for bis(2-ethylhexyl)phthalate have been flagged with a “B” qualifier.

The LCS associated with batch 21123 had phenol recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Sample -002 was diluted 5X due to the sample matrix. The reporting limits have been raised accordingly.

Sample Summary
Ramboll US Corporation
Lot Number: UF25040

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB01S-190624	Aqueous	06/24/2019 1059	06/25/2019
002	CMR-WB03D-190624	Aqueous	06/24/2019 1200	06/25/2019
003	TB-23-20190624	Aqueous	06/24/2019	06/25/2019

(3 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF25040

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB01S-190624	Aqueous	Benzene	8260B	130		ug/L	5
001	CMR-WB01S-190624	Aqueous	Cyclohexane	8260B	33		ug/L	5
001	CMR-WB01S-190624	Aqueous	Ethylbenzene	8260B	310		ug/L	5
001	CMR-WB01S-190624	Aqueous	Isopropylbenzene	8260B	29		ug/L	5
001	CMR-WB01S-190624	Aqueous	Methylcyclohexane	8260B	26		ug/L	5
001	CMR-WB01S-190624	Aqueous	Naphthalene	8260B	7.5		ug/L	5
001	CMR-WB01S-190624	Aqueous	Xylenes (total)	8260B	14		ug/L	6
001	CMR-WB01S-190624	Aqueous	m+p - Xylenes	8260B	14		ug/L	6
001	CMR-WB01S-190624	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.83	BJ	ug/L	7
001	CMR-WB01S-190624	Aqueous	Pentachlorophenol	8270D	2.1	J	ug/L	8
001	CMR-WB01S-190624	Aqueous	C5 - C8 Aliphatics,	Montana VPH	140	J	ug/L	11
001	CMR-WB01S-190624	Aqueous	C9 - C12 Aliphatics,	Montana VPH	560		ug/L	11
001	CMR-WB01S-190624	Aqueous	Benzene	Montana VPH	120		ug/L	12
001	CMR-WB01S-190624	Aqueous	C9 - C10 Aromatics	Montana VPH	770		ug/L	12
001	CMR-WB01S-190624	Aqueous	Ethylbenzene	Montana VPH	270		ug/L	12
001	CMR-WB01S-190624	Aqueous	Naphthalene	Montana VPH	14	J	ug/L	12
001	CMR-WB01S-190624	Aqueous	m+p - Xylenes	Montana VPH	13	J	ug/L	12
001	CMR-WB01S-190624	Aqueous	TPH	Montana VPH	2000		ug/L	13
001	CMR-WB01S-190624	Aqueous	Barium	6020B	35		ug/L	14
001	CMR-WB01S-190624	Aqueous	Cadmium	6020B	0.27	J	ug/L	14
001	CMR-WB01S-190624	Aqueous	Chromium	6020B	1.5	J	ug/L	14
001	CMR-WB01S-190624	Aqueous	Cobalt	6020B	4.4	J	ug/L	14
001	CMR-WB01S-190624	Aqueous	Copper	6020B	7.7		ug/L	14
001	CMR-WB01S-190624	Aqueous	Lead	6020B	0.26	J	ug/L	14
001	CMR-WB01S-190624	Aqueous	Nickel	6020B	13		ug/L	14
001	CMR-WB01S-190624	Aqueous	Vanadium	6020B	3.7	J	ug/L	14
001	CMR-WB01S-190624	Aqueous	Zinc	6020B	17		ug/L	14
002	CMR-WB03D-190624	Aqueous	Acetone	8260B	5.6	J	ug/L	15
002	CMR-WB03D-190624	Aqueous	Fluorene	8270D	0.33	J	ug/L	17
002	CMR-WB03D-190624	Aqueous	2-Methylnaphthalene	8270D	2.6		ug/L	18
002	CMR-WB03D-190624	Aqueous	Naphthalene	8270D	4.1		ug/L	18
002	CMR-WB03D-190624	Aqueous	C19 - C36 Aliphatics	Montana EPH	140		ug/L	19
002	CMR-WB03D-190624	Aqueous	C9 - C18 Aliphatics	Montana EPH	510		ug/L	19
002	CMR-WB03D-190624	Aqueous	C11 - C22 Aromatics	Montana EPH	100		ug/L	20
002	CMR-WB03D-190624	Aqueous	Arsenic	6020B	24		ug/L	24
002	CMR-WB03D-190624	Aqueous	Barium	6020B	1100		ug/L	24
002	CMR-WB03D-190624	Aqueous	Cobalt	6020B	3.1	J	ug/L	24
002	CMR-WB03D-190624	Aqueous	Nickel	6020B	5.2		ug/L	24
002	CMR-WB03D-190624	Aqueous	Zinc	6020B	24		ug/L	24
003	TB-23-20190624	Aqueous	Acetone	8260B	5.1	J	ug/L	25

(40 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-001
Description: CMR-WB01S-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1059
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	07/05/2019 1830	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		50	10	ug/L	1
Benzene	71-43-2	8260B	130		2.5	2.0	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		2.5	2.0	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		2.5	2.0	ug/L	1
Bromoform	75-25-2	8260B	ND		2.5	2.0	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.5	2.0	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		50	10	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		2.5	2.0	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		2.5	2.0	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		2.5	2.0	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.5	2.0	ug/L	1
Chloroform	67-66-3	8260B	ND		2.5	2.0	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		2.5	2.0	ug/L	1
Cyclohexane	110-82-7	8260B	33		2.5	2.0	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		2.5	2.0	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		2.5	2.0	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		2.5	2.0	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		2.5	2.0	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		2.5	2.0	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.5	2.0	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		2.5	2.0	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		2.5	2.0	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		2.5	2.0	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		2.5	2.0	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		2.5	2.0	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		2.5	0.55	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		100	67	ug/L	1
Ethylbenzene	100-41-4	8260B	310		2.5	2.0	ug/L	1
2-Hexanone	591-78-6	8260B	ND		50	10	ug/L	1
Isopropylbenzene	98-82-8	8260B	29		2.5	2.0	ug/L	1
Methyl acetate	79-20-9	8260B	ND		5.0	2.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		2.5	2.0	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		50	10	ug/L	1
Methylcyclohexane	108-87-2	8260B	26		25	2.0	ug/L	1
Methylene chloride	75-09-2	8260B	ND		2.5	2.0	ug/L	1
Naphthalene	91-20-3	8260B	7.5		2.5	2.0	ug/L	1
Styrene	100-42-5	8260B	ND		2.5	2.1	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		2.5	2.0	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		2.5	2.0	ug/L	1
Toluene	108-88-3	8260B	ND		2.5	2.0	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.0	2.1	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-001
Description: CMR-WB01S-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1059
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	07/05/2019 1830	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		2.5	2.0	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		2.5	2.0	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		2.5	2.0	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		2.5	2.0	ug/L	1
Trichloroethene	79-01-6	8260B	ND		2.5	2.0	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		2.5	2.0	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		2.5	2.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	14		5.0	2.0	ug/L	1
m+p - Xylenes	179601-23-1	8260B	14		2.5	2.0	ug/L	1
o - Xylenes	95-47-6	8260B	ND		2.5	2.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-001
Description: CMR-WB01S-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1059
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	07/07/2019 0032	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.83	BJ	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-001
Description: CMR-WB01S-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1059
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	07/07/2019 0032	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	2.1	J	4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		58	37-129
2-Fluorophenol		29	24-127
Nitrobenzene-d5		62	38-127
Phenol-d5		43	28-128
Terphenyl-d14		85	10-148
2,4,6-Tribromophenol		101	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25040-001
Description: CMR-WB01S-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1059
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 1732	CHG	06/27/2019 1005	20903

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25040-001
Description: CMR-WB01S-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1059
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 2334	CHG	06/27/2019 1005	20904

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		44	40-140
2-Fluorobiphenyl (fractionation 1)		98	40-140
o - Terphenyl (aromatic)		81	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25040-001
Description: CMR-WB01S-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1059
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/02/2019 1530	JJG		21450

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	140	J	380	75	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	560		380	75	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25040-001
Description: CMR-WB01S-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1059
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/02/2019 1530	JJG		21449

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	120		25	2.6	ug/L	1
C9 - C10 Aromatics		Montana VPH	770		130	25	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	270		25	3.1	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		25	6.0	ug/L	1
Naphthalene	91-20-3	Montana VPH	14	J	25	3.5	ug/L	1
Toluene	108-88-3	Montana VPH	ND		25	2.7	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	13	J	25	6.0	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		25	2.9	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		87	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25040-001
Description: CMR-WB01S-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1059
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/02/2019 1530	JJG		21447

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	2000		880	180	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		90	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-001
Description: CMR-WB01S-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1059
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1529	TJW	06/26/2019 1259	20716
1	3005A	6020B	1	07/02/2019 1712	BNW	06/27/2019 0834	20900
2	3005A	6020B	1	07/05/2019 1210	LLL	06/27/2019 0834	20900

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	ND		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	35		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	0.27	J	0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	1.5	J	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	4.4	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	7.7		5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	0.26	J	1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	13		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	3.7	J	5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	17		10	2.5	ug/L	2

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-002
Description: CMR-WB03D-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1200
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1417	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	5.6	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-002
Description: CMR-WB03D-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1200
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1417	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-002
Description: CMR-WB03D-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1200
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	07/06/2019 2135	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.80	0.20	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.80	0.20	ug/L	1
Anthracene	120-12-7	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.80	0.20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.80	0.20	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		4.0	0.75	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		20	1.1	ug/L	1
Carbazole	86-74-8	8270D	ND		4.0	0.20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		4.0	0.85	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		4.0	1.3	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		4.0	0.30	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		4.0	0.80	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		4.0	0.75	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		4.0	0.75	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		4.0	0.80	ug/L	1
Chrysene	218-01-9	8270D	ND		0.80	0.20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.80	0.20	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		4.0	0.80	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4.0	0.85	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4.0	0.90	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4.0	0.80	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		20	4.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		4.0	0.95	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		20	0.95	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		20	0.90	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		4.0	0.75	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		20	2.1	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		20	4.5	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		20	6.6	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		8.0	1.8	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		8.0	1.7	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		20	2.4	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		20	1.9	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.80	0.20	ug/L	1
Fluorene	86-73-7	8270D	0.33	J	0.80	0.20	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		4.0	0.75	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		4.0	0.85	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		20	5.5	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		4.0	0.85	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.80	0.20	ug/L	1
Isophorone	78-59-1	8270D	ND		4.0	1.1	ug/L	1

LOQ = Limit of Quantitation
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DL = Detection Limit
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N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-002
Description: CMR-WB03D-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1200
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	07/06/2019 2135	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	2.6		0.80	0.20	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		4.0	1.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		8.0	2.3	ug/L	1
Naphthalene	91-20-3	8270D	4.1		0.80	0.20	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		8.0	3.3	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		8.0	0.75	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		8.0	6.6	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		4.0	0.85	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		8.0	2.2	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		20	10	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		4.0	1.4	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		4.0	2.5	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		20	6.7	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.80	0.20	ug/L	1
Phenol	108-95-2	8270D	ND		4.0	0.95	ug/L	1
Pyrene	129-00-0	8270D	ND		0.80	0.20	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		4.0	1.3	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4.0	2.8	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4.0	1.9	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		4.0	0.95	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		4.0	1.1	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		56	37-129
2-Fluorophenol		33	24-127
Nitrobenzene-d5		65	38-127
Phenol-d5		48	28-128
Terphenyl-d14		74	10-148
2,4,6-Tribromophenol		93	35-144

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25040-002
Description: CMR-WB03D-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1200
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 1803	CHG	06/27/2019 1005	20903

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	140		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	510		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25040-002
Description: CMR-WB03D-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1200
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/29/2019 0004	CHG	06/27/2019 1005	20904

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	100		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		43	40-140
2-Fluorobiphenyl (fractionation 1)		92	40-140
o - Terphenyl (aromatic)		79	40-140

LOQ = Limit of Quantitation
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H = Out of holding time
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25040-002
Description: CMR-WB03D-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1200
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1558	JJG		21450

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		101	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25040-002
Description: CMR-WB03D-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1200
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1558	JJG		21449

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		94	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25040-002
Description: CMR-WB03D-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1200
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1558	JJG		21447

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		102	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-002
Description: CMR-WB03D-190624
Matrix: Aqueous
Date Sampled: 06/24/2019 1200
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1532	TJW	06/26/2019 1259	20716
1	3005A	6020B	1	07/02/2019 1718	BNW	06/27/2019 0834	20900
2	3005A	6020B	1	07/05/2019 1216	LLL	06/27/2019 0834	20900

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	24		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	1100		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	3.1	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	ND		5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	5.2		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	24		10	2.5	ug/L	2

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-003
Description: TB-23-20190624
Matrix: Aqueous
Date Sampled: 06/24/2019
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1236	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	5.1	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25040-003
Description: TB-23-20190624
Matrix: Aqueous
Date Sampled: 06/24/2019
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1236	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		93	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21644-001
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/05/2019 1110
Benzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromoform	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/05/2019 1110
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloroform	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Cyclohexane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/05/2019 1110
1,4-Dioxane	ND		1	20	13	ug/L	07/05/2019 1110
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
2-Hexanone	ND		1	10	2.0	ug/L	07/05/2019 1110
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Methyl acetate	ND		1	1.0	0.40	ug/L	07/05/2019 1110
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/05/2019 1110
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/05/2019 1110
Methylene chloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Naphthalene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Styrene	ND		1	0.50	0.41	ug/L	07/05/2019 1110
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Toluene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/05/2019 1110

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21644-001
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Trichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/05/2019 1110
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/05/2019 1110
o - Xylenes	ND		1	0.50	0.40	ug/L	07/05/2019 1110

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		99	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21644-002
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	160	N	1	159	60-140	07/05/2019 1011
Benzene	50	48		1	95	70-130	07/05/2019 1011
Bromochloromethane	50	44		1	87	70-130	07/05/2019 1011
Bromodichloromethane	50	46		1	92	70-130	07/05/2019 1011
Bromoform	50	53		1	107	70-130	07/05/2019 1011
Bromomethane (Methyl bromide)	50	45		1	90	70-130	07/05/2019 1011
2-Butanone (MEK)	100	130		1	126	70-130	07/05/2019 1011
Carbon disulfide	50	49		1	99	70-130	07/05/2019 1011
Carbon tetrachloride	50	42		1	84	70-130	07/05/2019 1011
Chlorobenzene	50	50		1	99	70-130	07/05/2019 1011
Chloroethane	50	46		1	92	70-130	07/05/2019 1011
Chloroform	50	43		1	87	70-130	07/05/2019 1011
Chloromethane (Methyl chloride)	50	41		1	83	60-140	07/05/2019 1011
Cyclohexane	50	36		1	73	70-130	07/05/2019 1011
1,2-Dibromo-3-chloropropane (DBCP)	50	49		1	98	70-130	07/05/2019 1011
Dibromochloromethane	50	50		1	101	70-130	07/05/2019 1011
1,2-Dibromoethane (EDB)	50	49		1	99	70-130	07/05/2019 1011
1,2-Dichlorobenzene	50	49		1	99	70-130	07/05/2019 1011
1,3-Dichlorobenzene	50	50		1	100	70-130	07/05/2019 1011
1,4-Dichlorobenzene	50	49		1	98	70-130	07/05/2019 1011
Dichlorodifluoromethane	50	39		1	77	60-140	07/05/2019 1011
1,1-Dichloroethane	50	44		1	88	70-130	07/05/2019 1011
1,2-Dichloroethane	50	45		1	90	70-130	07/05/2019 1011
1,1-Dichloroethene	50	44		1	87	70-130	07/05/2019 1011
cis-1,2-Dichloroethene	50	43		1	87	70-130	07/05/2019 1011
trans-1,2-Dichloroethene	50	44		1	88	70-130	07/05/2019 1011
1,2-Dichloropropane	50	47		1	94	70-130	07/05/2019 1011
cis-1,3-Dichloropropene	50	50		1	100	70-130	07/05/2019 1011
trans-1,3-Dichloropropene	50	50		1	99	70-130	07/05/2019 1011
1,4-Dioxane	500	530		1	106	60-140	07/05/2019 1011
Ethylbenzene	50	50		1	99	70-130	07/05/2019 1011
2-Hexanone	100	110		1	108	70-130	07/05/2019 1011
Isopropylbenzene	50	50		1	100	70-130	07/05/2019 1011
Methyl acetate	50	36		1	72	70-130	07/05/2019 1011
Methyl tertiary butyl ether (MTBE)	50	47		1	93	70-130	07/05/2019 1011
4-Methyl-2-pentanone	100	92		1	92	70-130	07/05/2019 1011
Methylcyclohexane	50	45		1	89	70-130	07/05/2019 1011
Methylene chloride	50	46		1	92	70-130	07/05/2019 1011
Naphthalene	50	49		1	98	70-130	07/05/2019 1011
Styrene	50	51		1	102	70-130	07/05/2019 1011
1,1,2,2-Tetrachloroethane	50	48		1	95	70-130	07/05/2019 1011
Tetrachloroethene	50	50		1	99	70-130	07/05/2019 1011
Toluene	50	48		1	96	70-130	07/05/2019 1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	43		1	86	70-130	07/05/2019 1011

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21644-002
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	101	70-130	07/05/2019 1011
1,2,4-Trichlorobenzene	50	50		1	101	70-130	07/05/2019 1011
1,1,1-Trichloroethane	50	43		1	86	70-130	07/05/2019 1011
1,1,2-Trichloroethane	50	48		1	96	70-130	07/05/2019 1011
Trichloroethene	50	47		1	95	70-130	07/05/2019 1011
Trichlorofluoromethane	50	41		1	81	70-130	07/05/2019 1011
Vinyl chloride	50	37		1	74	70-130	07/05/2019 1011
Xylenes (total)	100	99		1	99	70-130	07/05/2019 1011
m+p - Xylenes	50	49		1	98	70-130	07/05/2019 1011
o - Xylenes	50	50		1	100	70-130	07/05/2019 1011

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	70-130
Bromofluorobenzene		98	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21123-001
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Acenaphthylene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	07/05/2019 1135
Carbazole	ND		1	0.80	0.040	ug/L	07/05/2019 1135
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	07/05/2019 1135
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	07/05/2019 1135
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	07/05/2019 1135
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	07/05/2019 1135
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	07/05/2019 1135
2-Chlorophenol	ND		1	0.80	0.15	ug/L	07/05/2019 1135
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	07/05/2019 1135
Chrysene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Dibenzofuran	ND		1	0.80	0.16	ug/L	07/05/2019 1135
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	07/05/2019 1135
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	07/05/2019 1135
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	07/05/2019 1135
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
Diethylphthalate	ND		1	4.0	0.19	ug/L	07/05/2019 1135
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	07/05/2019 1135
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	07/05/2019 1135
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	07/05/2019 1135
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	07/05/2019 1135
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	07/05/2019 1135
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	07/05/2019 1135
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	07/05/2019 1135
bis(2-Ethylhexyl)phthalate	0.62	J	1	4.0	0.38	ug/L	07/05/2019 1135
Fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Fluorene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	07/05/2019 1135
Hexachloroethane	ND		1	0.80	0.17	ug/L	07/05/2019 1135
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Isophorone	ND		1	0.80	0.22	ug/L	07/05/2019 1135

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21123-001
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
2-Methylphenol	ND		1	0.80	0.21	ug/L	07/05/2019 1135
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	07/05/2019 1135
Naphthalene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
2-Nitroaniline	ND		1	1.6	0.66	ug/L	07/05/2019 1135
3-Nitroaniline	ND		1	1.6	0.15	ug/L	07/05/2019 1135
4-Nitroaniline	ND		1	1.6	1.3	ug/L	07/05/2019 1135
Nitrobenzene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
2-Nitrophenol	ND		1	1.6	0.44	ug/L	07/05/2019 1135
4-Nitrophenol	ND		1	4.0	2.1	ug/L	07/05/2019 1135
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	07/05/2019 1135
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	07/05/2019 1135
Pentachlorophenol	ND		1	4.0	1.3	ug/L	07/05/2019 1135
Phenanthrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Phenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
Pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	07/05/2019 1135
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	07/05/2019 1135
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	07/05/2019 1135
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	07/05/2019 1135

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		64	37-129
2-Fluorophenol		44	24-127
Nitrobenzene-d5		68	38-127
Phenol-d5		40	28-128
Terphenyl-d14		95	10-148
2,4,6-Tribromophenol		56	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21123-002
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.7		1	59	30-122	07/06/2019 2045
Acenaphthylene	8.0	5.1		1	63	30-130	07/06/2019 2045
Anthracene	8.0	5.6		1	70	30-123	07/06/2019 2045
Benzo(a)anthracene	8.0	5.9		1	74	40-125	07/06/2019 2045
Benzo(a)pyrene	8.0	5.9		1	74	40-128	07/06/2019 2045
Benzo(b)fluoranthene	8.0	6.8		1	85	30-130	07/06/2019 2045
Benzo(g,h,i)perylene	8.0	6.0		1	75	30-130	07/06/2019 2045
Benzo(k)fluoranthene	8.0	6.0		1	76	30-130	07/06/2019 2045
4-Bromophenyl phenyl ether	8.0	5.3		1	67	30-124	07/06/2019 2045
Butyl benzyl phthalate	8.0	6.3		1	79	54-135	07/06/2019 2045
Carbazole	8.0	5.8		1	72	45-101	07/06/2019 2045
bis (2-Chloro-1-methylethyl) ether	8.0	6.2		1	77	42-124	07/06/2019 2045
4-Chloro-3-methyl phenol	8.0	4.7		1	58	30-123	07/06/2019 2045
bis(2-Chloroethoxy)methane	8.0	4.8		1	60	44-127	07/06/2019 2045
bis(2-Chloroethyl)ether	8.0	5.6		1	70	46-120	07/06/2019 2045
2-Chloronaphthalene	8.0	4.8		1	60	46-100	07/06/2019 2045
2-Chlorophenol	8.0	4.2		1	52	50-117	07/06/2019 2045
4-Chlorophenyl phenyl ether	8.0	4.9		1	61	30-121	07/06/2019 2045
Chrysene	8.0	6.2		1	78	30-130	07/06/2019 2045
Dibenzo(a,h)anthracene	8.0	6.3		1	78	30-130	07/06/2019 2045
Dibenzofuran	8.0	4.8		1	61	30-118	07/06/2019 2045
1,2-Dichlorobenzene	8.0	4.3		1	53	32-111	07/06/2019 2045
1,3-Dichlorobenzene	8.0	4.2		1	52	28-110	07/06/2019 2045
1,4-Dichlorobenzene	8.0	4.3		1	53	29-112	07/06/2019 2045
3,3'-Dichlorobenzidine	8.0	4.1		1	52	10-126	07/06/2019 2045
2,4-Dichlorophenol	8.0	4.5		1	56	30-121	07/06/2019 2045
Diethylphthalate	8.0	5.7		1	72	40-125	07/06/2019 2045
Dimethyl phthalate	8.0	5.6		1	71	40-127	07/06/2019 2045
2,4-Dimethylphenol	8.0	5.9		1	74	20-125	07/06/2019 2045
Di-n-butyl phthalate	8.0	6.1		1	76	40-127	07/06/2019 2045
4,6-Dinitro-2-methylphenol	8.0	6.3		1	78	56-128	07/06/2019 2045
2,4-Dinitrophenol	16	8.9		1	56	11-126	07/06/2019 2045
2,4-Dinitrotoluene	8.0	5.7		1	71	59-127	07/06/2019 2045
2,6-Dinitrotoluene	8.0	5.4		1	67	59-126	07/06/2019 2045
Di-n-octylphthalate	8.0	4.2		1	53	50-136	07/06/2019 2045
bis(2-Ethylhexyl)phthalate	8.0	5.4		1	67	56-128	07/06/2019 2045
Fluoranthene	8.0	5.6		1	71	40-128	07/06/2019 2045
Fluorene	8.0	5.0		1	62	30-124	07/06/2019 2045
Hexachlorobenzene	8.0	5.6		1	70	30-125	07/06/2019 2045
Hexachlorobutadiene	8.0	4.1		1	51	24-110	07/06/2019 2045
Hexachlorocyclopentadiene	40	17		1	42	16-96	07/06/2019 2045
Hexachloroethane	8.0	4.0		1	51	31-110	07/06/2019 2045
Indeno(1,2,3-c,d)pyrene	8.0	5.8		1	72	30-130	07/06/2019 2045
Isophorone	8.0	5.3		1	66	57-123	07/06/2019 2045

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21123-002
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.6		1	58	40-132	07/06/2019 2045
2-Methylphenol	8.0	6.2		1	78	56-119	07/06/2019 2045
3+4-Methylphenol	8.0	5.8		1	73	53-119	07/06/2019 2045
Naphthalene	8.0	4.6		1	58	30-130	07/06/2019 2045
2-Nitroaniline	8.0	5.9		1	73	60-124	07/06/2019 2045
3-Nitroaniline	8.0	5.8		1	72	43-123	07/06/2019 2045
4-Nitroaniline	8.0	6.0		1	76	30-135	07/06/2019 2045
Nitrobenzene	8.0	5.0		1	63	51-122	07/06/2019 2045
2-Nitrophenol	8.0	5.4		1	68	51-118	07/06/2019 2045
4-Nitrophenol	16	10		1	65	53-130	07/06/2019 2045
N-Nitrosodi-n-propylamine	8.0	5.9		1	73	54-127	07/06/2019 2045
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.6		1	69	30-123	07/06/2019 2045
Pentachlorophenol	16	11		1	67	42-131	07/06/2019 2045
Phenanthrene	8.0	5.3		1	66	40-123	07/06/2019 2045
Phenol	8.0	3.8	N	1	47	49-117	07/06/2019 2045
Pyrene	8.0	6.2		1	77	40-126	07/06/2019 2045
1,2,4,5-Tetrachlorobenzene	8.0	4.4		1	55	30-130	07/06/2019 2045
2,3,4,6-Tetrachlorophenol	8.0	5.3		1	66	30-130	07/06/2019 2045
1,2,4-Trichlorobenzene	8.0	4.4		1	55	20-90	07/06/2019 2045
2,4,5-Trichlorophenol	8.0	4.8		1	60	30-123	07/06/2019 2045
2,4,6-Trichlorophenol	8.0	5.1		1	64	30-125	07/06/2019 2045

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		62	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		65	38-127
Phenol-d5		48	28-128
Terphenyl-d14		90	10-148
2,4,6-Tribromophenol		81	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20903-001
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	06/28/2019 1501
C9 - C18 Aliphatics	ND		1	100	100	ug/L	06/28/2019 1501

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20903-002
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	300		1	75	40-140	06/28/2019 1531
C9 - C18 Aliphatics	300	160		1	52	40-140	06/28/2019 1531

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		67	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20903-003
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	320		1	80	6.8	40-140	25	06/28/2019 1601
C9 - C18 Aliphatics	300	160		1	55	5.0	40-140	25	06/28/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		73	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20904-001
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	06/28/2019 2105

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		97	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		81	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20904-002
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	560		1	66	40-140	06/28/2019 2135

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		91	40-140
o - Terphenyl (aromatic)		72	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20904-003
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	620		1	73	9.8	40-140	25	06/28/2019 2205

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		64	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		79	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21447-001
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21447-002
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	400		1	108	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21447-003
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	400		1	106	2.0	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (aromatics) - MB

Sample ID: UQ21449-001
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	07/02/2019 1208
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	07/02/2019 1208
Ethylbenzene	ND		1	5.0	0.62	ug/L	07/02/2019 1208
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	07/02/2019 1208
Naphthalene	ND		1	5.0	0.70	ug/L	07/02/2019 1208
Toluene	ND		1	5.0	0.53	ug/L	07/02/2019 1208
m+p - Xylenes	ND		1	5.0	1.2	ug/L	07/02/2019 1208
o - Xylenes	ND		1	5.0	0.58	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21449-002
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	26		1	103	70-130	07/02/2019 1112
C9 - C10 Aromatics	25	27		1	106	70-130	07/02/2019 1112
Ethylbenzene	25	26		1	103	70-130	07/02/2019 1112
Methyl tertiary butyl ether (MTBE)	25	24		1	96	70-130	07/02/2019 1112
Naphthalene	25	24		1	95	70-130	07/02/2019 1112
Toluene	25	25		1	101	70-130	07/02/2019 1112
m+p - Xylenes	50	52		1	104	70-130	07/02/2019 1112
o - Xylenes	25	25		1	101	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21449-003
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	26		1	102	0.78	70-130	25	07/02/2019 1140
C9 - C10 Aromatics	25	25		1	99	6.6	70-130	25	07/02/2019 1140
Ethylbenzene	25	25		1	101	2.0	70-130	25	07/02/2019 1140
Methyl tertiary butyl ether (MTBE)	25	25		1	101	5.7	70-130	25	07/02/2019 1140
Naphthalene	25	23		1	93	2.1	70-130	25	07/02/2019 1140
Toluene	25	25		1	100	1.6	70-130	25	07/02/2019 1140
m+p - Xylenes	50	50		1	101	3.1	70-130	25	07/02/2019 1140
o - Xylenes	25	25		1	99	2.0	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21450-001
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/02/2019 1208
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21450-002
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	112	70-130	07/02/2019 1112
C9 - C12 Aliphatics, Adjusted	75	79		1	105	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21450-003
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	110	1.8	70-130	25	07/02/2019 1140
C9 - C12 Aliphatics, Adjusted	75	77		1	103	1.7	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20900-001
Batch: 20900
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/27/2019 834

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	07/02/2019 1543
Arsenic	ND		1	2.0	1.3	ug/L	07/02/2019 1543
Barium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Beryllium	ND		1	0.40	0.15	ug/L	07/02/2019 1543
Cadmium	ND		1	0.50	0.13	ug/L	07/02/2019 1543
Chromium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Cobalt	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Copper	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Lead	ND		1	1.0	0.25	ug/L	07/02/2019 1543
Nickel	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Selenium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Silver	ND		1	1.0	0.25	ug/L	07/02/2019 1543
Vanadium	ND		1	5.0	2.5	ug/L	07/02/2019 1543
Zinc	ND		1	10	2.5	ug/L	07/02/2019 1543

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - LCS

Sample ID: UQ20900-002
Batch: 20900
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/27/2019 834

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	96		1	96	80-120	07/02/2019 1549
Arsenic	100	100		1	103	80-120	07/02/2019 1549
Barium	100	98		1	98	80-120	07/02/2019 1549
Beryllium	100	99		1	99	80-120	07/02/2019 1549
Cadmium	100	96		1	96	80-120	07/02/2019 1549
Chromium	100	100		1	101	80-120	07/02/2019 1549
Cobalt	100	100		1	102	80-120	07/02/2019 1549
Copper	100	98		1	98	80-120	07/02/2019 1549
Lead	100	100		1	100	80-120	07/02/2019 1549
Nickel	100	100		1	101	80-120	07/02/2019 1549
Selenium	100	98		1	98	80-120	07/02/2019 1549
Silver	100	100		1	102	80-120	07/02/2019 1549
Vanadium	100	100		1	100	80-120	07/02/2019 1549
Zinc	100	96		1	96	80-120	07/02/2019 1549

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-MS - MB

Sample ID: UQ20716-001
Batch: 20716
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/27/2019 1438

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20716-002
Batch: 20716
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	97	80-120	06/27/2019 1446

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Chain of Custody

and

Miscellaneous Documents

Chain of Custody Record

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

Number

Client	Ramboll US Corporation
Address	7600 College Boulevard Suite 1905
City	Overland Park
State	KS
Zip Code	66210
Project Name	CMR RIAIM East Rail
Project Number	1690012344-003
P.O No.	
Report to Contact	Daniel Price/Michael Wilson
Telephone No. / E-mail	(314) [illegible] / [illegible]@ramboll.com
Sampler's Signature	X [signature] Brooks Bailey, Andrew Hardwick, Elizabeth Borucki
Quote No.	
Page	1 of 1

UF25040

XMN2

Analysis (Attach list if more space is needed)

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	Matrix:	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH					Remarks / Cooler I.D.
CMR-WB01S-190624	6/24/2019	10:59	G	X				2		1	7				X	X	X	X	X					Cooler 002
CMR-WB03D-190624	6/24/2019	12:00	G	X				2		1	7				X	X	X	X	X					Cooler 002
TB-23	NA	NA	G	X							2				X									Trip Blank/Cooler 002

Turn Around Time Required (Prior lab approval required for expedited TAT): [X] Standard [ ] Rush (Please Specify)

Sample Disposal: [ ] Return to Client [ ] Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks): [ ] Non-Hazardous [ ] Flammable [ ] Skin Irritant [X] SDS provided [ ] Unknown

QC Requirements:

Relinquished by	Date	Time	Received by	Date	Time
1. Brooks Bailey	6/24/2019	17:45	1.		
2.			2.		
3.			3.		
4. Fed EX	6-25-19	0919	4. Laboratory Received by: L Hite	6-25-19	0919

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) [X] Y [ ] N [ ] Ice Pack
Receipt Temp. 2.3 °C

Document Number: ME0020W-01

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 06-25-2019 Lot #: UF25040

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: ____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: LKH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

2.3 / 2.3 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? ____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) 003(2) were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JSH Date: 06-25-2019

Comments:

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF25046, 5 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF25046 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB03-0.5-1.0-190622	UF25046-001
CMR-WB03-3.5-4.0-190622	UF25046-002
CMR-WB03-5.0-5.5-190622	UF25046-003
CMR-WB03-2.0-2.5-190622	UF25046-004
CMR-WB03-10.0-10.75-190622	UF25046-005
TB-25-20190622	UF25046-006

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of methyl acetate and bromomethane. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methyl acetate and bromomethane results have been validated as estimated.

Blank Detections
During analysis, acetone was detected in trip blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All acetone results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF25046

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 5 Solid, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples, no action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UF25046

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 5 Solid, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	Acetone detected in trip blank. All project sample detections of acetone validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to sample dilution, no action taken.	Surrogates out due to matrix interference/dilution, no action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out of high for acetone. See above. LCS out low for methyl acetate and bromomethane. All methyl acetate and bromomethane results validated as estimated (J, UJ).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/A
Other Non-conformances	CCV out of criteria high for acetone. See above.	No other non-conformances noted.
Overall Assessment of Data	All methyl acetate and bromomethane results validated as estimated (J, UJ). All detected results for acetone validated as non-detect (U).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM West Rail

Project Number: 1690012344-003

Lot Number:**UF25046**

Date Completed:07/11/2019

07/12/2019 11:26 AM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF25046

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21644 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections above the LOQ for this compound in the samples associated with this batch; therefore, data quality is not impacted.

The LCS associated with batch 21458 had methyl acetate recovered marginally outside of the acceptance limits. The LCS associated with batch 21574 had bromomethane recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

The continuing calibration verification (CCV) associated with sample -006 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections above the LOQ for this compound in the associated samples; therefore, data quality is not impacted.

Sample -005 had the surrogate recovered outside of the acceptance limits due to sample dilution.

Semivolatiles
Sample -001 was diluted 100X due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Sampled -004 and -005 were diluted 25X due to the sample matrix. The reporting limits have been raised accordingly. The associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana EPH
Sample -005 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Montana VPH
Samples -001, and -005 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene and MTBE, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS. Samples -001, -004, and -005 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Sample Summary
Ramboll US Corporation
Lot Number: UF25046

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB03-0.5-1.0-190622	Solid	06/22/2019 0920	06/25/2019
002	CMR-WB03-3.5-4.0-190622	Solid	06/22/2019 0940	06/25/2019
003	CMR-WB03-5.0-5.5-190622	Solid	06/22/2019 0935	06/25/2019
004	CMR-WB03-2.0-2.5-190622	Solid	06/22/2019 1240	06/25/2019
005	CMR-WB03-10.0-10.75-190622	Solid	06/22/2019 1255	06/25/2019
006	TB-25-20190622	Aqueous	06/22/2019	06/25/2019

(6 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF25046

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB03-0.5-1.0-190622	Solid	Acetone	8260B	84		ug/kg	10
001	CMR-WB03-0.5-1.0-190622	Solid	Methylcyclohexane	8260B	3.6	J	ug/kg	10
001	CMR-WB03-0.5-1.0-190622	Solid	m+p - Xylenes	8260B	3.6	J	ug/kg	11
001	CMR-WB03-0.5-1.0-190622	Solid	Benzo(a)anthracene	8270D	280	J	ug/kg	12
001	CMR-WB03-0.5-1.0-190622	Solid	Benzo(a)pyrene	8270D	300		ug/kg	12
001	CMR-WB03-0.5-1.0-190622	Solid	Benzo(b)fluoranthene	8270D	540		ug/kg	12
001	CMR-WB03-0.5-1.0-190622	Solid	Benzo(g,h,i)perylene	8270D	180	J	ug/kg	12
001	CMR-WB03-0.5-1.0-190622	Solid	Chrysene	8270D	260	J	ug/kg	12
001	CMR-WB03-0.5-1.0-190622	Solid	Fluoranthene	8270D	280	J	ug/kg	12
001	CMR-WB03-0.5-1.0-190622	Solid	2-Methylnaphthalene	8270D	440		ug/kg	13
001	CMR-WB03-0.5-1.0-190622	Solid	Naphthalene	8270D	200	J	ug/kg	13
001	CMR-WB03-0.5-1.0-190622	Solid	Phenanthrene	8270D	470		ug/kg	13
001	CMR-WB03-0.5-1.0-190622	Solid	Pyrene	8270D	420		ug/kg	13
001	CMR-WB03-0.5-1.0-190622	Solid	C19 - C36 Aliphatics	Montana EPH	100		mg/kg	14
001	CMR-WB03-0.5-1.0-190622	Solid	C9 - C18 Aliphatics	Montana EPH	220		mg/kg	14
001	CMR-WB03-0.5-1.0-190622	Solid	C11 - C22 Aromatics	Montana EPH	62		mg/kg	15
001	CMR-WB03-0.5-1.0-190622	Solid	C5 - C8 Aliphatics,	Montana VPH	7.9		mg/kg	16
001	CMR-WB03-0.5-1.0-190622	Solid	C9 - C12 Aliphatics,	Montana VPH	16		mg/kg	16
001	CMR-WB03-0.5-1.0-190622	Solid	Benzene	Montana VPH	0.093	J	mg/kg	17
001	CMR-WB03-0.5-1.0-190622	Solid	C9 - C10 Aromatics	Montana VPH	15		mg/kg	17
001	CMR-WB03-0.5-1.0-190622	Solid	Ethylbenzene	Montana VPH	0.14	J	mg/kg	17
001	CMR-WB03-0.5-1.0-190622	Solid	Naphthalene	Montana VPH	2.2		mg/kg	17
001	CMR-WB03-0.5-1.0-190622	Solid	Toluene	Montana VPH	0.73		mg/kg	17
001	CMR-WB03-0.5-1.0-190622	Solid	m+p - Xylenes	Montana VPH	1.2		mg/kg	17
001	CMR-WB03-0.5-1.0-190622	Solid	o - Xylenes	Montana VPH	0.28	J	mg/kg	17
001	CMR-WB03-0.5-1.0-190622	Solid	TPH	Montana VPH	48		mg/kg	18
001	CMR-WB03-0.5-1.0-190622	Solid	Antimony	6020B	1.9		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Arsenic	6020B	54		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Barium	6020B	61		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Beryllium	6020B	1.5		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Cadmium	6020B	8.7		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Chromium	6020B	6.7		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Cobalt	6020B	4.4		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Copper	6020B	430		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Lead	6020B	1100		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Mercury	7471B	1.2		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Nickel	6020B	11		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Selenium	6020B	1.1	J	mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Silver	6020B	8.1		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Vanadium	6020B	27		mg/kg	19
001	CMR-WB03-0.5-1.0-190622	Solid	Zinc	6020B	1300		mg/kg	19
002	CMR-WB03-3.5-4.0-190622	Solid	Acetone	8260B	79		ug/kg	20
002	CMR-WB03-3.5-4.0-190622	Solid	Benzo(a)anthracene	8270D	2.1	J	ug/kg	22
002	CMR-WB03-3.5-4.0-190622	Solid	Benzo(b)fluoranthene	8270D	2.4	J	ug/kg	22
002	CMR-WB03-3.5-4.0-190622	Solid	Benzo(g,h,i)perylene	8270D	1.2	J	ug/kg	22

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-WB03-3.5-4.0-190622	Solid	Chrysene	8270D	1.2	J	ug/kg	22
002	CMR-WB03-3.5-4.0-190622	Solid	Fluoranthene	8270D	1.1	J	ug/kg	22
002	CMR-WB03-3.5-4.0-190622	Solid	Phenanthrene	8270D	2.3	J	ug/kg	23
002	CMR-WB03-3.5-4.0-190622	Solid	Pyrene	8270D	1.7	J	ug/kg	23
002	CMR-WB03-3.5-4.0-190622	Solid	Antimony	6020B	0.28	J	mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Arsenic	6020B	17		mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Barium	6020B	170		mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Beryllium	6020B	0.11		mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Cadmium	6020B	0.37		mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Chromium	6020B	12		mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Cobalt	6020B	6.2		mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Copper	6020B	280		mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Lead	6020B	8.3		mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Nickel	6020B	13		mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Silver	6020B	0.24	J	mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Vanadium	6020B	29		mg/kg	29
002	CMR-WB03-3.5-4.0-190622	Solid	Zinc	6020B	77		mg/kg	29
003	CMR-WB03-5.0-5.5-190622	Solid	Acetone	8260B	150		ug/kg	30
003	CMR-WB03-5.0-5.5-190622	Solid	Arsenic	6020B	13		mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Barium	6020B	540		mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Beryllium	6020B	0.11		mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Cadmium	6020B	0.34		mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Chromium	6020B	16		mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Cobalt	6020B	6.6		mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Copper	6020B	15		mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Lead	6020B	10		mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Mercury	7471B	0.030	J	mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Nickel	6020B	16		mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Silver	6020B	0.082	J	mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Vanadium	6020B	38		mg/kg	39
003	CMR-WB03-5.0-5.5-190622	Solid	Zinc	6020B	57		mg/kg	39
004	CMR-WB03-2.0-2.5-190622	Solid	Acetone	8260B	37		ug/kg	40
004	CMR-WB03-2.0-2.5-190622	Solid	C19 - C36 Aliphatics	Montana EPH	47		mg/kg	44
004	CMR-WB03-2.0-2.5-190622	Solid	C9 - C18 Aliphatics	Montana EPH	110		mg/kg	44
004	CMR-WB03-2.0-2.5-190622	Solid	C11 - C22 Aromatics	Montana EPH	16		mg/kg	45
004	CMR-WB03-2.0-2.5-190622	Solid	C5 - C8 Aliphatics,	Montana VPH	1.3	J	mg/kg	46
004	CMR-WB03-2.0-2.5-190622	Solid	C9 - C12 Aliphatics,	Montana VPH	28		mg/kg	46
004	CMR-WB03-2.0-2.5-190622	Solid	C9 - C10 Aromatics	Montana VPH	29		mg/kg	47
004	CMR-WB03-2.0-2.5-190622	Solid	Ethylbenzene	Montana VPH	0.23	J	mg/kg	47
004	CMR-WB03-2.0-2.5-190622	Solid	Toluene	Montana VPH	0.051	J	mg/kg	47
004	CMR-WB03-2.0-2.5-190622	Solid	m+p - Xylenes	Montana VPH	0.45		mg/kg	47
004	CMR-WB03-2.0-2.5-190622	Solid	o - Xylenes	Montana VPH	0.52		mg/kg	47
004	CMR-WB03-2.0-2.5-190622	Solid	TPH	Montana VPH	57		mg/kg	48
004	CMR-WB03-2.0-2.5-190622	Solid	Antimony	6020B	0.35	J	mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Arsenic	6020B	21		mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Barium	6020B	340		mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Beryllium	6020B	0.18		mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Cadmium	6020B	46		mg/kg	49

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
004	CMR-WB03-2.0-2.5-190622	Solid	Chromium	6020B	13		mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Cobalt	6020B	21		mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Copper	6020B	350		mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Lead	6020B	88		mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Mercury	7471B	0.075	J	mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Nickel	6020B	40		mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Selenium	6020B	0.54	J	mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Silver	6020B	0.75		mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Vanadium	6020B	26		mg/kg	49
004	CMR-WB03-2.0-2.5-190622	Solid	Zinc	6020B	7400		mg/kg	49
005	CMR-WB03-10.0-10.75-190622	Solid	Acetone	8260B	2100	J	ug/kg	50
005	CMR-WB03-10.0-10.75-190622	Solid	Benzene	8260B	560	J	ug/kg	50
005	CMR-WB03-10.0-10.75-190622	Solid	Cyclohexane	8260B	4100		ug/kg	50
005	CMR-WB03-10.0-10.75-190622	Solid	Ethylbenzene	8260B	8400		ug/kg	50
005	CMR-WB03-10.0-10.75-190622	Solid	Isopropylbenzene	8260B	2300		ug/kg	50
005	CMR-WB03-10.0-10.75-190622	Solid	Methylcyclohexane	8260B	13000		ug/kg	50
005	CMR-WB03-10.0-10.75-190622	Solid	Xylenes (total)	8260B	1400	J	ug/kg	51
005	CMR-WB03-10.0-10.75-190622	Solid	m+p - Xylenes	8260B	1400		ug/kg	51
005	CMR-WB03-10.0-10.75-190622	Solid	Anthracene	8270D	38	J	ug/kg	52
005	CMR-WB03-10.0-10.75-190622	Solid	2-Methylnaphthalene	8270D	310		ug/kg	53
005	CMR-WB03-10.0-10.75-190622	Solid	Naphthalene	8270D	140		ug/kg	53
005	CMR-WB03-10.0-10.75-190622	Solid	Phenanthrene	8270D	67	J	ug/kg	53
005	CMR-WB03-10.0-10.75-190622	Solid	C19 - C36 Aliphatics	Montana EPH	850		mg/kg	54
005	CMR-WB03-10.0-10.75-190622	Solid	C9 - C18 Aliphatics	Montana EPH	2800		mg/kg	54
005	CMR-WB03-10.0-10.75-190622	Solid	C11 - C22 Aromatics	Montana EPH	620		mg/kg	55
005	CMR-WB03-10.0-10.75-190622	Solid	C5 - C8 Aliphatics,	Montana VPH	240		mg/kg	56
005	CMR-WB03-10.0-10.75-190622	Solid	C9 - C12 Aliphatics,	Montana VPH	640		mg/kg	56
005	CMR-WB03-10.0-10.75-190622	Solid	Benzene	Montana VPH	0.19	J	mg/kg	57
005	CMR-WB03-10.0-10.75-190622	Solid	C9 - C10 Aromatics	Montana VPH	380		mg/kg	57
005	CMR-WB03-10.0-10.75-190622	Solid	Ethylbenzene	Montana VPH	16		mg/kg	57
005	CMR-WB03-10.0-10.75-190622	Solid	Naphthalene	Montana VPH	11		mg/kg	57
005	CMR-WB03-10.0-10.75-190622	Solid	m+p - Xylenes	Montana VPH	2.0		mg/kg	57
005	CMR-WB03-10.0-10.75-190622	Solid	o - Xylenes	Montana VPH	14		mg/kg	57
005	CMR-WB03-10.0-10.75-190622	Solid	TPH	Montana VPH	1300		mg/kg	58
005	CMR-WB03-10.0-10.75-190622	Solid	Antimony	6020B	0.41	J	mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Arsenic	6020B	17		mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Barium	6020B	260		mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Beryllium	6020B	0.098	J	mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Cadmium	6020B	0.55		mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Chromium	6020B	20		mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Cobalt	6020B	11		mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Copper	6020B	17		mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Lead	6020B	13		mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Mercury	7471B	0.022	J	mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Nickel	6020B	20		mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Silver	6020B	0.076	J	mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Vanadium	6020B	54		mg/kg	59
005	CMR-WB03-10.0-10.75-190622	Solid	Zinc	6020B	78		mg/kg	59

Detection Summary (Continued)

Lot Number: UF25046

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
006	TB-25-20190622	Aqueous	Acetone	8260B	7.5	J	ug/L	60

(142 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-001
Description: CMR-WB03-0.5-1.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0920
% Solids: 86.9 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/02/2019 1515	JM1		21458	4.02

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	84		29	11	ug/kg	1
Benzene	71-43-2	8260B	ND		7.2	2.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		7.2	2.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		7.2	2.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		7.2	2.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		7.2	4.3	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		29	5.7	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		7.2	2.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		7.2	2.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		7.2	2.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		7.2	2.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		7.2	2.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		7.2	4.3	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		7.2	2.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		7.2	2.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		7.2	2.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		7.2	2.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		7.2	2.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		7.2	2.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		7.2	2.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		7.2	4.3	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		7.2	2.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		7.2	2.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		7.2	2.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		7.2	2.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		7.2	2.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		7.2	2.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		7.2	2.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		7.2	2.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		360	36	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		7.2	2.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		14	5.7	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		7.2	2.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		7.2	2.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		7.2	2.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		14	5.7	ug/kg	1
Methylcyclohexane	108-87-2	8260B	3.6	J	7.2	2.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		7.2	2.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		7.2	2.9	ug/kg	1
Styrene	100-42-5	8260B	ND		7.2	2.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		7.2	2.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		7.2	2.9	ug/kg	1
Toluene	108-88-3	8260B	ND		7.2	2.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		7.2	2.9	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-001
Description: CMR-WB03-0.5-1.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0920
% Solids: 86.9 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/02/2019 1515	JM1		21458	4.02

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		7.2	2.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		7.2	2.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		7.2	2.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		7.2	2.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		7.2	2.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		7.2	2.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		7.2	4.3	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		14	5.7	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	3.6	J	7.2	2.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		7.2	2.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	53-142
Bromofluorobenzene		94	47-138
Toluene-d8		108	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-001
Description: CMR-WB03-0.5-1.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0920
% Solids: 86.9 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	07/06/2019 2345	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		290	90	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		290	100	ug/kg	1
Anthracene	120-12-7	8270D	ND		290	55	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	280	J	290	64	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	300		290	72	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	540		290	54	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	180	J	290	71	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		290	52	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		1400	540	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		1400	540	ug/kg	1
Carbazole	86-74-8	8270D	ND		1400	540	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		1400	540	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		1400	540	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		1400	540	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		1400	540	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		1400	540	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		1400	540	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		1400	540	ug/kg	1
Chrysene	218-01-9	8270D	260	J	290	49	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		290	55	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		1400	540	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		7300	2700	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		7300	2700	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		7300	2700	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		1400	540	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1400	540	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		1400	540	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		1400	800	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		1400	540	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		1400	540	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		7300	2700	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		7300	2700	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		2900	1100	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		2900	1100	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		1400	540	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		7300	2700	ug/kg	1
Fluoranthene	206-44-0	8270D	280	J	290	46	ug/kg	1
Fluorene	86-73-7	8270D	ND		290	62	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		1400	540	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		1400	540	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		7300	2700	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		1400	540	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		290	110	ug/kg	1
Isophorone	78-59-1	8270D	ND		1400	540	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-001
Description: CMR-WB03-0.5-1.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0920
% Solids: 86.9 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	07/06/2019 2345	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	440		290	110	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		1400	540	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		2900	1100	ug/kg	1
Naphthalene	91-20-3	8270D	200	J	290	110	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		2900	1100	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		2900	1100	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		2900	1100	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		1400	540	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		2900	1100	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		7300	2700	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		1400	540	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		1400	540	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		7300	2700	ug/kg	1
Phenanthrene	85-01-8	8270D	470		290	78	ug/kg	1
Phenol	108-95-2	8270D	ND		1400	540	ug/kg	1
Pyrene	129-00-0	8270D	420		290	54	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		3600	1100	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		7300	1100	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		7300	2700	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		1400	540	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		1400	540	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		69	33-102
2-Fluorophenol	N	34	35-115
Nitrobenzene-d5		73	22-109
Phenol-d5	N	29	33-122
Terphenyl-d14		89	41-120
2,4,6-Tribromophenol		33	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
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N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-001
Description: CMR-WB03-0.5-1.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0920
% Solids: 86.9 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0045	CHG	06/27/2019 1715	21005

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	100		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	220		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		75	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-001
Description: CMR-WB03-0.5-1.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0920
% Solids: 86.9 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0711	CHG	06/27/2019 1715	21007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	62		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		111	40-140
2-Fluorobiphenyl (fractionation 1)		111	40-140
o - Terphenyl (aromatic)		101	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-001
Description: CMR-WB03-0.5-1.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0920
% Solids: 86.9 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1816	JJG		21739

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	7.9		5.4	1.1	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	16		5.4	1.1	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	134	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-001
Description: CMR-WB03-0.5-1.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0920
% Solids: 86.9 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1816	JJG		21738

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.093	J	0.36	0.049	mg/kg	1
C9 - C10 Aromatics		Montana VPH	15		1.8	0.72	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	0.14	J	0.36	0.045	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.36	0.078	mg/kg	1
Naphthalene	91-20-3	Montana VPH	2.2		0.36	0.19	mg/kg	1
Toluene	108-88-3	Montana VPH	0.73		0.36	0.058	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	1.2		0.36	0.081	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.28	J	0.36	0.040	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		88	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25046-001
Description: CMR-WB03-0.5-1.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0920
% Solids: 86.9 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1816	JJG		21737

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	48		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	314	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-001
Description: CMR-WB03-0.5-1.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0920
% Solids: 86.9 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	7471B	7471B	1	06/28/2019 1753	TJW	06/27/2019 1855	20938
2	3050B	6020B	1	07/07/2019 2316	LLL	07/01/2019 0831	21083
3	3050B	6020B	3	07/07/2019 2322	LLL	07/01/2019 0831	21083

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.9		0.56	0.22	mg/kg	2
Arsenic	7440-38-2	6020B	54		0.56	0.22	mg/kg	2
Barium	7440-39-3	6020B	61		1.5	0.35	mg/kg	2
Beryllium	7440-41-7	6020B	1.5		0.11	0.038	mg/kg	2
Cadmium	7440-43-9	6020B	8.7		0.15	0.028	mg/kg	2
Chromium	7440-47-3	6020B	6.7		1.5	0.62	mg/kg	2
Cobalt	7440-48-4	6020B	4.4		1.5	0.34	mg/kg	2
Copper	7440-50-8	6020B	430		1.5	0.36	mg/kg	2
Lead	7439-92-1	6020B	1100		0.84	0.23	mg/kg	3
Mercury	7439-97-6	7471B	1.2		0.087	0.021	mg/kg	1
Nickel	7440-02-0	6020B	11		1.5	0.34	mg/kg	2
Selenium	7782-49-2	6020B	1.1	J	1.5	0.53	mg/kg	2
Silver	7440-22-4	6020B	8.1		0.28	0.067	mg/kg	2
Vanadium	7440-62-2	6020B	27		1.5	0.28	mg/kg	2
Zinc	7440-66-6	6020B	1300		8.4	1.7	mg/kg	3

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-002
Description: CMR-WB03-3.5-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0940
% Solids: 86.1 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/02/2019 1538	JM1		21458	5.68

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	79		20	8.2	ug/kg	1
Benzene	71-43-2	8260B	ND		5.1	2.0	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		5.1	2.0	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		5.1	2.0	ug/kg	1
Bromoform	75-25-2	8260B	ND		5.1	2.0	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.1	3.1	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		20	4.1	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		5.1	2.0	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		5.1	2.0	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		5.1	2.0	ug/kg	1
Chloroethane	75-00-3	8260B	ND		5.1	2.0	ug/kg	1
Chloroform	67-66-3	8260B	ND		5.1	2.0	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.1	3.1	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		5.1	2.0	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.1	2.0	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		5.1	2.0	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.1	2.0	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.1	2.0	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.1	2.0	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.1	2.0	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		5.1	3.1	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		5.1	2.0	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		5.1	2.0	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		5.1	2.0	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.1	2.0	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.1	2.0	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		5.1	2.0	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.1	2.0	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.1	2.0	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		260	26	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		5.1	2.0	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		10	4.1	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		5.1	2.0	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		5.1	2.0	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.1	2.0	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	4.1	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		5.1	2.0	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		5.1	2.0	ug/kg	1
Naphthalene	91-20-3	8260B	ND		5.1	2.0	ug/kg	1
Styrene	100-42-5	8260B	ND		5.1	2.0	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.1	2.0	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		5.1	2.0	ug/kg	1
Toluene	108-88-3	8260B	ND		5.1	2.0	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.1	2.0	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-002
Description: CMR-WB03-3.5-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0940
% Solids: 86.1 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/02/2019 1538	JM1		21458	5.68

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.1	2.0	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.1	2.0	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.1	2.0	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.1	2.0	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		5.1	2.0	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		5.1	2.0	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		5.1	3.1	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		10	4.1	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		5.1	2.0	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		5.1	2.0	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	53-142
Bromofluorobenzene		101	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
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ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-002
Description: CMR-WB03-3.5-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0940
% Solids: 86.1 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/07/2019 2133	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		3.1	0.96	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		3.1	1.1	ug/kg	1
Anthracene	120-12-7	8270D	ND		3.1	0.59	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	2.1	J	3.1	0.69	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		3.1	0.77	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	2.4	J	3.1	0.58	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	1.2	J	3.1	0.75	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		3.1	0.56	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		15	5.8	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		15	5.8	ug/kg	1
Carbazole	86-74-8	8270D	ND		15	5.8	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		15	5.8	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		15	5.8	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		15	5.8	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		15	5.8	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		15	5.8	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		15	5.8	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		15	5.8	ug/kg	1
Chrysene	218-01-9	8270D	1.2	J	3.1	0.52	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		3.1	0.59	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		15	5.8	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		78	29	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		78	29	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		78	29	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		15	5.8	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		15	5.8	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		15	5.8	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		15	8.6	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		15	5.8	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		15	5.8	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		78	29	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		78	29	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		31	12	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		31	12	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		15	5.8	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		78	29	ug/kg	1
Fluoranthene	206-44-0	8270D	1.1	J	3.1	0.49	ug/kg	1
Fluorene	86-73-7	8270D	ND		3.1	0.66	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		15	5.8	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		15	5.8	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		78	29	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		15	5.8	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		3.1	1.2	ug/kg	1
Isophorone	78-59-1	8270D	ND		15	5.8	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-002
Description: CMR-WB03-3.5-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0940
% Solids: 86.1 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/07/2019 2133	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		3.1	1.1	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		15	5.8	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		31	12	ug/kg	1
Naphthalene	91-20-3	8270D	ND		3.1	1.1	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		31	12	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		31	12	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		31	12	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		15	5.8	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		31	12	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		78	29	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		15	5.8	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		15	5.8	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		78	29	ug/kg	1
Phenanthrene	85-01-8	8270D	2.3	J	3.1	0.84	ug/kg	1
Phenol	108-95-2	8270D	ND		15	5.8	ug/kg	1
Pyrene	129-00-0	8270D	1.7	J	3.1	0.58	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		38	12	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		78	12	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		78	29	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		15	5.8	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		15	5.8	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		37	33-102
2-Fluorophenol		36	35-115
Nitrobenzene-d5		39	22-109
Phenol-d5		37	33-122
Terphenyl-d14		47	41-120
2,4,6-Tribromophenol		52	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-002
Description: CMR-WB03-3.5-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0940
% Solids: 86.1 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0115	CHG	06/27/2019 1715	21005

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		87	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-002
Description: CMR-WB03-3.5-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0940
% Solids: 86.1 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0741	CHG	06/27/2019 1715	21007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		105	40-140
2-Fluorobiphenyl (fractionation 1)		104	40-140
o - Terphenyl (aromatic)		90	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-002
Description: CMR-WB03-3.5-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0940
% Solids: 86.1 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1845	JJG		21739

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.95	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.95	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		99	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-002
Description: CMR-WB03-3.5-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0940
% Solids: 86.1 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1845	JJG		21738

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.32	0.043	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.6	0.63	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.32	0.039	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.32	0.068	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.32	0.16	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.32	0.051	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.32	0.071	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.32	0.035	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		86	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25046-002
Description: CMR-WB03-3.5-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0940
% Solids: 86.1 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/03/2019 1845	JJG		21737

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-002
Description: CMR-WB03-3.5-4.0-190622
Matrix: Solid
Date Sampled: 06/22/2019 0940
% Solids: 86.1 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/05/2019 1637	LLL	07/01/2019 0831	21083
1	7471B	7471B	1	06/28/2019 1755	TJW	06/27/2019 1855	20938
2	3050B	6020B	1	07/07/2019 2328	LLL	07/01/2019 0831	21083

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.28	J	0.51	0.20	mg/kg	1
Arsenic	7440-38-2	6020B	17		0.51	0.20	mg/kg	1
Barium	7440-39-3	6020B	170		1.3	0.31	mg/kg	1
Beryllium	7440-41-7	6020B	0.11		0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	0.37		0.13	0.025	mg/kg	1
Chromium	7440-47-3	6020B	12		1.3	0.56	mg/kg	1
Cobalt	7440-48-4	6020B	6.2		1.3	0.30	mg/kg	1
Copper	7440-50-8	6020B	280		1.3	0.33	mg/kg	1
Lead	7439-92-1	6020B	8.3		0.25	0.069	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.093	0.022	mg/kg	1
Nickel	7440-02-0	6020B	13		1.3	0.30	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.3	0.48	mg/kg	1
Silver	7440-22-4	6020B	0.24	J	0.25	0.061	mg/kg	2
Vanadium	7440-62-2	6020B	29		1.3	0.25	mg/kg	1
Zinc	7440-66-6	6020B	77		2.5	0.51	mg/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-003
Description: CMR-WB03-5.0-5.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 0935
% Solids: 85.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/02/2019 1600	JM1		21458	6.14

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	150		19	7.6	ug/kg	1
Benzene	71-43-2	8260B	ND		4.8	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.8	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.8	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.8	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.8	2.9	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.8	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.8	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.8	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.8	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.8	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.8	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.8	2.9	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.8	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.8	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.8	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.8	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.8	2.9	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.8	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.8	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.8	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.8	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.8	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.8	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		240	24	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.8	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.5	3.8	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.8	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.8	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.8	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.5	3.8	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.8	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.8	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.8	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.8	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.8	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.8	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.8	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.8	1.9	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Description: CMR-WB03-5.0-5.5-190622
Date Sampled: 06/22/2019 0935
Date Received: 06/25/2019

Laboratory ID: UF25046-003
Matrix: Solid
% Solids: 85.6 06/26/2019 0028

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/02/2019 1600	JM1		21458	6.14

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.8	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.8	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.8	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.8	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.8	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.8	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.8	2.9	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.5	3.8	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.8	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.8	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		89	53-142
Bromofluorobenzene		102	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-003
Description: CMR-WB03-5.0-5.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 0935
% Solids: 85.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/07/2019 0355	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		3.1	0.96	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		3.1	1.1	ug/kg	1
Anthracene	120-12-7	8270D	ND		3.1	0.59	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		3.1	0.68	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		3.1	0.77	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		3.1	0.58	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		3.1	0.75	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		3.1	0.56	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		15	5.8	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		15	5.8	ug/kg	1
Carbazole	86-74-8	8270D	ND		15	5.8	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		15	5.8	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		15	5.8	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		15	5.8	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		15	5.8	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		15	5.8	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		15	5.8	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		15	5.8	ug/kg	1
Chrysene	218-01-9	8270D	ND		3.1	0.52	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		3.1	0.59	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		15	5.8	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		78	29	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		78	29	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		78	29	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		15	5.8	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		15	5.8	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		15	5.8	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		15	8.6	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		15	5.8	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		15	5.8	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		78	29	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		78	29	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		31	12	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		31	12	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		15	5.8	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		78	29	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		3.1	0.49	ug/kg	1
Fluorene	86-73-7	8270D	ND		3.1	0.66	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		15	5.8	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		15	5.8	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		78	29	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		15	5.8	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		3.1	1.2	ug/kg	1
Isophorone	78-59-1	8270D	ND		15	5.8	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-003
Description: CMR-WB03-5.0-5.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 0935
% Solids: 85.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/07/2019 0355	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		3.1	1.1	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		15	5.8	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		31	12	ug/kg	1
Naphthalene	91-20-3	8270D	ND		3.1	1.1	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		31	12	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		31	12	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		31	12	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		15	5.8	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		31	12	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		78	29	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		15	5.8	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		15	5.8	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		78	29	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		3.1	0.84	ug/kg	1
Phenol	108-95-2	8270D	ND		15	5.8	ug/kg	1
Pyrene	129-00-0	8270D	ND		3.1	0.58	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		38	12	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		78	12	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		78	29	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		15	5.8	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		15	5.8	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		48	33-102
2-Fluorophenol		53	35-115
Nitrobenzene-d5		52	22-109
Phenol-d5		52	33-122
Terphenyl-d14		64	41-120
2,4,6-Tribromophenol		70	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-003
Description: CMR-WB03-5.0-5.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 0935
% Solids: 85.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0145	CHG	06/27/2019 1715	21005

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		83	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-003
Description: CMR-WB03-5.0-5.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 0935
% Solids: 85.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0811	CHG	06/27/2019 1715	21007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		120	40-140
2-Fluorobiphenyl (fractionation 1)		118	40-140
o - Terphenyl (aromatic)		91	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-003
Description: CMR-WB03-5.0-5.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 0935
% Solids: 85.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1621	JJG		21743

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.5	0.90	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.5	0.90	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		104	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-003
Description: CMR-WB03-5.0-5.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 0935
% Solids: 85.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1621	JJG		21742

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.30	0.041	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.5	0.60	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.30	0.037	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.30	0.065	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.30	0.16	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.30	0.048	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.30	0.067	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.30	0.034	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25046-003
Description: CMR-WB03-5.0-5.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 0935
% Solids: 85.6 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1621	JJG		21740

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		105	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB03-5.0-5.5-190622
Date Sampled: 06/22/2019 0935
Date Received: 06/25/2019

Laboratory ID: UF25046-003
Matrix: Solid
% Solids: 85.6 06/26/2019 0028

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/05/2019 1643	LLL	07/01/2019 0831	21083
1	7471B	7471B	1	06/28/2019 1803	TJW	06/27/2019 1855	20938
2	3050B	6020B	1	07/07/2019 2334	LLL	07/01/2019 0831	21083

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.53	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	13		0.53	0.21	mg/kg	1
Barium	7440-39-3	6020B	540		1.4	0.33	mg/kg	1
Beryllium	7440-41-7	6020B	0.11		0.11	0.036	mg/kg	1
Cadmium	7440-43-9	6020B	0.34		0.14	0.027	mg/kg	1
Chromium	7440-47-3	6020B	16		1.4	0.59	mg/kg	1
Cobalt	7440-48-4	6020B	6.6		1.4	0.32	mg/kg	1
Copper	7440-50-8	6020B	15		1.4	0.35	mg/kg	1
Lead	7439-92-1	6020B	10		0.27	0.072	mg/kg	1
Mercury	7439-97-6	7471B	0.030	J	0.085	0.021	mg/kg	1
Nickel	7440-02-0	6020B	16		1.4	0.32	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.50	mg/kg	1
Silver	7440-22-4	6020B	0.082	J	0.27	0.064	mg/kg	2
Vanadium	7440-62-2	6020B	38		1.4	0.27	mg/kg	1
Zinc	7440-66-6	6020B	57		2.7	0.53	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-004
Description: CMR-WB03-2.0-2.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1240
% Solids: 87.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/02/2019 1623	JM1		21458	6.05

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	37		19	7.6	ug/kg	1
Benzene	71-43-2	8260B	ND		4.7	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.7	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.7	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.7	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.7	2.8	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.8	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.7	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.7	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.7	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.7	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.7	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.7	2.8	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.7	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.7	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.7	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.7	2.8	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.7	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.7	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.7	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.7	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.7	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		240	24	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.7	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.5	3.8	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.7	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.7	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.7	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.5	3.8	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.7	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.7	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.7	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.7	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.7	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.7	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.7	1.9	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-004
Description: CMR-WB03-2.0-2.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1240
% Solids: 87.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/02/2019 1623	JM1		21458	6.05

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.7	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.7	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.7	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.7	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.7	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.7	2.8	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.5	3.8	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.7	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.7	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		98	47-138
Toluene-d8		104	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-004
Description: CMR-WB03-2.0-2.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1240
% Solids: 87.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	07/07/2019 0059	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		76	23	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		76	27	ug/kg	1
Anthracene	120-12-7	8270D	ND		76	14	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		76	17	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		76	19	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		76	14	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		76	18	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		76	14	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		370	140	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		370	140	ug/kg	1
Carbazole	86-74-8	8270D	ND		370	140	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		370	140	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		370	140	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		370	140	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		370	140	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		370	140	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		370	140	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		370	140	ug/kg	1
Chrysene	218-01-9	8270D	ND		76	13	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		76	14	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		370	140	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		1900	710	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		1900	710	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		1900	710	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		370	140	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		370	140	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		370	140	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		370	210	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		370	140	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		370	140	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		1900	710	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		1900	710	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		760	280	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		760	280	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		370	140	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		1900	710	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		76	12	ug/kg	1
Fluorene	86-73-7	8270D	ND		76	16	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		370	140	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		370	140	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		1900	710	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		370	140	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		76	28	ug/kg	1
Isophorone	78-59-1	8270D	ND		370	140	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-004
Description: CMR-WB03-2.0-2.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1240
% Solids: 87.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	07/07/2019 0059	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		76	28	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		370	140	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		760	280	ug/kg	1
Naphthalene	91-20-3	8270D	ND		76	27	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		760	280	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		760	280	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		760	280	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		370	140	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		760	280	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		1900	710	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		370	140	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		370	140	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		1900	710	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		76	20	ug/kg	1
Phenol	108-95-2	8270D	ND		370	140	ug/kg	1
Pyrene	129-00-0	8270D	ND		76	14	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		930	280	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		1900	280	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		1900	710	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		370	140	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		370	140	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		45	33-102
2-Fluorophenol	N	22	35-115
Nitrobenzene-d5		34	22-109
Phenol-d5	N	23	33-122
Terphenyl-d14		60	41-120
2,4,6-Tribromophenol		36	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
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J = Estimated result < LOQ and ≥ DL
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-004
Description: CMR-WB03-2.0-2.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1240
% Solids: 87.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0214	CHG	06/27/2019 1715	21005

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	47		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	110		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		94	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-004
Description: CMR-WB03-2.0-2.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1240
% Solids: 87.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0840	CHG	06/27/2019 1715	21007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	16		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		113	40-140
2-Fluorobiphenyl (fractionation 1)		114	40-140
o - Terphenyl (aromatic)		92	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-004
Description: CMR-WB03-2.0-2.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1240
% Solids: 87.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1649	JJG		21743

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	1.3	J	4.7	0.94	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	28		4.7	0.94	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	199	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-004
Description: CMR-WB03-2.0-2.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1240
% Solids: 87.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1649	JJG		21742

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.31	0.042	mg/kg	1
C9 - C10 Aromatics		Montana VPH	29		1.6	0.62	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	0.23	J	0.31	0.039	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.31	0.067	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.31	0.16	mg/kg	1
Toluene	108-88-3	Montana VPH	0.051	J	0.31	0.050	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	0.45		0.31	0.070	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.52		0.31	0.035	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	193	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25046-004
Description: CMR-WB03-2.0-2.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1240
% Solids: 87.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1649	JJG		21740

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	57		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	186	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-004
Description: CMR-WB03-2.0-2.5-190622
Matrix: Solid
Date Sampled: 06/22/2019 1240
% Solids: 87.4 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/05/2019 1649	LLL	07/01/2019 0831	21083
1	7471B	7471B	1	06/28/2019 1805	TJW	06/27/2019 1855	20938
2	3050B	6020B	1	07/07/2019 2340	LLL	07/01/2019 0831	21083
3	3050B	6020B	100	07/10/2019 2311	BNW	07/01/2019 0831	21083

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.35	J	0.51	0.20	mg/kg	1
Arsenic	7440-38-2	6020B	21		0.51	0.20	mg/kg	1
Barium	7440-39-3	6020B	340		1.3	0.31	mg/kg	1
Beryllium	7440-41-7	6020B	0.18		0.10	0.034	mg/kg	1
Cadmium	7440-43-9	6020B	46		0.13	0.025	mg/kg	1
Chromium	7440-47-3	6020B	13		1.3	0.56	mg/kg	1
Cobalt	7440-48-4	6020B	21		1.3	0.30	mg/kg	1
Copper	7440-50-8	6020B	350		1.3	0.33	mg/kg	1
Lead	7439-92-1	6020B	88		0.25	0.069	mg/kg	1
Mercury	7439-97-6	7471B	0.075	J	0.089	0.022	mg/kg	1
Nickel	7440-02-0	6020B	40		1.3	0.30	mg/kg	1
Selenium	7782-49-2	6020B	0.54	J	1.3	0.48	mg/kg	1
Silver	7440-22-4	6020B	0.75		0.25	0.061	mg/kg	2
Vanadium	7440-62-2	6020B	26		1.3	0.25	mg/kg	1
Zinc	7440-66-6	6020B	7400		250	51	mg/kg	3

LOQ = Limit of Quantitation
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H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-005
Description: CMR-WB03-10.0-10.75-190622
Matrix: Solid
Date Sampled: 06/22/2019 1255
% Solids: 86.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	4	07/03/2019 1104	JM1		21574	5.80

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	2100	J	4600	920	ug/kg	1
Benzene	71-43-2	8260B	560	J	1200	460	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		1200	460	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		1200	460	ug/kg	1
Bromoform	75-25-2	8260B	ND		1200	460	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		1200	460	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		4600	920	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		1200	460	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		1200	460	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		1200	460	ug/kg	1
Chloroethane	75-00-3	8260B	ND		1200	460	ug/kg	1
Chloroform	67-66-3	8260B	ND		1200	460	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1200	460	ug/kg	1
Cyclohexane	110-82-7	8260B	4100		1200	460	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1200	460	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		1200	460	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1200	460	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1200	460	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1200	460	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1200	460	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		1200	460	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		1200	460	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		1200	460	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		1200	460	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1200	460	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1200	460	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		1200	460	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1200	460	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1200	460	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		58000	5800	ug/kg	1
Ethylbenzene	100-41-4	8260B	8400		1200	460	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		2300	920	ug/kg	1
Isopropylbenzene	98-82-8	8260B	2300		1200	460	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		1200	460	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1200	460	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		2300	920	ug/kg	1
Methylcyclohexane	108-87-2	8260B	13000		1200	460	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		1200	460	ug/kg	1
Naphthalene	91-20-3	8260B	ND		1200	460	ug/kg	1
Styrene	100-42-5	8260B	ND		1200	460	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1200	460	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		1200	460	ug/kg	1
Toluene	108-88-3	8260B	ND		1200	460	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1200	460	ug/kg	1

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-005
Description: CMR-WB03-10.0-10.75-190622
Matrix: Solid
Date Sampled: 06/22/2019 1255
% Solids: 86.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	4	07/03/2019 1104	JM1		21574	5.80

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		1200	460	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1200	460	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1200	460	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1200	460	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		1200	460	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		1200	460	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		1200	460	ug/kg	1
Xylenes (total)	1330-20-7	8260B	1400	J	2300	920	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	1400		1200	460	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		1200	460	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		110	53-142
Bromofluorobenzene		119	47-138
Toluene-d8	N	143	68-124

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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-005
Description: CMR-WB03-10.0-10.75-190622
Matrix: Solid
Date Sampled: 06/22/2019 1255
% Solids: 86.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	07/07/2019 0123	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		77	24	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		77	27	ug/kg	1
Anthracene	120-12-7	8270D	38	J	77	15	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		77	17	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		77	19	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		77	14	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		77	19	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		77	14	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		370	140	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		370	140	ug/kg	1
Carbazole	86-74-8	8270D	ND		370	140	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		370	140	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		370	140	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		370	140	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		370	140	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		370	140	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		370	140	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		370	140	ug/kg	1
Chrysene	218-01-9	8270D	ND		77	13	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		77	15	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		370	140	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		1900	710	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		1900	710	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		1900	710	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		370	140	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		370	140	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		370	140	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		370	210	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		370	140	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		370	140	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		1900	710	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		1900	710	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		770	290	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		770	290	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		370	140	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		1900	710	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		77	12	ug/kg	1
Fluorene	86-73-7	8270D	ND		77	16	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		370	140	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		370	140	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		1900	710	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		370	140	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		77	29	ug/kg	1
Isophorone	78-59-1	8270D	ND		370	140	ug/kg	1

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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-005
Description: CMR-WB03-10.0-10.75-190622
Matrix: Solid
Date Sampled: 06/22/2019 1255
% Solids: 86.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	07/07/2019 0123	SCD	06/26/2019 1540	20811

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	310		77	28	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		370	140	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		770	290	ug/kg	1
Naphthalene	91-20-3	8270D	140		77	28	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		770	290	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		770	290	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		770	290	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		370	140	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		770	290	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		1900	710	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		370	140	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		370	140	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		1900	710	ug/kg	1
Phenanthrene	85-01-8	8270D	67	J	77	21	ug/kg	1
Phenol	108-95-2	8270D	ND		370	140	ug/kg	1
Pyrene	129-00-0	8270D	ND		77	14	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		940	290	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		1900	290	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		1900	710	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		370	140	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		370	140	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl	N	25	33-102
2-Fluorophenol	N	19	35-115
Nitrobenzene-d5		28	22-109
Phenol-d5		34	33-122
Terphenyl-d14	N	36	41-120
2,4,6-Tribromophenol	N	25	30-117

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J = Estimated result < LOQ and ≥ DL
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-005
Description: CMR-WB03-10.0-10.75-190622
Matrix: Solid
Date Sampled: 06/22/2019 1255
% Solids: 86.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0244	CHG	06/27/2019 1715	21005

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	850		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	2800		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		82	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-005
Description: CMR-WB03-10.0-10.75-190622
Matrix: Solid
Date Sampled: 06/22/2019 1255
% Solids: 86.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0910	CHG	06/27/2019 1715	21007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	620		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)	N	164	40-140
2-Fluorobiphenyl (fractionation 1)	N	176	40-140
o - Terphenyl (aromatic)		122	40-140

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-005
Description: CMR-WB03-10.0-10.75-190622
Matrix: Solid
Date Sampled: 06/22/2019 1255
% Solids: 86.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	2	07/05/2019 1717	JJG		21743

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	240		8.8	1.8	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	640		8.8	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF25046-005
Description: CMR-WB03-10.0-10.75-190622
Matrix: Solid
Date Sampled: 06/22/2019 1255
% Solids: 86.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	2	07/05/2019 1717	JJG		21742

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.19	J	0.59	0.080	mg/kg	1
C9 - C10 Aromatics		Montana VPH	380		2.9	1.2	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	16		0.59	0.073	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.59	0.13	mg/kg	1
Naphthalene	91-20-3	Montana VPH	11		0.59	0.31	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.59	0.094	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	2.0		0.59	0.13	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	14		0.59	0.066	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	523	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF25046-005
Description: CMR-WB03-10.0-10.75-190622
Matrix: Solid
Date Sampled: 06/22/2019 1255
% Solids: 86.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	2	07/05/2019 1717	JJG		21740

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1300		18	3.5	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-005
Description: CMR-WB03-10.0-10.75-190622
Matrix: Solid
Date Sampled: 06/22/2019 1255
% Solids: 86.5 06/26/2019 0028
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/05/2019 1655	LLL	07/01/2019 0831	21083
1	7471B	7471B	1	06/28/2019 1808	TJW	06/27/2019 1855	20938
2	3050B	6020B	1	07/07/2019 2346	LLL	07/01/2019 0831	21083

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.41	J	0.56	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	17		0.56	0.22	mg/kg	1
Barium	7440-39-3	6020B	260		1.5	0.35	mg/kg	1
Beryllium	7440-41-7	6020B	0.098	J	0.11	0.038	mg/kg	1
Cadmium	7440-43-9	6020B	0.55		0.15	0.028	mg/kg	1
Chromium	7440-47-3	6020B	20		1.5	0.62	mg/kg	1
Cobalt	7440-48-4	6020B	11		1.5	0.34	mg/kg	1
Copper	7440-50-8	6020B	17		1.5	0.36	mg/kg	1
Lead	7439-92-1	6020B	13		0.28	0.076	mg/kg	1
Mercury	7439-97-6	7471B	0.022	J	0.093	0.022	mg/kg	1
Nickel	7440-02-0	6020B	20		1.5	0.34	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.5	0.53	mg/kg	1
Silver	7440-22-4	6020B	0.076	J	0.28	0.067	mg/kg	2
Vanadium	7440-62-2	6020B	54		1.5	0.28	mg/kg	1
Zinc	7440-66-6	6020B	78		2.8	0.56	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-006
Description: TB-25-20190622
Matrix: Aqueous
Date Sampled: 06/22/2019
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1301	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	7.5	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF25046-006
Description: TB-25-20190622
Matrix: Aqueous
Date Sampled: 06/22/2019
Date Received: 06/25/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/05/2019 1301	BWS		21644

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		93	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21458-001
Batch: 21458
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	07/02/2019 1000
Benzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Bromochloromethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Bromoform	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	07/02/2019 1000
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	07/02/2019 1000
Carbon disulfide	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Chlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Chloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Chloroform	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	07/02/2019 1000
Cyclohexane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	07/02/2019 1000
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,4-Dioxane	ND		1	250	25	ug/kg	07/02/2019 1000
Ethylbenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
2-Hexanone	ND		1	10	4.0	ug/kg	07/02/2019 1000
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Methyl acetate	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	07/02/2019 1000
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Methylene chloride	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Naphthalene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Styrene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Toluene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21458-001
Batch: 21458
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Trichloroethene	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
Vinyl chloride	ND		1	5.0	3.0	ug/kg	07/02/2019 1000
Xylenes (total)	ND		1	10	4.0	ug/kg	07/02/2019 1000
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	07/02/2019 1000
o - Xylenes	ND		1	5.0	2.0	ug/kg	07/02/2019 1000

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		97	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21458-002
Batch: 21458
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	100		1	101	60-140	07/02/2019 0937
Benzene	50	49		1	98	70-130	07/02/2019 0937
Bromochloromethane	50	48		1	96	70-130	07/02/2019 0937
Bromodichloromethane	50	49		1	99	70-130	07/02/2019 0937
Bromoform	50	50		1	100	70-130	07/02/2019 0937
Bromomethane (Methyl bromide)	50	45		1	90	70-130	07/02/2019 0937
2-Butanone (MEK)	100	100		1	101	60-140	07/02/2019 0937
Carbon disulfide	50	50		1	100	70-130	07/02/2019 0937
Carbon tetrachloride	50	49		1	97	70-130	07/02/2019 0937
Chlorobenzene	50	50		1	101	70-130	07/02/2019 0937
Chloroethane	50	51		1	103	70-130	07/02/2019 0937
Chloroform	50	48		1	97	70-130	07/02/2019 0937
Chloromethane (Methyl chloride)	50	45		1	90	60-140	07/02/2019 0937
Cyclohexane	50	41		1	81	70-130	07/02/2019 0937
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	94	70-130	07/02/2019 0937
Dibromochloromethane	50	49		1	99	70-130	07/02/2019 0937
1,2-Dibromoethane (EDB)	50	50		1	100	70-130	07/02/2019 0937
1,2-Dichlorobenzene	50	50		1	100	70-130	07/02/2019 0937
1,3-Dichlorobenzene	50	51		1	102	70-130	07/02/2019 0937
1,4-Dichlorobenzene	50	50		1	101	70-130	07/02/2019 0937
Dichlorodifluoromethane	50	36		1	73	60-140	07/02/2019 0937
1,1-Dichloroethane	50	50		1	100	70-130	07/02/2019 0937
1,2-Dichloroethane	50	49		1	97	70-130	07/02/2019 0937
1,1-Dichloroethene	50	48		1	97	70-130	07/02/2019 0937
cis-1,2-Dichloroethene	50	48		1	96	70-130	07/02/2019 0937
trans-1,2-Dichloroethene	50	49		1	98	70-130	07/02/2019 0937
1,2-Dichloropropane	50	49		1	98	70-130	07/02/2019 0937
cis-1,3-Dichloropropene	50	50		1	100	70-130	07/02/2019 0937
trans-1,3-Dichloropropene	50	51		1	101	70-130	07/02/2019 0937
1,4-Dioxane	500	470		1	93	60-140	07/02/2019 0937
Ethylbenzene	50	51		1	101	70-130	07/02/2019 0937
2-Hexanone	100	110		1	108	70-130	07/02/2019 0937
Isopropylbenzene	50	51		1	102	70-130	07/02/2019 0937
Methyl acetate	50	34	N	1	68	70-130	07/02/2019 0937
Methyl tertiary butyl ether (MTBE)	50	48		1	97	70-130	07/02/2019 0937
4-Methyl-2-pentanone	100	91		1	91	70-130	07/02/2019 0937
Methylcyclohexane	50	43		1	85	70-130	07/02/2019 0937
Methylene chloride	50	46		1	92	70-130	07/02/2019 0937
Naphthalene	50	49		1	98	70-130	07/02/2019 0937
Styrene	50	50		1	101	70-130	07/02/2019 0937
1,1,2,2-Tetrachloroethane	50	47		1	95	70-130	07/02/2019 0937
Tetrachloroethene	50	52		1	104	70-130	07/02/2019 0937
Toluene	50	48		1	97	70-130	07/02/2019 0937
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	45		1	89	70-130	07/02/2019 0937

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21458-002
Batch: 21458
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	53		1	106	70-130	07/02/2019 0937
1,2,4-Trichlorobenzene	50	52		1	104	70-130	07/02/2019 0937
1,1,1-Trichloroethane	50	49		1	98	70-130	07/02/2019 0937
1,1,2-Trichloroethane	50	48		1	97	70-130	07/02/2019 0937
Trichloroethene	50	50		1	99	70-130	07/02/2019 0937
Trichlorofluoromethane	50	44		1	88	70-130	07/02/2019 0937
Vinyl chloride	50	44		1	88	70-130	07/02/2019 0937
Xylenes (total)	100	100		1	101	70-130	07/02/2019 0937
m+p - Xylenes	50	51		1	102	70-130	07/02/2019 0937
o - Xylenes	50	50		1	100	70-130	07/02/2019 0937

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21574-001
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	07/02/2019 1740
Benzene	ND		1	250	100	ug/kg	07/02/2019 1740
Bromochloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Bromodichloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Bromoform	ND		1	250	100	ug/kg	07/02/2019 1740
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	07/02/2019 1740
2-Butanone (MEK)	ND		1	1000	200	ug/kg	07/02/2019 1740
Carbon disulfide	ND		1	250	100	ug/kg	07/02/2019 1740
Carbon tetrachloride	ND		1	250	100	ug/kg	07/02/2019 1740
Chlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Chloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Chloroform	ND		1	250	100	ug/kg	07/02/2019 1740
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	07/02/2019 1740
Cyclohexane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	07/02/2019 1740
Dibromochloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Dichlorodifluoromethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1-Dichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichloropropane	ND		1	250	100	ug/kg	07/02/2019 1740
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	07/02/2019 1740
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	07/02/2019 1740
1,4-Dioxane	ND		1	13000	1300	ug/kg	07/02/2019 1740
Ethylbenzene	ND		1	250	100	ug/kg	07/02/2019 1740
2-Hexanone	ND		1	500	200	ug/kg	07/02/2019 1740
Isopropylbenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Methyl acetate	ND		1	250	100	ug/kg	07/02/2019 1740
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	07/02/2019 1740
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	07/02/2019 1740
Methylcyclohexane	ND		1	250	100	ug/kg	07/02/2019 1740
Methylene chloride	ND		1	250	100	ug/kg	07/02/2019 1740
Naphthalene	ND		1	250	100	ug/kg	07/02/2019 1740
Styrene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Tetrachloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
Toluene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	07/02/2019 1740

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21574-001
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Trichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
Trichlorofluoromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Vinyl chloride	ND		1	250	100	ug/kg	07/02/2019 1740
Xylenes (total)	ND		1	500	200	ug/kg	07/02/2019 1740
m+p - Xylenes	ND		1	250	100	ug/kg	07/02/2019 1740
o - Xylenes	ND		1	250	100	ug/kg	07/02/2019 1740

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		105	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		106	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21574-002
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	5200		1	104	60-140	07/02/2019 1718
Benzene	2500	2500		1	101	70-130	07/02/2019 1718
Bromochloromethane	2500	2500		1	99	70-130	07/02/2019 1718
Bromodichloromethane	2500	2600		1	103	70-130	07/02/2019 1718
Bromoform	2500	2500		1	99	70-130	07/02/2019 1718
Bromomethane (Methyl bromide)	2500	1700	N	1	68	70-130	07/02/2019 1718
2-Butanone (MEK)	5000	5600		1	113	60-140	07/02/2019 1718
Carbon disulfide	2500	2200		1	89	70-130	07/02/2019 1718
Carbon tetrachloride	2500	2600		1	105	70-130	07/02/2019 1718
Chlorobenzene	2500	2600		1	105	70-130	07/02/2019 1718
Chloroethane	2500	2300		1	92	70-130	07/02/2019 1718
Chloroform	2500	2500		1	99	70-130	07/02/2019 1718
Chloromethane (Methyl chloride)	2500	1900		1	78	60-140	07/02/2019 1718
Cyclohexane	2500	2600		1	105	70-130	07/02/2019 1718
1,2-Dibromo-3-chloropropane (DBCP)	2500	2400		1	95	70-130	07/02/2019 1718
Dibromochloromethane	2500	2600		1	103	70-130	07/02/2019 1718
1,2-Dibromoethane (EDB)	2500	2700		1	107	70-130	07/02/2019 1718
1,2-Dichlorobenzene	2500	2700		1	106	70-130	07/02/2019 1718
1,3-Dichlorobenzene	2500	2700		1	108	70-130	07/02/2019 1718
1,4-Dichlorobenzene	2500	2700		1	107	70-130	07/02/2019 1718
Dichlorodifluoromethane	2500	1600		1	66	60-140	07/02/2019 1718
1,1-Dichloroethane	2500	2500		1	101	70-130	07/02/2019 1718
1,2-Dichloroethane	2500	2500		1	101	70-130	07/02/2019 1718
1,1-Dichloroethene	2500	2400		1	95	70-130	07/02/2019 1718
cis-1,2-Dichloroethene	2500	2500		1	98	70-130	07/02/2019 1718
trans-1,2-Dichloroethene	2500	2500		1	98	70-130	07/02/2019 1718
1,2-Dichloropropane	2500	2500		1	101	70-130	07/02/2019 1718
cis-1,3-Dichloropropene	2500	2600		1	105	70-130	07/02/2019 1718
trans-1,3-Dichloropropene	2500	2700		1	107	70-130	07/02/2019 1718
1,4-Dioxane	25000	25000		1	100	60-140	07/02/2019 1718
Ethylbenzene	2500	2700		1	107	70-130	07/02/2019 1718
2-Hexanone	5000	5600		1	113	70-130	07/02/2019 1718
Isopropylbenzene	2500	2700		1	106	70-130	07/02/2019 1718
Methyl acetate	2500	1900		1	74	70-130	07/02/2019 1718
Methyl tertiary butyl ether (MTBE)	2500	2400		1	97	70-130	07/02/2019 1718
4-Methyl-2-pentanone	5000	4800		1	96	70-130	07/02/2019 1718
Methylcyclohexane	2500	2900		1	118	70-130	07/02/2019 1718
Methylene chloride	2500	2200		1	88	70-130	07/02/2019 1718
Naphthalene	2500	2400		1	98	70-130	07/02/2019 1718
Styrene	2500	2700		1	106	70-130	07/02/2019 1718
1,1,2,2-Tetrachloroethane	2500	2600		1	105	70-130	07/02/2019 1718
Tetrachloroethene	2500	2800		1	112	70-130	07/02/2019 1718
Toluene	2500	2600		1	104	70-130	07/02/2019 1718
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	2900		1	115	70-130	07/02/2019 1718

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21574-002
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2700		1	106	70-130	07/02/2019 1718
1,2,4-Trichlorobenzene	2500	2700		1	108	70-130	07/02/2019 1718
1,1,1-Trichloroethane	2500	2400		1	98	70-130	07/02/2019 1718
1,1,2-Trichloroethane	2500	2600		1	103	70-130	07/02/2019 1718
Trichloroethene	2500	2600		1	102	70-130	07/02/2019 1718
Trichlorofluoromethane	2500	2600		1	102	70-130	07/02/2019 1718
Vinyl chloride	2500	2100		1	83	70-130	07/02/2019 1718
Xylenes (total)	5000	5300		1	106	70-130	07/02/2019 1718
m+p - Xylenes	2500	2700		1	107	70-130	07/02/2019 1718
o - Xylenes	2500	2600		1	105	70-130	07/02/2019 1718

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		98	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21644-001
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/05/2019 1110
Benzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromoform	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/05/2019 1110
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloroform	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Cyclohexane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/05/2019 1110
1,4-Dioxane	ND		1	20	13	ug/L	07/05/2019 1110
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
2-Hexanone	ND		1	10	2.0	ug/L	07/05/2019 1110
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Methyl acetate	ND		1	1.0	0.40	ug/L	07/05/2019 1110
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/05/2019 1110
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/05/2019 1110
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/05/2019 1110
Methylene chloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Naphthalene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Styrene	ND		1	0.50	0.41	ug/L	07/05/2019 1110
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Toluene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/05/2019 1110

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21644-001
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Trichloroethene	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/05/2019 1110
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/05/2019 1110
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/05/2019 1110
o - Xylenes	ND		1	0.50	0.40	ug/L	07/05/2019 1110

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		99	70-130

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21644-002
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	160	N	1	159	60-140	07/05/2019 1011
Benzene	50	48		1	95	70-130	07/05/2019 1011
Bromochloromethane	50	44		1	87	70-130	07/05/2019 1011
Bromodichloromethane	50	46		1	92	70-130	07/05/2019 1011
Bromoform	50	53		1	107	70-130	07/05/2019 1011
Bromomethane (Methyl bromide)	50	45		1	90	70-130	07/05/2019 1011
2-Butanone (MEK)	100	130		1	126	70-130	07/05/2019 1011
Carbon disulfide	50	49		1	99	70-130	07/05/2019 1011
Carbon tetrachloride	50	42		1	84	70-130	07/05/2019 1011
Chlorobenzene	50	50		1	99	70-130	07/05/2019 1011
Chloroethane	50	46		1	92	70-130	07/05/2019 1011
Chloroform	50	43		1	87	70-130	07/05/2019 1011
Chloromethane (Methyl chloride)	50	41		1	83	60-140	07/05/2019 1011
Cyclohexane	50	36		1	73	70-130	07/05/2019 1011
1,2-Dibromo-3-chloropropane (DBCP)	50	49		1	98	70-130	07/05/2019 1011
Dibromochloromethane	50	50		1	101	70-130	07/05/2019 1011
1,2-Dibromoethane (EDB)	50	49		1	99	70-130	07/05/2019 1011
1,2-Dichlorobenzene	50	49		1	99	70-130	07/05/2019 1011
1,3-Dichlorobenzene	50	50		1	100	70-130	07/05/2019 1011
1,4-Dichlorobenzene	50	49		1	98	70-130	07/05/2019 1011
Dichlorodifluoromethane	50	39		1	77	60-140	07/05/2019 1011
1,1-Dichloroethane	50	44		1	88	70-130	07/05/2019 1011
1,2-Dichloroethane	50	45		1	90	70-130	07/05/2019 1011
1,1-Dichloroethene	50	44		1	87	70-130	07/05/2019 1011
cis-1,2-Dichloroethene	50	43		1	87	70-130	07/05/2019 1011
trans-1,2-Dichloroethene	50	44		1	88	70-130	07/05/2019 1011
1,2-Dichloropropane	50	47		1	94	70-130	07/05/2019 1011
cis-1,3-Dichloropropene	50	50		1	100	70-130	07/05/2019 1011
trans-1,3-Dichloropropene	50	50		1	99	70-130	07/05/2019 1011
1,4-Dioxane	500	530		1	106	60-140	07/05/2019 1011
Ethylbenzene	50	50		1	99	70-130	07/05/2019 1011
2-Hexanone	100	110		1	108	70-130	07/05/2019 1011
Isopropylbenzene	50	50		1	100	70-130	07/05/2019 1011
Methyl acetate	50	36		1	72	70-130	07/05/2019 1011
Methyl tertiary butyl ether (MTBE)	50	47		1	93	70-130	07/05/2019 1011
4-Methyl-2-pentanone	100	92		1	92	70-130	07/05/2019 1011
Methylcyclohexane	50	45		1	89	70-130	07/05/2019 1011
Methylene chloride	50	46		1	92	70-130	07/05/2019 1011
Naphthalene	50	49		1	98	70-130	07/05/2019 1011
Styrene	50	51		1	102	70-130	07/05/2019 1011
1,1,2,2-Tetrachloroethane	50	48		1	95	70-130	07/05/2019 1011
Tetrachloroethene	50	50		1	99	70-130	07/05/2019 1011
Toluene	50	48		1	96	70-130	07/05/2019 1011
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	43		1	86	70-130	07/05/2019 1011

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21644-002
Batch: 21644
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	101	70-130	07/05/2019 1011
1,2,4-Trichlorobenzene	50	50		1	101	70-130	07/05/2019 1011
1,1,1-Trichloroethane	50	43		1	86	70-130	07/05/2019 1011
1,1,2-Trichloroethane	50	48		1	96	70-130	07/05/2019 1011
Trichloroethene	50	47		1	95	70-130	07/05/2019 1011
Trichlorofluoromethane	50	41		1	81	70-130	07/05/2019 1011
Vinyl chloride	50	37		1	74	70-130	07/05/2019 1011
Xylenes (total)	100	99		1	99	70-130	07/05/2019 1011
m+p - Xylenes	50	49		1	98	70-130	07/05/2019 1011
o - Xylenes	50	50		1	100	70-130	07/05/2019 1011

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	70-130
Bromofluorobenzene		98	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20811-001
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	07/06/2019 1905
Acenaphthylene	ND		1	2.7	0.95	ug/kg	07/06/2019 1905
Anthracene	ND		1	2.7	0.51	ug/kg	07/06/2019 1905
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	07/06/2019 1905
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	07/06/2019 1905
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	07/06/2019 1905
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	07/06/2019 1905
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	07/06/2019 1905
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
Carbazole	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	07/06/2019 1905
2-Chlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/06/2019 1905
Chrysene	ND		1	2.7	0.45	ug/kg	07/06/2019 1905
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	07/06/2019 1905
Dibenzofuran	ND		1	13	5.0	ug/kg	07/06/2019 1905
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	07/06/2019 1905
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
Diethylphthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
Dimethyl phthalate	ND		1	13	7.4	ug/kg	07/06/2019 1905
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	07/06/2019 1905
2,4-Dinitrophenol	ND		1	67	25	ug/kg	07/06/2019 1905
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	07/06/2019 1905
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	07/06/2019 1905
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	07/06/2019 1905
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	07/06/2019 1905
Fluoranthene	ND		1	2.7	0.42	ug/kg	07/06/2019 1905
Fluorene	ND		1	2.7	0.57	ug/kg	07/06/2019 1905
Hexachlorobenzene	ND		1	13	5.0	ug/kg	07/06/2019 1905
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	07/06/2019 1905
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	07/06/2019 1905
Hexachloroethane	ND		1	13	5.0	ug/kg	07/06/2019 1905
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	07/06/2019 1905
Isophorone	ND		1	13	5.0	ug/kg	07/06/2019 1905

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20811-001
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	07/06/2019 1905
2-Methylphenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
3+4-Methylphenol	ND		1	27	10	ug/kg	07/06/2019 1905
Naphthalene	ND		1	2.7	0.97	ug/kg	07/06/2019 1905
2-Nitroaniline	ND		1	27	10	ug/kg	07/06/2019 1905
3-Nitroaniline	ND		1	27	10	ug/kg	07/06/2019 1905
4-Nitroaniline	ND		1	27	10	ug/kg	07/06/2019 1905
Nitrobenzene	ND		1	13	5.0	ug/kg	07/06/2019 1905
2-Nitrophenol	ND		1	27	10	ug/kg	07/06/2019 1905
4-Nitrophenol	ND		1	67	25	ug/kg	07/06/2019 1905
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	07/06/2019 1905
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	07/06/2019 1905
Pentachlorophenol	ND		1	67	25	ug/kg	07/06/2019 1905
Phenanthrene	ND		1	2.7	0.72	ug/kg	07/06/2019 1905
Phenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
Pyrene	ND		1	2.7	0.50	ug/kg	07/06/2019 1905
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	07/06/2019 1905
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	07/06/2019 1905
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	07/06/2019 1905
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	07/06/2019 1905

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		58	33-102
2-Fluorophenol		54	35-115
Nitrobenzene-d5		61	22-109
Phenol-d5		55	33-122
Terphenyl-d14		88	41-120
2,4,6-Tribromophenol		85	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20811-002
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	80		1	60	12-111	07/06/2019 1930
Acenaphthylene	130	84		1	63	44-122	07/06/2019 1930
Anthracene	130	93		1	70	16-122	07/06/2019 1930
Benzo(a)anthracene	130	94		1	71	40-121	07/06/2019 1930
Benzo(a)pyrene	130	99		1	75	36-114	07/06/2019 1930
Benzo(b)fluoranthene	130	100		1	79	38-123	07/06/2019 1930
Benzo(g,h,i)perylene	130	110		1	80	43-120	07/06/2019 1930
Benzo(k)fluoranthene	130	97		1	73	40-126	07/06/2019 1930
4-Bromophenyl phenyl ether	130	88		1	66	30-130	07/06/2019 1930
Butyl benzyl phthalate	130	110		1	82	48-124	07/06/2019 1930
Carbazole	130	95		1	71	47-125	07/06/2019 1930
bis (2-Chloro-1-methylethyl) ether	130	80		1	60	41-113	07/06/2019 1930
4-Chloro-3-methyl phenol	130	81		1	61	48-120	07/06/2019 1930
bis(2-Chloroethoxy)methane	130	78		1	58	38-115	07/06/2019 1930
bis(2-Chloroethyl)ether	130	78		1	59	46-122	07/06/2019 1930
2-Chloronaphthalene	130	79		1	59	37-106	07/06/2019 1930
2-Chlorophenol	130	79		1	59	44-122	07/06/2019 1930
4-Chlorophenyl phenyl ether	130	82		1	61	32-107	07/06/2019 1930
Chrysene	130	96		1	73	41-124	07/06/2019 1930
Dibenzo(a,h)anthracene	130	110		1	84	38-125	07/06/2019 1930
Dibenzofuran	130	82		1	61	45-128	07/06/2019 1930
1,2-Dichlorobenzene	130	71		1	54	39-94	07/06/2019 1930
1,3-Dichlorobenzene	130	69		1	52	30-130	07/06/2019 1930
1,4-Dichlorobenzene	130	70		1	53	39-92	07/06/2019 1930
3,3'-Dichlorobenzidine	130	69		1	52	10-119	07/06/2019 1930
2,4-Dichlorophenol	130	78		1	58	30-96	07/06/2019 1930
Diethylphthalate	130	86		1	65	30-130	07/06/2019 1930
Dimethyl phthalate	130	87		1	65	24-127	07/06/2019 1930
2,4-Dimethylphenol	130	130		1	97	30-130	07/06/2019 1930
Di-n-butyl phthalate	130	90		1	68	35-108	07/06/2019 1930
4,6-Dinitro-2-methylphenol	130	110		1	81	53-150	07/06/2019 1930
2,4-Dinitrophenol	270	190		1	72	32-115	07/06/2019 1930
2,4-Dinitrotoluene	130	89		1	67	40-130	07/06/2019 1930
2,6-Dinitrotoluene	130	86		1	64	46-118	07/06/2019 1930
Di-n-octylphthalate	130	110		1	82	49-118	07/06/2019 1930
bis(2-Ethylhexyl)phthalate	130	120		1	88	33-123	07/06/2019 1930
Fluoranthene	130	88		1	66	26-133	07/06/2019 1930
Fluorene	130	82		1	62	19-108	07/06/2019 1930
Hexachlorobenzene	130	91		1	68	10-125	07/06/2019 1930
Hexachlorobutadiene	130	68		1	51	47-116	07/06/2019 1930
Hexachlorocyclopentadiene	670	340		1	50	48-127	07/06/2019 1930
Hexachloroethane	130	67		1	50	18-154	07/06/2019 1930
Indeno(1,2,3-c,d)pyrene	130	100		1	78	42-123	07/06/2019 1930
Isophorone	130	86		1	65	30-130	07/06/2019 1930

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20811-002
Batch: 20811
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/26/2019 1540

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	76		1	57	10-107	07/06/2019 1930
2-Methylphenol	130	81		1	61	33-103	07/06/2019 1930
3+4-Methylphenol	130	97		1	73	18-121	07/06/2019 1930
Naphthalene	130	76		1	57	10-112	07/06/2019 1930
2-Nitroaniline	130	100		1	76	46-128	07/06/2019 1930
3-Nitroaniline	130	54		1	41	30-130	07/06/2019 1930
4-Nitroaniline	130	83		1	63	51-129	07/06/2019 1930
Nitrobenzene	130	83		1	63	49-142	07/06/2019 1930
2-Nitrophenol	130	87		1	66	33-114	07/06/2019 1930
4-Nitrophenol	270	170		1	63	27-138	07/06/2019 1930
N-Nitrosodi-n-propylamine	130	88		1	66	45-112	07/06/2019 1930
N-Nitrosodiphenylamine (Diphenylamine)	130	99		1	74	49-123	07/06/2019 1930
Pentachlorophenol	270	190		1	70	36-108	07/06/2019 1930
Phenanthrene	130	88		1	66	16-123	07/06/2019 1930
Phenol	130	86		1	64	39-108	07/06/2019 1930
Pyrene	130	92		1	69	34-121	07/06/2019 1930
1,2,4,5-Tetrachlorobenzene	130	76		1	57	30-130	07/06/2019 1930
2,3,4,6-Tetrachlorophenol	130	90		1	68	53-125	07/06/2019 1930
1,2,4-Trichlorobenzene	130	73		1	55	30-130	07/06/2019 1930
2,4,5-Trichlorophenol	130	85		1	64	32-105	07/06/2019 1930
2,4,6-Trichlorophenol	130	84		1	63	31-102	07/06/2019 1930

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		60	33-102
2-Fluorophenol		61	35-115
Nitrobenzene-d5		64	22-109
Phenol-d5		62	33-122
Terphenyl-d14		80	41-120
2,4,6-Tribromophenol		82	30-117

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ21005-001
Batch: 21005
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	07/05/2019 2246
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	07/05/2019 2246

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ21005-002
Batch: 21005
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	40		1	101	40-140	07/05/2019 2316
C9 - C18 Aliphatics	30	19		1	65	40-140	07/05/2019 2316

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		91	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ21007-001
Batch: 21007
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	07/06/2019 0612

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		128	40-140
2-Fluorobiphenyl (fractionation 1)		127	40-140
o - Terphenyl (aromatic)		98	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ21007-002
Batch: 21007
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	69		1	82	40-140	07/06/2019 0642

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		113	40-140
2-Fluorobiphenyl (fractionation 1)		113	40-140
o - Terphenyl (aromatic)		94	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21737-001
Batch: 21737
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21737-002
Batch: 21737
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	21		1	109	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21737-003
Batch: 21737
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	107	2.5	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		85	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21738-001
Batch: 21738
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	07/03/2019 1348
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	07/03/2019 1348
Ethylbenzene	ND		1	0.25	0.031	mg/kg	07/03/2019 1348
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	07/03/2019 1348
Naphthalene	ND		1	0.25	0.13	mg/kg	07/03/2019 1348
Toluene	ND		1	0.25	0.040	mg/kg	07/03/2019 1348
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	07/03/2019 1348
o - Xylenes	ND		1	0.25	0.028	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		75	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21738-002
Batch: 21738
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	07/03/2019 1252
C9 - C10 Aromatics	1.3	1.3		1	104	70-130	07/03/2019 1252
Ethylbenzene	1.3	1.2		1	96	70-130	07/03/2019 1252
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	07/03/2019 1252
Naphthalene	1.3	1.0		1	80	70-130	07/03/2019 1252
Toluene	1.3	1.2		1	96	70-130	07/03/2019 1252
m+p - Xylenes	2.5	2.5		1	100	70-130	07/03/2019 1252
o - Xylenes	1.3	1.3		1	104	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aromatics) - LCSD

Sample ID: UQ21738-003
Batch: 21738
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
C9 - C10 Aromatics	1.3	1.2		1	96	8.0	70-130	25	07/03/2019 1320
Ethylbenzene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
Methyl tertiary butyl ether (MTBE)	1.3	1.0		1	80	9.5	70-130	25	07/03/2019 1320
Naphthalene	1.3	1.0		1	80	0.00	70-130	25	07/03/2019 1320
Toluene	1.3	1.2		1	96	0.00	70-130	25	07/03/2019 1320
m+p - Xylenes	2.5	2.5		1	100	0.00	70-130	25	07/03/2019 1320
o - Xylenes	1.3	1.2		1	96	8.0	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21739-001
Batch: 21739
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/03/2019 1348
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/03/2019 1348

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21739-002
Batch: 21739
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.4		1	109	70-130	07/03/2019 1252
C9 - C12 Aliphatics, Adjusted	3.8	4.5		1	120	70-130	07/03/2019 1252

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21739-003
Batch: 21739
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.3		1	107	2.1	70-130	25	07/03/2019 1320
C9 - C12 Aliphatics, Adjusted	3.8	4.2		1	112	7.0	70-130	25	07/03/2019 1320

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21740-001
Batch: 21740
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	07/05/2019 1545

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - LCS

Sample ID: UQ21740-002
Batch: 21740
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	20		1	108	70-130	07/05/2019 1449

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21740-003
Batch: 21740
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	104	3.5	70-130	25	07/05/2019 1517

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		85	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21742-001
Batch: 21742
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	07/05/2019 1545
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	07/05/2019 1545
Ethylbenzene	ND		1	0.25	0.031	mg/kg	07/05/2019 1545
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	07/05/2019 1545
Naphthalene	ND		1	0.25	0.13	mg/kg	07/05/2019 1545
Toluene	ND		1	0.25	0.040	mg/kg	07/05/2019 1545
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	07/05/2019 1545
o - Xylenes	ND		1	0.25	0.028	mg/kg	07/05/2019 1545

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21742-002
Batch: 21742
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	07/05/2019 1517
C9 - C10 Aromatics	1.3	1.2		1	96	70-130	07/05/2019 1517
Ethylbenzene	1.3	1.2		1	96	70-130	07/05/2019 1517
Methyl tertiary butyl ether (MTBE)	1.3	1.0		1	80	70-130	07/05/2019 1517
Naphthalene	1.3	1.0		1	80	70-130	07/05/2019 1517
Toluene	1.3	1.2		1	96	70-130	07/05/2019 1517
m+p - Xylenes	2.5	2.5		1	100	70-130	07/05/2019 1517
o - Xylenes	1.3	1.2		1	96	70-130	07/05/2019 1517

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21742-003
Batch: 21742
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	8.0	70-130	25	07/05/2019 1449
C9 - C10 Aromatics	1.3	1.3		1	104	8.0	70-130	25	07/05/2019 1449
Ethylbenzene	1.3	1.3		1	104	8.0	70-130	25	07/05/2019 1449
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	9.5	70-130	25	07/05/2019 1449
Naphthalene	1.3	1.1		1	88	9.5	70-130	25	07/05/2019 1449
Toluene	1.3	1.3		1	104	8.0	70-130	25	07/05/2019 1449
m+p - Xylenes	2.5	2.6		1	104	3.9	70-130	25	07/05/2019 1449
o - Xylenes	1.3	1.3		1	104	8.0	70-130	25	07/05/2019 1449

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21743-001
Batch: 21743
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/05/2019 1545
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/05/2019 1545

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21743-002
Batch: 21743
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.3		1	106	70-130	07/05/2019 1449
C9 - C12 Aliphatics, Adjusted	3.8	4.0		1	108	70-130	07/05/2019 1449

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21743-003
Batch: 21743
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.1		1	101	4.5	70-130	25	07/05/2019 1517
C9 - C12 Aliphatics, Adjusted	3.8	3.8		1	101	6.8	70-130	25	07/05/2019 1517

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ21083-001
Batch: 21083
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	07/05/2019 1601
Arsenic	ND		1	0.50	0.20	mg/kg	07/05/2019 1601
Barium	ND		1	1.3	0.31	mg/kg	07/05/2019 1601
Beryllium	ND		1	0.10	0.034	mg/kg	07/05/2019 1601
Cadmium	ND		1	0.13	0.025	mg/kg	07/05/2019 1601
Chromium	ND		1	1.3	0.55	mg/kg	07/05/2019 1601
Cobalt	ND		1	1.3	0.30	mg/kg	07/05/2019 1601
Copper	ND		1	1.3	0.33	mg/kg	07/05/2019 1601
Lead	ND		1	0.25	0.068	mg/kg	07/05/2019 1601
Nickel	ND		1	1.3	0.30	mg/kg	07/05/2019 1601
Selenium	ND		1	1.3	0.47	mg/kg	07/05/2019 1601
Silver	ND		1	0.25	0.060	mg/kg	07/05/2019 1601
Vanadium	ND		1	1.3	0.25	mg/kg	07/05/2019 1601
Zinc	ND		1	2.5	0.50	mg/kg	07/05/2019 1601

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ21083-002
Batch: 21083
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	51		1	103	80-120	07/05/2019 1607
Arsenic	50	48		1	97	80-120	07/05/2019 1607
Barium	50	49		1	98	80-120	07/05/2019 1607
Beryllium	50	48		1	95	80-120	07/05/2019 1607
Cadmium	50	50		1	99	80-120	07/05/2019 1607
Chromium	50	44		1	88	80-120	07/05/2019 1607
Cobalt	50	51		1	103	80-120	07/05/2019 1607
Copper	50	50		1	101	80-120	07/05/2019 1607
Lead	50	54		1	108	80-120	07/05/2019 1607
Nickel	50	48		1	96	80-120	07/05/2019 1607
Selenium	50	47		1	93	80-120	07/05/2019 1607
Silver	50	56		1	112	80-120	07/05/2019 1607
Vanadium	50	44		1	88	80-120	07/05/2019 1607
Zinc	50	48		1	97	80-120	07/05/2019 1607

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20938-001
Batch: 20938
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/27/2019 1855

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/28/2019 1745

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20938-002
Batch: 20938
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/27/2019 1855

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.86		1	104	80-120	06/28/2019 1748

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Chain of Custody
and
Miscellaneous Documents

Shealy Environmental Services, Inc.
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SHEALY Chain of Custody Record

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

Number 91163

Ramboll US Corporation
Client

7500 College Boulevard Suite 1905
Address

Overland Park KS 66210
City | State | Zip Code

CMR RIAM-West Rail
Project Name

1690012344-003
Project No.

Report to Contact: Daniel Price/Michael Wilson

Sampler's Signature: x

Printed Name: Brooks Bailey, Andrew Hardwick, Elizabeth Boracki

Telephone No. / E-mail: (314) 590-2970 / dprice@ramboll.com; (316) 440-7806 / muilsen@ramboll.com

Quote No.

Page 1 of 1

UF25046

KMNZ

P.O. No.

Analysis (Attach list if more space is needed)

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Grab / Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Other Liquids	No. of Containers by Preservative Type: Plastic	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	MeOH	VOCs	VPH	SVOC	Metals	EPH	Remarks / Cooler I.D.
CMR-WB03-0.5-1.0-190622	6/22/19	0920	G		X		2					1	2	X	X	X	X	X	Cooler 004
CMR-WB03-3.5-4.0-190622	6/22/19	0940	G		X		2					1	2	X	X	X	X	X	Cooler 004
CMR-WB03-5.0-6.5-190622	6/22/19	0935	G		X		2					1	2	X	X	X	X	X	Cooler 004
CMR-WB02-2.0-2.5-190622	6/22/19	1240	G		X		2					1	2	X	X	X	X	X	Cooler 004
CMR-WB02-10.0-10.75-190622	6/22/19	1255	G		X		2					1	2	X	X	X	X	X	Trip Blank / Cooler 004
TB-25	NA	NA		X						2				X					

4.24.2019

Turn Around Time Required (Prior lab approval required for expedited TAT.)
☒ Standard ☐ Rush (Specify)

Sample Disposal
☐ Return to Client ☐ Disposal by Lab

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☒ Unknown

QC Requirements (Specify)

	Date	Time
1. Relinquished by	6/24/2019	17:45
2. Relinquished by		
3. Relinquished by		
4. Relinquished by FedEx	6/25/19	0919

	Date	Time
1. Received by		
2. Received by		
3. Received by		
4. Laboratory received by	6/25/19	0919

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack

Receipt Temp. 2.8 °C

DISTRIBUTION: WHITE & YELLOW Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number F-AD-139 Effective Date: 08-01-2014

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: Ramboll Cooler Inspected by/date: JSH / 06/25/19 Lot #: UF25046

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other:

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

2.8 / 2.8 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☐ Temperature Blank ☑ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☐ Wet Ice ☐ Ice Packs ☐ Dry Ice ☑ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☐ Yes	☑ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JSH Date: 06/25/19

Comments:

MEMO

Date: **July 23, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF26019, 3 Groundwater Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF26019 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-MW79D-190625	UF26019-001
CMR-MW79S-190625	UF26019-002
CMR-MW99-190625	UF26019-003
TB-26-20190625	UF26019-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of phenol. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all phenol results have been validated as estimated.

Blank Detections
During analysis, acetone was detected in trip blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All acetone results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF26019

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples, no action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UF26019

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	Acetone detected in trip blank. All project sample detections of acetone validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to sample dilution, no action taken.	No issues
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out of high for acetone. See above. LCS out low for phenol. All phenol results validated as estimated (J, UJ).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/A
Other Non-conformances	CCV out of criteria high for acetone. See above.	No other non-conformances noted.
Overall Assessment of Data	All phenol results validated as estimated (J, UJ). All detected results for acetone validated as non-detect (U).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM - West Rail

Project Number: 1690012344-003

Lot Number:**UF26019**

Date Completed:07/10/2019

07/10/2019 1:37 PM
Approved and released by:
Project Manager: Kelly M. Nance

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF26019

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21720 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections above the LOQ for this compound in the samples associated with this batch; therefore, data quality is not impacted.

Semivolatiles
The method blank associated with batch 21123 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. There were no detections for this compound in the samples associated with this method blank.

The LCS associated with batch 21123 had phenol recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Samples -001 and -003 were diluted 25X and 5X, respectively, due to the sample matrix. The reporting limits have been raised accordingly. The surrogates associated with sample -003 were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Sample -002 was diluted 250X due to high concentrations of a target compound. As a result, the associated surrogate was recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
Sample -002 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene and MTBE, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Sample Summary
Ramboll US Corporation
Lot Number: UF26019

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-MW79D-190625	Aqueous	06/25/2019 1052	06/26/2019
002	CMR-MW79S-190625	Aqueous	06/25/2019 0904	06/26/2019
003	CMR-MW99-190625	Aqueous	06/25/2019 1616	06/26/2019
004	TB-26-20190625	Aqueous	06/25/2019	06/26/2019

(4 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF26019

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-MW79D-190625	Aqueous	Acetone	8260B	88	J	ug/L	7
001	CMR-MW79D-190625	Aqueous	Benzene	8260B	1000		ug/L	7
001	CMR-MW79D-190625	Aqueous	Cyclohexane	8260B	98		ug/L	7
001	CMR-MW79D-190625	Aqueous	1,2-Dichloroethane	8260B	16		ug/L	7
001	CMR-MW79D-190625	Aqueous	Ethylbenzene	8260B	4.5	J	ug/L	7
001	CMR-MW79D-190625	Aqueous	Methylcyclohexane	8260B	30	J	ug/L	7
001	CMR-MW79D-190625	Aqueous	Toluene	8260B	12		ug/L	7
001	CMR-MW79D-190625	Aqueous	Xylenes (total)	8260B	50		ug/L	8
001	CMR-MW79D-190625	Aqueous	m+p - Xylenes	8260B	36		ug/L	8
001	CMR-MW79D-190625	Aqueous	o - Xylenes	8260B	14		ug/L	8
001	CMR-MW79D-190625	Aqueous	2-Methylnaphthalene	8270D	1.4	J	ug/L	10
001	CMR-MW79D-190625	Aqueous	Phenol	8270D	51		ug/L	10
001	CMR-MW79D-190625	Aqueous	C11 - C22 Aromatics	Montana EPH	140		ug/L	12
001	CMR-MW79D-190625	Aqueous	C5 - C8 Aliphatics,	Montana VPH	1000		ug/L	13
001	CMR-MW79D-190625	Aqueous	C9 - C12 Aliphatics,	Montana VPH	280	J	ug/L	13
001	CMR-MW79D-190625	Aqueous	Benzene	Montana VPH	930		ug/L	14
001	CMR-MW79D-190625	Aqueous	C9 - C10 Aromatics	Montana VPH	180		ug/L	14
001	CMR-MW79D-190625	Aqueous	Toluene	Montana VPH	30		ug/L	14
001	CMR-MW79D-190625	Aqueous	m+p - Xylenes	Montana VPH	53		ug/L	14
001	CMR-MW79D-190625	Aqueous	o - Xylenes	Montana VPH	21	J	ug/L	14
001	CMR-MW79D-190625	Aqueous	TPH	Montana VPH	2500		ug/L	15
001	CMR-MW79D-190625	Aqueous	Arsenic	6020B	15		ug/L	16
001	CMR-MW79D-190625	Aqueous	Barium	6020B	73		ug/L	16
001	CMR-MW79D-190625	Aqueous	Cobalt	6020B	14		ug/L	16
001	CMR-MW79D-190625	Aqueous	Copper	6020B	5.9		ug/L	16
001	CMR-MW79D-190625	Aqueous	Lead	6020B	0.43	J	ug/L	16
001	CMR-MW79D-190625	Aqueous	Nickel	6020B	32		ug/L	16
001	CMR-MW79D-190625	Aqueous	Selenium	6020B	5.9		ug/L	16
001	CMR-MW79D-190625	Aqueous	Zinc	6020B	15		ug/L	16
002	CMR-MW79S-190625	Aqueous	Acetone	8260B	180	J	ug/L	17
002	CMR-MW79S-190625	Aqueous	Benzene	8260B	3500		ug/L	17
002	CMR-MW79S-190625	Aqueous	2-Butanone (MEK)	8260B	380	J	ug/L	17
002	CMR-MW79S-190625	Aqueous	Cyclohexane	8260B	340		ug/L	17
002	CMR-MW79S-190625	Aqueous	1,2-Dichloroethane	8260B	26		ug/L	17
002	CMR-MW79S-190625	Aqueous	Ethylbenzene	8260B	990		ug/L	17
002	CMR-MW79S-190625	Aqueous	Isopropylbenzene	8260B	52		ug/L	17
002	CMR-MW79S-190625	Aqueous	Methylcyclohexane	8260B	160	J	ug/L	17
002	CMR-MW79S-190625	Aqueous	Naphthalene	8260B	350		ug/L	17
002	CMR-MW79S-190625	Aqueous	Toluene	8260B	960		ug/L	17
002	CMR-MW79S-190625	Aqueous	Xylenes (total)	8260B	5300		ug/L	18
002	CMR-MW79S-190625	Aqueous	m+p - Xylenes	8260B	4300		ug/L	18
002	CMR-MW79S-190625	Aqueous	o - Xylenes	8260B	1100		ug/L	18
002	CMR-MW79S-190625	Aqueous	2,4-Dimethylphenol	8270D	1000		ug/L	19
002	CMR-MW79S-190625	Aqueous	2-Methylnaphthalene	8270D	83		ug/L	20
002	CMR-MW79S-190625	Aqueous	2-Methylphenol	8270D	610		ug/L	20

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-MW79S-190625	Aqueous	3+4-Methylphenol	8270D	23	J	ug/L	20
002	CMR-MW79S-190625	Aqueous	Naphthalene	8270D	220		ug/L	20
002	CMR-MW79S-190625	Aqueous	Phenol	8270D	24	J	ug/L	20
002	CMR-MW79S-190625	Aqueous	C11 - C22 Aromatics	Montana EPH	790		ug/L	22
002	CMR-MW79S-190625	Aqueous	C5 - C8 Aliphatics,	Montana VPH	4000		ug/L	23
002	CMR-MW79S-190625	Aqueous	C9 - C12 Aliphatics,	Montana VPH	1600	J	ug/L	23
002	CMR-MW79S-190625	Aqueous	Benzene	Montana VPH	3100		ug/L	24
002	CMR-MW79S-190625	Aqueous	C9 - C10 Aromatics	Montana VPH	3500		ug/L	24
002	CMR-MW79S-190625	Aqueous	Ethylbenzene	Montana VPH	920		ug/L	24
002	CMR-MW79S-190625	Aqueous	Naphthalene	Montana VPH	350		ug/L	24
002	CMR-MW79S-190625	Aqueous	Toluene	Montana VPH	870		ug/L	24
002	CMR-MW79S-190625	Aqueous	m+p - Xylenes	Montana VPH	4000		ug/L	24
002	CMR-MW79S-190625	Aqueous	o - Xylenes	Montana VPH	990		ug/L	24
002	CMR-MW79S-190625	Aqueous	TPH	Montana VPH	22000		ug/L	25
002	CMR-MW79S-190625	Aqueous	Antimony	6020B	1.5	J	ug/L	26
002	CMR-MW79S-190625	Aqueous	Arsenic	6020B	280		ug/L	26
002	CMR-MW79S-190625	Aqueous	Barium	6020B	1300		ug/L	26
002	CMR-MW79S-190625	Aqueous	Chromium	6020B	1.6	J	ug/L	26
002	CMR-MW79S-190625	Aqueous	Cobalt	6020B	4.1	J	ug/L	26
002	CMR-MW79S-190625	Aqueous	Copper	6020B	1.7	J	ug/L	26
002	CMR-MW79S-190625	Aqueous	Lead	6020B	9.1		ug/L	26
002	CMR-MW79S-190625	Aqueous	Nickel	6020B	13		ug/L	26
002	CMR-MW79S-190625	Aqueous	Selenium	6020B	3.8	J	ug/L	26
002	CMR-MW79S-190625	Aqueous	Vanadium	6020B	8.7		ug/L	26
002	CMR-MW79S-190625	Aqueous	Zinc	6020B	8.1	J	ug/L	26
003	CMR-MW99-190625	Aqueous	Acetone	8260B	8.5	J	ug/L	27
003	CMR-MW99-190625	Aqueous	2-Methylnaphthalene	8270D	0.26	J	ug/L	30
003	CMR-MW99-190625	Aqueous	Naphthalene	8270D	0.22	J	ug/L	30
003	CMR-MW99-190625	Aqueous	C9 - C10 Aromatics	Montana VPH	8.0	J	ug/L	34
003	CMR-MW99-190625	Aqueous	Arsenic	6020B	90		ug/L	36
003	CMR-MW99-190625	Aqueous	Barium	6020B	120		ug/L	36
003	CMR-MW99-190625	Aqueous	Nickel	6020B	7.5		ug/L	36
003	CMR-MW99-190625	Aqueous	Zinc	6020B	8.5	J	ug/L	36
004	TB-26-20190625	Aqueous	Acetone	8260B	6.0	J	ug/L	37

(79 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-001
Description: CMR-MW79D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1052
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	10	07/06/2019 2021	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	88	J	100	20	ug/L	1
Benzene	71-43-2	8260B	1000		5.0	4.0	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		5.0	4.0	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		5.0	4.0	ug/L	1
Bromoform	75-25-2	8260B	ND		5.0	4.0	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.0	4.0	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		100	20	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		5.0	4.0	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		5.0	4.0	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		5.0	4.0	ug/L	1
Chloroethane	75-00-3	8260B	ND		5.0	4.0	ug/L	1
Chloroform	67-66-3	8260B	ND		5.0	4.0	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.0	4.0	ug/L	1
Cyclohexane	110-82-7	8260B	98		5.0	4.0	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.0	4.0	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		5.0	4.0	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.0	4.0	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.0	4.0	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.0	4.0	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.0	4.0	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		5.0	4.0	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		5.0	4.0	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	16		5.0	4.0	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		5.0	4.0	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.0	4.0	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.0	4.0	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		5.0	4.0	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.0	4.0	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.0	1.1	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		200	130	ug/L	1
Ethylbenzene	100-41-4	8260B	4.5	J	5.0	4.0	ug/L	1
2-Hexanone	591-78-6	8260B	ND		100	20	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		5.0	4.0	ug/L	1
Methyl acetate	79-20-9	8260B	ND		10	4.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.0	4.0	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		100	20	ug/L	1
Methylcyclohexane	108-87-2	8260B	30	J	50	4.0	ug/L	1
Methylene chloride	75-09-2	8260B	ND		5.0	4.0	ug/L	1
Naphthalene	91-20-3	8260B	ND		5.0	4.0	ug/L	1
Styrene	100-42-5	8260B	ND		5.0	4.1	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.0	4.0	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		5.0	4.0	ug/L	1
Toluene	108-88-3	8260B	12		5.0	4.0	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		10	4.2	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-001
Description: CMR-MW79D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1052
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	10	07/06/2019 2021	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.0	4.0	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.0	4.0	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.0	4.0	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.0	4.0	ug/L	1
Trichloroethene	79-01-6	8260B	ND		5.0	4.0	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		5.0	4.0	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		5.0	4.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	50		10	4.0	ug/L	1
m+p - Xylenes	179601-23-1	8260B	36		5.0	4.0	ug/L	1
o - Xylenes	95-47-6	8260B	14		5.0	4.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		96	70-130
Bromofluorobenzene		105	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-001
Description: CMR-MW79D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1052
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	25	07/06/2019 2200	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		4.0	1.0	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		4.0	1.0	ug/L	1
Anthracene	120-12-7	8270D	ND		4.0	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		4.0	1.0	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		4.0	1.0	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		4.0	1.0	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		4.0	1.0	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		4.0	1.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		20	3.8	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		100	5.3	ug/L	1
Carbazole	86-74-8	8270D	ND		20	1.0	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		20	4.3	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		20	6.5	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		20	1.5	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		20	4.0	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		20	3.8	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		20	3.8	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		20	4.0	ug/L	1
Chrysene	218-01-9	8270D	ND		4.0	1.0	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		4.0	1.0	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		20	4.0	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		20	4.3	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		20	4.5	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		20	4.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		100	20	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		20	4.8	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		100	4.8	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		100	4.5	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		20	3.8	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		100	11	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		100	22	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		100	33	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		40	9.0	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		40	8.5	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		100	12	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		100	9.5	ug/L	1
Fluoranthene	206-44-0	8270D	ND		4.0	1.0	ug/L	1
Fluorene	86-73-7	8270D	ND		4.0	1.0	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		20	3.8	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		20	4.3	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		100	28	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		20	4.3	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		4.0	1.0	ug/L	1
Isophorone	78-59-1	8270D	ND		20	5.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-001
Description: CMR-MW79D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1052
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	25	07/06/2019 2200	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	1.4	J	4.0	1.0	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		20	5.3	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		40	12	ug/L	1
Naphthalene	91-20-3	8270D	ND		4.0	1.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		40	17	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		40	3.8	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		40	33	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		20	4.3	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		40	11	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		100	52	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		20	7.0	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		20	13	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		100	34	ug/L	1
Phenanthrene	85-01-8	8270D	ND		4.0	1.0	ug/L	1
Phenol	108-95-2	8270D	51		20	4.8	ug/L	1
Pyrene	129-00-0	8270D	ND		4.0	1.0	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		20	6.3	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		20	14	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		20	9.3	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		20	4.8	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		20	5.5	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		66	37-129
2-Fluorophenol		31	24-127
Nitrobenzene-d5		59	38-127
Phenol-d5		52	28-128
Terphenyl-d14		57	10-148
2,4,6-Tribromophenol		77	35-144

LOQ = Limit of Quantitation
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DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-001
Description: CMR-MW79D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1052
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 1833	CHG	06/27/2019 1005	20903

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		56	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-001
Description: CMR-MW79D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1052
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/29/2019 0033	CHG	06/27/2019 1005	20904

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	140		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		85	40-140
2-Fluorobiphenyl (fractionation 1)		94	40-140
o - Terphenyl (aromatic)		64	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-001
Description: CMR-MW79D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1052
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/02/2019 1626	JJG		21450

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	1000		380	75	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	280	J	380	75	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		98	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-001
Description: CMR-MW79D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1052
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/02/2019 1626	JJG		21449

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	930		25	2.6	ug/L	1
C9 - C10 Aromatics		Montana VPH	180		130	25	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		25	3.1	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		25	6.0	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		25	3.5	ug/L	1
Toluene	108-88-3	Montana VPH	30		25	2.7	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	53		25	6.0	ug/L	1
o - Xylenes	95-47-6	Montana VPH	21	J	25	2.9	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		91	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF26019-001
Description: CMR-MW79D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1052
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/02/2019 1626	JJG		21447

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	2500		880	180	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		99	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-001
Description: CMR-MW79D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1052
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1227	TJW	06/26/2019 1504	20792
1	3005A	6020B	1	07/02/2019 1724	BNW	06/27/2019 0834	20900
2	3005A	6020B	1	07/05/2019 1222	LLL	06/27/2019 0834	20900

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	15		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	73		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	14		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	5.9		5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	0.43	J	1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	32		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	5.9		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	15		10	2.5	ug/L	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-002
Description: CMR-MW79S-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 0904
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	50	07/06/2019 2046	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	180	J	500	100	ug/L	1
Benzene	71-43-2	8260B	3500		25	20	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		25	20	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		25	20	ug/L	1
Bromoform	75-25-2	8260B	ND		25	20	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		25	20	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	380	J	500	100	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		25	20	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		25	20	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		25	20	ug/L	1
Chloroethane	75-00-3	8260B	ND		25	20	ug/L	1
Chloroform	67-66-3	8260B	ND		25	20	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		25	20	ug/L	1
Cyclohexane	110-82-7	8260B	340		25	20	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		25	20	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		25	20	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		25	20	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		25	20	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		25	20	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		25	20	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		25	20	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		25	20	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	26		25	20	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		25	20	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		25	20	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		25	20	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		25	20	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		25	20	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		25	5.5	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		1000	670	ug/L	1
Ethylbenzene	100-41-4	8260B	990		25	20	ug/L	1
2-Hexanone	591-78-6	8260B	ND		500	100	ug/L	1
Isopropylbenzene	98-82-8	8260B	52		25	20	ug/L	1
Methyl acetate	79-20-9	8260B	ND		50	20	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		25	20	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		500	100	ug/L	1
Methylcyclohexane	108-87-2	8260B	160	J	250	20	ug/L	1
Methylene chloride	75-09-2	8260B	ND		25	20	ug/L	1
Naphthalene	91-20-3	8260B	350		25	20	ug/L	1
Styrene	100-42-5	8260B	ND		25	21	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		25	20	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		25	20	ug/L	1
Toluene	108-88-3	8260B	960		25	20	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		50	21	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-002
Description: CMR-MW79S-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 0904
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	50	07/06/2019 2046	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		25	20	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		25	20	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		25	20	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		25	20	ug/L	1
Trichloroethene	79-01-6	8260B	ND		25	20	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		25	20	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		25	20	ug/L	1
Xylenes (total)	1330-20-7	8260B	5300		50	20	ug/L	1
m+p - Xylenes	179601-23-1	8260B	4300		25	20	ug/L	1
o - Xylenes	95-47-6	8260B	1100		25	20	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		94	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-002
Description: CMR-MW79S-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 0904
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	50	07/06/2019 2225	SCD	06/28/2019 1501	21123
2	3520C	8270D	250	07/09/2019 1409	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		8.0	2.0	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		8.0	2.0	ug/L	1
Anthracene	120-12-7	8270D	ND		8.0	2.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		8.0	2.0	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		8.0	2.0	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		8.0	2.0	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		8.0	2.0	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		8.0	2.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		40	7.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		200	11	ug/L	1
Carbazole	86-74-8	8270D	ND		40	2.0	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		40	8.5	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		40	13	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		40	3.0	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		40	8.0	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		40	7.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		40	7.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		40	8.0	ug/L	1
Chrysene	218-01-9	8270D	ND		8.0	2.0	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		8.0	2.0	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		40	8.0	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		40	8.5	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		40	9.0	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		40	8.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		200	41	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		40	9.5	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		200	9.5	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		200	9.0	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	1000		200	38	ug/L	2
Di-n-butyl phthalate	84-74-2	8270D	ND		200	21	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		200	45	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		200	66	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		80	18	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		80	17	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		200	24	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		200	19	ug/L	1
Fluoranthene	206-44-0	8270D	ND		8.0	2.0	ug/L	1
Fluorene	86-73-7	8270D	ND		8.0	2.0	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		40	7.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		40	8.5	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		200	55	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		40	8.5	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		8.0	2.0	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-002
Description: CMR-MW79S-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 0904
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	50	07/06/2019 2225	SCD	06/28/2019 1501	21123
2	3520C	8270D	250	07/09/2019 1409	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		40	11	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	83		8.0	2.0	ug/L	1
2-Methylphenol	95-48-7	8270D	610		40	11	ug/L	1
3+4-Methylphenol	106-44-5	8270D	23	J	80	23	ug/L	1
Naphthalene	91-20-3	8270D	220		8.0	2.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		80	33	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		80	7.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		80	66	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		40	8.5	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		80	22	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		200	100	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		40	14	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		40	25	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		200	67	ug/L	1
Phenanthrene	85-01-8	8270D	ND		8.0	2.0	ug/L	1
Phenol	108-95-2	8270D	24	J	40	9.5	ug/L	1
Pyrene	129-00-0	8270D	ND		8.0	2.0	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		40	13	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		40	28	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		40	19	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		40	9.5	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		40	11	ug/L	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		74	37-129		50	37-129
2-Fluorophenol		109	24-127		77	24-127
Nitrobenzene-d5		58	38-127		75	38-127
Phenol-d5		94	28-128		63	28-128
Terphenyl-d14		51	10-148		45	10-148
2,4,6-Tribromophenol		71	35-144	N	31	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-002
Description: CMR-MW79S-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 0904
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 1904	CHG	06/27/2019 1005	20903

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		47	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-002
Description: CMR-MW79S-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 0904
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/29/2019 0103	CHG	06/27/2019 1005	20904

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	790		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		98	40-140
2-Fluorobiphenyl (fractionation 1)		101	40-140
o - Terphenyl (aromatic)		61	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-002
Description: CMR-MW79S-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 0904
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	50	07/02/2019 1654	JJG		21450

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	4000		3800	750	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	1600	J	3800	750	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-002
Description: CMR-MW79S-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 0904
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	50	07/02/2019 1654	JJG		21449

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	3100		250	26	ug/L	1
C9 - C10 Aromatics		Montana VPH	3500		1300	250	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	920		250	31	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		250	60	ug/L	1
Naphthalene	91-20-3	Montana VPH	350		250	35	ug/L	1
Toluene	108-88-3	Montana VPH	870		250	27	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	4000		250	60	ug/L	1
o - Xylenes	95-47-6	Montana VPH	990		250	29	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		94	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF26019-002
Description: CMR-MW79S-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 0904
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	50	07/02/2019 1654	JJG		21447

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	22000		8800	1800	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		97	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-002
Description: CMR-MW79S-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 0904
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1229	TJW	06/26/2019 1504	20792
1	3005A	6020B	1	07/02/2019 1730	BNW	06/27/2019 0834	20900
2	3005A	6020B	1	07/05/2019 1228	LLL	06/27/2019 0834	20900

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.5	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	280		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	1300		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	1.6	J	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	4.1	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	1.7	J	5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	9.1		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	13		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	3.8	J	5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	8.7		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	8.1	J	10	2.5	ug/L	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-003
Description: CMR-MW99-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1616
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/06/2019 1632	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	8.5	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-003
Description: CMR-MW99-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1616
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/06/2019 1632	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		96	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		102	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-003
Description: CMR-MW99-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1616
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	07/07/2019 0214	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.80	0.20	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.80	0.20	ug/L	1
Anthracene	120-12-7	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.80	0.20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.80	0.20	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		4.0	0.75	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		20	1.1	ug/L	1
Carbazole	86-74-8	8270D	ND		4.0	0.20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		4.0	0.85	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		4.0	1.3	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		4.0	0.30	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		4.0	0.80	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		4.0	0.75	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		4.0	0.75	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		4.0	0.80	ug/L	1
Chrysene	218-01-9	8270D	ND		0.80	0.20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.80	0.20	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		4.0	0.80	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4.0	0.85	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4.0	0.90	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4.0	0.80	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		20	4.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		4.0	0.95	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		20	0.95	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		20	0.90	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		4.0	0.75	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		20	2.1	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		20	4.5	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		20	6.6	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		8.0	1.8	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		8.0	1.7	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		20	2.4	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		20	1.9	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.80	0.20	ug/L	1
Fluorene	86-73-7	8270D	ND		0.80	0.20	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		4.0	0.75	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		4.0	0.85	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		20	5.5	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		4.0	0.85	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.80	0.20	ug/L	1
Isophorone	78-59-1	8270D	ND		4.0	1.1	ug/L	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-003
Description: CMR-MW99-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1616
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	07/07/2019 0214	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	0.26	J	0.80	0.20	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		4.0	1.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		8.0	2.3	ug/L	1
Naphthalene	91-20-3	8270D	0.22	J	0.80	0.20	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		8.0	3.3	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		8.0	0.75	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		8.0	6.6	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		4.0	0.85	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		8.0	2.2	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		20	10	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		4.0	1.4	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		4.0	2.5	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		20	6.7	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.80	0.20	ug/L	1
Phenol	108-95-2	8270D	ND		4.0	0.95	ug/L	1
Pyrene	129-00-0	8270D	ND		0.80	0.20	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		4.0	1.3	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4.0	2.8	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4.0	1.9	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		4.0	0.95	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		4.0	1.1	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		40	37-129
2-Fluorophenol	N	19	24-127
Nitrobenzene-d5	N	36	38-127
Phenol-d5	N	25	28-128
Terphenyl-d14		44	10-148
2,4,6-Tribromophenol		61	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-003
Description: CMR-MW99-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1616
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 1934	CHG	06/27/2019 1005	20903

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		60	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-003
Description: CMR-MW99-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1616
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/29/2019 0132	CHG	06/27/2019 1005	20904

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		75	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		68	40-140

LOQ = Limit of Quantitation
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W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-003
Description: CMR-MW99-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1616
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1722	JJG		21450

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		104	70-130

LOQ = Limit of Quantitation
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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26019-003
Description: CMR-MW99-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1616
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1722	JJG		21449

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	8.0	J	25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		105	70-130

LOQ = Limit of Quantitation
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF26019-003
Description: CMR-MW99-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1616
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1722	JJG		21447

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		105	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-003
Description: CMR-MW99-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1616
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1232	TJW	06/26/2019 1504	20792
1	3005A	6020B	1	07/02/2019 1736	BNW	06/27/2019 0834	20900
2	3005A	6020B	1	07/05/2019 1257	LLL	06/27/2019 0834	20900

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	90		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	120		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	ND		5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	7.5		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	8.5	J	10	2.5	ug/L	2

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-004
Description: TB-26-20190625
Matrix: Aqueous
Date Sampled: 06/25/2019
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/06/2019 1427	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	6.0	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26019-004
Description: TB-26-20190625
Matrix: Aqueous
Date Sampled: 06/25/2019
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/06/2019 1427	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21720-001
Batch: 21720
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/06/2019 1352
Benzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Bromoform	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/06/2019 1352
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/06/2019 1352
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Chloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Chloroform	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Cyclohexane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/06/2019 1352
1,4-Dioxane	ND		1	20	13	ug/L	07/06/2019 1352
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
2-Hexanone	ND		1	10	2.0	ug/L	07/06/2019 1352
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Methyl acetate	ND		1	1.0	0.40	ug/L	07/06/2019 1352
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/06/2019 1352
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/06/2019 1352
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/06/2019 1352
Methylene chloride	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Naphthalene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Styrene	ND		1	0.50	0.41	ug/L	07/06/2019 1352
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Toluene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/06/2019 1352

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21720-001
Batch: 21720
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Trichloroethene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/06/2019 1352
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/06/2019 1352
o - Xylenes	ND		1	0.50	0.40	ug/L	07/06/2019 1352

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		94	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21720-002
Batch: 21720
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	160	N	1	156	60-140	07/06/2019 1239
Benzene	50	49		1	98	70-130	07/06/2019 1239
Bromochloromethane	50	45		1	90	70-130	07/06/2019 1239
Bromodichloromethane	50	48		1	96	70-130	07/06/2019 1239
Bromoform	50	50		1	100	70-130	07/06/2019 1239
Bromomethane (Methyl bromide)	50	43		1	87	70-130	07/06/2019 1239
2-Butanone (MEK)	100	120		1	121	70-130	07/06/2019 1239
Carbon disulfide	50	50		1	100	70-130	07/06/2019 1239
Carbon tetrachloride	50	43		1	86	70-130	07/06/2019 1239
Chlorobenzene	50	49		1	99	70-130	07/06/2019 1239
Chloroethane	50	48		1	96	70-130	07/06/2019 1239
Chloroform	50	45		1	89	70-130	07/06/2019 1239
Chloromethane (Methyl chloride)	50	44		1	88	60-140	07/06/2019 1239
Cyclohexane	50	42		1	84	70-130	07/06/2019 1239
1,2-Dibromo-3-chloropropane (DBCP)	50	51		1	102	70-130	07/06/2019 1239
Dibromochloromethane	50	49		1	97	70-130	07/06/2019 1239
1,2-Dibromoethane (EDB)	50	50		1	100	70-130	07/06/2019 1239
1,2-Dichlorobenzene	50	50		1	100	70-130	07/06/2019 1239
1,3-Dichlorobenzene	50	49		1	99	70-130	07/06/2019 1239
1,4-Dichlorobenzene	50	50		1	99	70-130	07/06/2019 1239
Dichlorodifluoromethane	50	43		1	87	60-140	07/06/2019 1239
1,1-Dichloroethane	50	48		1	95	70-130	07/06/2019 1239
1,2-Dichloroethane	50	47		1	94	70-130	07/06/2019 1239
1,1-Dichloroethene	50	45		1	90	70-130	07/06/2019 1239
cis-1,2-Dichloroethene	50	45		1	91	70-130	07/06/2019 1239
trans-1,2-Dichloroethene	50	46		1	92	70-130	07/06/2019 1239
1,2-Dichloropropane	50	49		1	98	70-130	07/06/2019 1239
cis-1,3-Dichloropropene	50	50		1	101	70-130	07/06/2019 1239
trans-1,3-Dichloropropene	50	49		1	99	70-130	07/06/2019 1239
1,4-Dioxane	500	390		1	78	60-140	07/06/2019 1239
Ethylbenzene	50	50		1	101	70-130	07/06/2019 1239
2-Hexanone	100	110		1	109	70-130	07/06/2019 1239
Isopropylbenzene	50	51		1	103	70-130	07/06/2019 1239
Methyl acetate	50	37		1	73	70-130	07/06/2019 1239
Methyl tertiary butyl ether (MTBE)	50	50		1	99	70-130	07/06/2019 1239
4-Methyl-2-pentanone	100	96		1	96	70-130	07/06/2019 1239
Methylcyclohexane	50	51		1	101	70-130	07/06/2019 1239
Methylene chloride	50	45		1	90	70-130	07/06/2019 1239
Naphthalene	50	50		1	99	70-130	07/06/2019 1239
Styrene	50	51		1	102	70-130	07/06/2019 1239
1,1,2,2-Tetrachloroethane	50	49		1	98	70-130	07/06/2019 1239
Tetrachloroethene	50	51		1	101	70-130	07/06/2019 1239
Toluene	50	49		1	97	70-130	07/06/2019 1239
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	50		1	100	70-130	07/06/2019 1239

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21720-002
Batch: 21720
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	49		1	98	70-130	07/06/2019 1239
1,2,4-Trichlorobenzene	50	50		1	100	70-130	07/06/2019 1239
1,1,1-Trichloroethane	50	45		1	90	70-130	07/06/2019 1239
1,1,2-Trichloroethane	50	49		1	97	70-130	07/06/2019 1239
Trichloroethene	50	48		1	97	70-130	07/06/2019 1239
Trichlorofluoromethane	50	44		1	89	70-130	07/06/2019 1239
Vinyl chloride	50	40		1	81	70-130	07/06/2019 1239
Xylenes (total)	100	99		1	99	70-130	07/06/2019 1239
m+p - Xylenes	50	49		1	98	70-130	07/06/2019 1239
o - Xylenes	50	51		1	101	70-130	07/06/2019 1239

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		99	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21123-001
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Acenaphthylene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	07/05/2019 1135
Carbazole	ND		1	0.80	0.040	ug/L	07/05/2019 1135
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	07/05/2019 1135
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	07/05/2019 1135
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	07/05/2019 1135
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	07/05/2019 1135
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	07/05/2019 1135
2-Chlorophenol	ND		1	0.80	0.15	ug/L	07/05/2019 1135
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	07/05/2019 1135
Chrysene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Dibenzofuran	ND		1	0.80	0.16	ug/L	07/05/2019 1135
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	07/05/2019 1135
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	07/05/2019 1135
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	07/05/2019 1135
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
Diethylphthalate	ND		1	4.0	0.19	ug/L	07/05/2019 1135
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	07/05/2019 1135
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	07/05/2019 1135
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	07/05/2019 1135
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	07/05/2019 1135
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	07/05/2019 1135
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	07/05/2019 1135
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	07/05/2019 1135
bis(2-Ethylhexyl)phthalate	0.62	J	1	4.0	0.38	ug/L	07/05/2019 1135
Fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Fluorene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	07/05/2019 1135
Hexachloroethane	ND		1	0.80	0.17	ug/L	07/05/2019 1135
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Isophorone	ND		1	0.80	0.22	ug/L	07/05/2019 1135

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21123-001
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
2-Methylphenol	ND		1	0.80	0.21	ug/L	07/05/2019 1135
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	07/05/2019 1135
Naphthalene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
2-Nitroaniline	ND		1	1.6	0.66	ug/L	07/05/2019 1135
3-Nitroaniline	ND		1	1.6	0.15	ug/L	07/05/2019 1135
4-Nitroaniline	ND		1	1.6	1.3	ug/L	07/05/2019 1135
Nitrobenzene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
2-Nitrophenol	ND		1	1.6	0.44	ug/L	07/05/2019 1135
4-Nitrophenol	ND		1	4.0	2.1	ug/L	07/05/2019 1135
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	07/05/2019 1135
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	07/05/2019 1135
Pentachlorophenol	ND		1	4.0	1.3	ug/L	07/05/2019 1135
Phenanthrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Phenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
Pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	07/05/2019 1135
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	07/05/2019 1135
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	07/05/2019 1135
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	07/05/2019 1135

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		64	37-129
2-Fluorophenol		44	24-127
Nitrobenzene-d5		68	38-127
Phenol-d5		40	28-128
Terphenyl-d14		95	10-148
2,4,6-Tribromophenol		56	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21123-002
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.7		1	59	30-122	07/06/2019 2045
Acenaphthylene	8.0	5.1		1	63	30-130	07/06/2019 2045
Anthracene	8.0	5.6		1	70	30-123	07/06/2019 2045
Benzo(a)anthracene	8.0	5.9		1	74	40-125	07/06/2019 2045
Benzo(a)pyrene	8.0	5.9		1	74	40-128	07/06/2019 2045
Benzo(b)fluoranthene	8.0	6.8		1	85	30-130	07/06/2019 2045
Benzo(g,h,i)perylene	8.0	6.0		1	75	30-130	07/06/2019 2045
Benzo(k)fluoranthene	8.0	6.0		1	76	30-130	07/06/2019 2045
4-Bromophenyl phenyl ether	8.0	5.3		1	67	30-124	07/06/2019 2045
Butyl benzyl phthalate	8.0	6.3		1	79	54-135	07/06/2019 2045
Carbazole	8.0	5.8		1	72	45-101	07/06/2019 2045
bis (2-Chloro-1-methylethyl) ether	8.0	6.2		1	77	42-124	07/06/2019 2045
4-Chloro-3-methyl phenol	8.0	4.7		1	58	30-123	07/06/2019 2045
bis(2-Chloroethoxy)methane	8.0	4.8		1	60	44-127	07/06/2019 2045
bis(2-Chloroethyl)ether	8.0	5.6		1	70	46-120	07/06/2019 2045
2-Chloronaphthalene	8.0	4.8		1	60	46-100	07/06/2019 2045
2-Chlorophenol	8.0	4.2		1	52	50-117	07/06/2019 2045
4-Chlorophenyl phenyl ether	8.0	4.9		1	61	30-121	07/06/2019 2045
Chrysene	8.0	6.2		1	78	30-130	07/06/2019 2045
Dibenzo(a,h)anthracene	8.0	6.3		1	78	30-130	07/06/2019 2045
Dibenzofuran	8.0	4.8		1	61	30-118	07/06/2019 2045
1,2-Dichlorobenzene	8.0	4.3		1	53	32-111	07/06/2019 2045
1,3-Dichlorobenzene	8.0	4.2		1	52	28-110	07/06/2019 2045
1,4-Dichlorobenzene	8.0	4.3		1	53	29-112	07/06/2019 2045
3,3'-Dichlorobenzidine	8.0	4.1		1	52	10-126	07/06/2019 2045
2,4-Dichlorophenol	8.0	4.5		1	56	30-121	07/06/2019 2045
Diethylphthalate	8.0	5.7		1	72	40-125	07/06/2019 2045
Dimethyl phthalate	8.0	5.6		1	71	40-127	07/06/2019 2045
2,4-Dimethylphenol	8.0	5.9		1	74	20-125	07/06/2019 2045
Di-n-butyl phthalate	8.0	6.1		1	76	40-127	07/06/2019 2045
4,6-Dinitro-2-methylphenol	8.0	6.3		1	78	56-128	07/06/2019 2045
2,4-Dinitrophenol	16	8.9		1	56	11-126	07/06/2019 2045
2,4-Dinitrotoluene	8.0	5.7		1	71	59-127	07/06/2019 2045
2,6-Dinitrotoluene	8.0	5.4		1	67	59-126	07/06/2019 2045
Di-n-octylphthalate	8.0	4.2		1	53	50-136	07/06/2019 2045
bis(2-Ethylhexyl)phthalate	8.0	5.4		1	67	56-128	07/06/2019 2045
Fluoranthene	8.0	5.6		1	71	40-128	07/06/2019 2045
Fluorene	8.0	5.0		1	62	30-124	07/06/2019 2045
Hexachlorobenzene	8.0	5.6		1	70	30-125	07/06/2019 2045
Hexachlorobutadiene	8.0	4.1		1	51	24-110	07/06/2019 2045
Hexachlorocyclopentadiene	40	17		1	42	16-96	07/06/2019 2045
Hexachloroethane	8.0	4.0		1	51	31-110	07/06/2019 2045
Indeno(1,2,3-c,d)pyrene	8.0	5.8		1	72	30-130	07/06/2019 2045
Isophorone	8.0	5.3		1	66	57-123	07/06/2019 2045

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21123-002
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.6		1	58	40-132	07/06/2019 2045
2-Methylphenol	8.0	6.2		1	78	56-119	07/06/2019 2045
3+4-Methylphenol	8.0	5.8		1	73	53-119	07/06/2019 2045
Naphthalene	8.0	4.6		1	58	30-130	07/06/2019 2045
2-Nitroaniline	8.0	5.9		1	73	60-124	07/06/2019 2045
3-Nitroaniline	8.0	5.8		1	72	43-123	07/06/2019 2045
4-Nitroaniline	8.0	6.0		1	76	30-135	07/06/2019 2045
Nitrobenzene	8.0	5.0		1	63	51-122	07/06/2019 2045
2-Nitrophenol	8.0	5.4		1	68	51-118	07/06/2019 2045
4-Nitrophenol	16	10		1	65	53-130	07/06/2019 2045
N-Nitrosodi-n-propylamine	8.0	5.9		1	73	54-127	07/06/2019 2045
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.6		1	69	30-123	07/06/2019 2045
Pentachlorophenol	16	11		1	67	42-131	07/06/2019 2045
Phenanthrene	8.0	5.3		1	66	40-123	07/06/2019 2045
Phenol	8.0	3.8	N	1	47	49-117	07/06/2019 2045
Pyrene	8.0	6.2		1	77	40-126	07/06/2019 2045
1,2,4,5-Tetrachlorobenzene	8.0	4.4		1	55	30-130	07/06/2019 2045
2,3,4,6-Tetrachlorophenol	8.0	5.3		1	66	30-130	07/06/2019 2045
1,2,4-Trichlorobenzene	8.0	4.4		1	55	20-90	07/06/2019 2045
2,4,5-Trichlorophenol	8.0	4.8		1	60	30-123	07/06/2019 2045
2,4,6-Trichlorophenol	8.0	5.1		1	64	30-125	07/06/2019 2045

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		62	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		65	38-127
Phenol-d5		48	28-128
Terphenyl-d14		90	10-148
2,4,6-Tribromophenol		81	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20903-001
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	06/28/2019 1501
C9 - C18 Aliphatics	ND		1	100	100	ug/L	06/28/2019 1501

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20903-002
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	300		1	75	40-140	06/28/2019 1531
C9 - C18 Aliphatics	300	160		1	52	40-140	06/28/2019 1531

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		67	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20903-003
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	320		1	80	6.8	40-140	25	06/28/2019 1601
C9 - C18 Aliphatics	300	160		1	55	5.0	40-140	25	06/28/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		73	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20904-001
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	06/28/2019 2105

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		97	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		81	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20904-002
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	560		1	66	40-140	06/28/2019 2135

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		91	40-140
o - Terphenyl (aromatic)		72	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20904-003
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	620		1	73	9.8	40-140	25	06/28/2019 2205

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		64	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		79	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21447-001
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21447-002
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	400		1	108	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21447-003
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	400		1	106	2.0	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21449-001
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	07/02/2019 1208
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	07/02/2019 1208
Ethylbenzene	ND		1	5.0	0.62	ug/L	07/02/2019 1208
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	07/02/2019 1208
Naphthalene	ND		1	5.0	0.70	ug/L	07/02/2019 1208
Toluene	ND		1	5.0	0.53	ug/L	07/02/2019 1208
m+p - Xylenes	ND		1	5.0	1.2	ug/L	07/02/2019 1208
o - Xylenes	ND		1	5.0	0.58	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21449-002
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	26		1	103	70-130	07/02/2019 1112
C9 - C10 Aromatics	25	27		1	106	70-130	07/02/2019 1112
Ethylbenzene	25	26		1	103	70-130	07/02/2019 1112
Methyl tertiary butyl ether (MTBE)	25	24		1	96	70-130	07/02/2019 1112
Naphthalene	25	24		1	95	70-130	07/02/2019 1112
Toluene	25	25		1	101	70-130	07/02/2019 1112
m+p - Xylenes	50	52		1	104	70-130	07/02/2019 1112
o - Xylenes	25	25		1	101	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aromatics) - LCSD

Sample ID: UQ21449-003
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	26		1	102	0.78	70-130	25	07/02/2019 1140
C9 - C10 Aromatics	25	25		1	99	6.6	70-130	25	07/02/2019 1140
Ethylbenzene	25	25		1	101	2.0	70-130	25	07/02/2019 1140
Methyl tertiary butyl ether (MTBE)	25	25		1	101	5.7	70-130	25	07/02/2019 1140
Naphthalene	25	23		1	93	2.1	70-130	25	07/02/2019 1140
Toluene	25	25		1	100	1.6	70-130	25	07/02/2019 1140
m+p - Xylenes	50	50		1	101	3.1	70-130	25	07/02/2019 1140
o - Xylenes	25	25		1	99	2.0	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21450-001
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/02/2019 1208
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21450-002
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	112	70-130	07/02/2019 1112
C9 - C12 Aliphatics, Adjusted	75	79		1	105	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21450-003
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	110	1.8	70-130	25	07/02/2019 1140
C9 - C12 Aliphatics, Adjusted	75	77		1	103	1.7	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - MB

Sample ID: UQ20900-001
Batch: 20900
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/27/2019 834

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	07/02/2019 1543
Arsenic	ND		1	2.0	1.3	ug/L	07/02/2019 1543
Barium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Beryllium	ND		1	0.40	0.15	ug/L	07/02/2019 1543
Cadmium	ND		1	0.50	0.13	ug/L	07/02/2019 1543
Chromium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Cobalt	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Copper	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Lead	ND		1	1.0	0.25	ug/L	07/02/2019 1543
Nickel	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Selenium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Silver	ND		1	1.0	0.25	ug/L	07/02/2019 1543
Vanadium	ND		1	5.0	2.5	ug/L	07/02/2019 1543
Zinc	ND		1	10	2.5	ug/L	07/02/2019 1543

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - LCS

Sample ID: UQ20900-002
Batch: 20900
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/27/2019 834

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	96		1	96	80-120	07/02/2019 1549
Arsenic	100	100		1	103	80-120	07/02/2019 1549
Barium	100	98		1	98	80-120	07/02/2019 1549
Beryllium	100	99		1	99	80-120	07/02/2019 1549
Cadmium	100	96		1	96	80-120	07/02/2019 1549
Chromium	100	100		1	101	80-120	07/02/2019 1549
Cobalt	100	100		1	102	80-120	07/02/2019 1549
Copper	100	98		1	98	80-120	07/02/2019 1549
Lead	100	100		1	100	80-120	07/02/2019 1549
Nickel	100	100		1	101	80-120	07/02/2019 1549
Selenium	100	98		1	98	80-120	07/02/2019 1549
Silver	100	100		1	102	80-120	07/02/2019 1549
Vanadium	100	100		1	100	80-120	07/02/2019 1549
Zinc	100	96		1	96	80-120	07/02/2019 1549

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20792-001
Batch: 20792
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1504

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/27/2019 1217

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20792-002
Batch: 20792
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1504

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	94	80-120	06/27/2019 1219

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - MS

Sample ID: UF26019-003MS
Batch: 20792
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1504

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	ND	0.0020	0.0019		1	96	85-115	06/27/2019 1234

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF26019-003MD
Batch: 20792
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1504

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Mercury	ND	0.0020	0.0019		1	93	2.4	85-115	20	06/27/2019 1237

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Chain of Custody
and
Miscellaneous Documents

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106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

Chain of Custody Record

Number 90161

Client: Rambell	Report to Contact: Michael Wilson/Daniel Price	Telephone No. / E-mail: dprice@rambell.com mwilson@rambell.com	Quote No.
Address: 7800 College Blvd #H905	Sampler's Signature: x	Analysis (Attach list if more space is needed)	Page 1 of 1
City: Overland Park / State: KS / Zip Code: 66210	Printed Name: Elizabeth Boucki		
Project Name: CMR-RIAIM - West Rail			
Project No.: 169012344-003	P.O. No.		

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Grab / Composite	Matrix: Aqueous	Matrix: Soil	Matrix: Non-Aqueous	No. of Containers by Preservative Type: Unpres.	HNO3	H2SO4	HCl	NaOH	ZnAc/ NaOH	VOCs	SVOCs	EPHs	VPH	Metals	Remarks / Cooler I.D.
CMR-MW7D-190625	6-25-2019	10:52		X			2		1	7			X	X	X	X	X	Cooler 002
CMR-MW7S-190625	6-25-2019	09:04		X			2		1	7			X	X	X	X	X	Cooler 002
CMR-MW9 - 190625	6-25-2019	16:16		X			2		1	7			X	X	X	X	X	Cooler 002

6-25-2019

UF26019

KMN2

Turn Around Time Required (Prior lab approval required for expedited TAT.): ☐ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by	6-25-2019	17:45	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: Fed Ex	6-26-19	1020	4. Laboratory received by: L Hite	6-26-19	1028

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice: (Circle) (Yes) No Ice Pack
Receipt Temp: 3.1 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-139 Effective Date: 08-01-2014

SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/7/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 06-26-2019 Lot #: UF26019

LCH 6-26-19

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: ____

☑ Yes	☒ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☒ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: LKH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

3.1 / 3.1 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 5 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☑ Yes	☐ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote #

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA ____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) 004(2) ____ were received with bubbles >6 mm in diameter.

Samples(s) NA ____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: LKH Date: 06-26-2019

Comments: WE RECEIVED TWO 40ML HCL VIALS FOR "TRIP BLANK" THAT WAS NOT LISTED ON THE COC.

MEMO

Date: **July 23, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF26025, 4 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF26025 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB14-5.0-6.0-190625	UF26025-001
CMR-WB14-20.0-21.0-190625	UF26025-002
CMR-WB14-20.0-21.0-190625-DUP	UF26025-003
CMR-WB15-4.0-5.0-190625	UF26025-004
TB-27-20190625	UF26025-005

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

MS/MSD Recoveries
For the VOC and SVOC analysis suites MS/MSD results were reported. Recoveries were largely within criteria with the exception of beryllium and antimony. These out of criteria recoveries indicate a possible bias to results. Therefore, all beryllium and antimony results were flagged as estimated (J, UJ).

For the SVOC analysis suite MS/MSD results were reported to be almost universally out of criteria with extremely low recoveries. However, this is largely due to non-detected analytes. The MS/MSD sample was spike at a normal level but due to high native concentrations/ matrix issues, the sample was run at a high dilution. Therefore the spiked amount was at or below the reporting limit. Due to this, the low recoveries do not represent a systematic matrix issue. No validation action warranted.

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of acetone and bromomethane. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all acetone and bromomethane results have been validated as estimated.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF26025

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	MS/MSD recoveries out for multiple metals likely due to high native sample concentrations. Beryllium and antimony recoveries out with acceptable spikes. All beryllium and antimony results validated as estimated (J, UJ).
Laboratory Control Sample	No issues
Duplicate Samples	One FD submitted with samples. Acceptable agreement, no action taken.
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All beryllium and antimony results validated as estimated (J, UJ).

SDG No. UF26025

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	No issues	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to sample dilution, no action taken.	No issues
Matrix Spike/Matrix Spike Duplicate	VOC MS/MSD recoveries out of criteria high for multiple analytes with no detections. Low recoveries for some non-COC analytes. No action taken. SVOC MS/MSD out of criteria for vast majority of analytes, likely due to dilution. No action taken.	MS/MSD recoveries out of criteria likely due to high native sample concentrations, no action taken.
Laboratory Control Sample	LCS out of high for acetone. Acetone detected results validated as estimated (J). LCS out high for MEK with no detections, no action taken. LCS out low for bromomethane. All bromomethane results validated as estimated (J, UJ).	No issues
Field Duplicates	One FD submitted with samples. Results show acceptable agreement, no action taken.	One FD submitted with samples. Results show acceptable agreement, no action taken.
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/A
Other Non-conformances	CCV out of criteria high for acetone. See above.	No other non-conformances noted.

SDG No. UF26025

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Overall Assessment of Data	All bromomethane results validated as estimated (J, UJ). Acetone detected results validated as estimated (J).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM - West Rail

Project Number: 1690012344-003

Lot Number:**UF26025**

Date Completed:07/11/2019

07/12/2019 12:53 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF26025

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21574 had bromomethane recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

The LCS associated with batch 21776 had acetone and 2-butanone (MEK) recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections for these compounds in the samples associated with this batch; therefore, data quality is not impacted.

The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -004 had multiple compounds recovered outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit. The MS associated with sample -003 had multiple compounds recovered outside of the acceptance limits The LCS were recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

The /continuing calibration verification (CCV) associated with sample -005 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections for this compound in the associated samples; therefore, data quality is not impacted.

Sample -004 was analyzed high level due to the sample matrix. The reporting limits have been raised accordingly.

Semivolatiles
The MS/MSD associated with sample -004 had multiple compounds and surrogates recovered outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit. No corrective

action was required, as dilutions greater than 5X reduce the concentration of the MS spikes to a level that impacts recovery accuracy. The sample results are reported and no corrective action is required.

Sample -004 was diluted 100X due to the sample matrix. The reporting limits have been raised accordingly. The associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana EPH
The MS/MSD associated with sample -004 had C19-C36 Aliphatics and C9-C18 Aliphatics recovered outside of the acceptance limits. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

The MSD associated with sample -004 had surrogates recovered outside of the acceptance limits. The sample, MS, and LCS had all surrogates recovered within the acceptance limits; therefore, the sample results are reported.

Montana VPH
Sample -004 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene and MTBE, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

The MS/MSD associated with sample -004 had multiple compounds and surrogates recovered outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit.The LCS were recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

The RPD for acetone in the duplicate associated with sample -002 exceeded the acceptance limit. The associated sample results were reported.

Sample -004 had surrogates recovered outside of the acceptance limits due to confirmed matrix interference.

Metals
The MS/MSD associated with sample -004 had multiple metals recovered outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit.The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample Summary
Ramboll US Corporation
Lot Number: UF26025

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB14-5.0-6.0-190625	Solid	06/25/2019 1120	06/26/2019
002	CMR-WB14-20.0-21.0-190625	Solid	06/25/2019 1125	06/26/2019
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	06/25/2019 1130	06/26/2019
004	CMR-WB15-4.0-5.0-190625	Solid	06/25/2019 1300	06/26/2019
005	TB-27-20190625	Aqueous	06/25/2019	06/26/2019

(5 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF26025

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB14-5.0-6.0-190625	Solid	Acetone	8260B	36		ug/kg	6
001	CMR-WB14-5.0-6.0-190625	Solid	C9 - C12 Aliphatics,	Montana VPH	0.83	J	mg/kg	12
001	CMR-WB14-5.0-6.0-190625	Solid	TPH	Montana VPH	2.4	J	mg/kg	14
001	CMR-WB14-5.0-6.0-190625	Solid	Antimony	6020B	0.32	J	mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Arsenic	6020B	2.3		mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Barium	6020B	530		mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Beryllium	6020B	0.095	J	mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Cadmium	6020B	0.11	J	mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Chromium	6020B	28		mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Cobalt	6020B	9.2		mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Copper	6020B	20		mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Lead	6020B	7.4		mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Nickel	6020B	25		mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Vanadium	6020B	60		mg/kg	15
001	CMR-WB14-5.0-6.0-190625	Solid	Zinc	6020B	71		mg/kg	15
002	CMR-WB14-20.0-21.0-190625	Solid	Acetone	8260B	94		ug/kg	16
002	CMR-WB14-20.0-21.0-190625	Solid	Benzo(b)fluoranthene	8270D	5.1		ug/kg	18
002	CMR-WB14-20.0-21.0-190625	Solid	Benzo(g,h,i)perylene	8270D	2.7	J	ug/kg	18
002	CMR-WB14-20.0-21.0-190625	Solid	Antimony	6020B	0.34	J	mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Arsenic	6020B	3.4		mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Barium	6020B	150		mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Beryllium	6020B	0.070	J	mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Cadmium	6020B	0.56		mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Chromium	6020B	27		mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Cobalt	6020B	6.2		mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Copper	6020B	47		mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Lead	6020B	9.7		mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Mercury	7471B	0.027	J	mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Nickel	6020B	28		mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Silver	6020B	0.12	J	mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Vanadium	6020B	59		mg/kg	25
002	CMR-WB14-20.0-21.0-190625	Solid	Zinc	6020B	74		mg/kg	25
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Acetone	8260B	96		ug/kg	26
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Benzo(b)fluoranthene	8270D	5.4		ug/kg	28
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Benzo(g,h,i)perylene	8270D	3.4		ug/kg	28
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Fluoranthene	8270D	0.73	J	ug/kg	28
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Naphthalene	8270D	1.0	J	ug/kg	29
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Antimony	6020B	0.30	J	mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Arsenic	6020B	2.9		mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Barium	6020B	200		mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Beryllium	6020B	0.073	J	mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Cadmium	6020B	0.36		mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Chromium	6020B	28		mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Cobalt	6020B	5.7		mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Copper	6020B	52		mg/kg	35

Detection Summary (Continued)

Lot Number: UF26025

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Lead	6020B	9.3		mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Mercury	7471B	0.044	J	mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Nickel	6020B	27		mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Silver	6020B	0.13	J	mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Vanadium	6020B	61		mg/kg	35
003	CMR-WB14-20.0-21.0-190625-DUP	Solid	Zinc	6020B	68		mg/kg	35
004	CMR-WB15-4.0-5.0-190625	Solid	Methylcyclohexane	8260B	180	J	ug/kg	36
004	CMR-WB15-4.0-5.0-190625	Solid	o - Xylenes	8260B	190	J	ug/kg	37
004	CMR-WB15-4.0-5.0-190625	Solid	C19 - C36 Aliphatics	Montana EPH	260		mg/kg	40
004	CMR-WB15-4.0-5.0-190625	Solid	C9 - C18 Aliphatics	Montana EPH	880		mg/kg	40
004	CMR-WB15-4.0-5.0-190625	Solid	C11 - C22 Aromatics	Montana EPH	200		mg/kg	41
004	CMR-WB15-4.0-5.0-190625	Solid	C5 - C8 Aliphatics,	Montana VPH	34		mg/kg	42
004	CMR-WB15-4.0-5.0-190625	Solid	C9 - C12 Aliphatics,	Montana VPH	220		mg/kg	42
004	CMR-WB15-4.0-5.0-190625	Solid	C9 - C10 Aromatics	Montana VPH	140		mg/kg	43
004	CMR-WB15-4.0-5.0-190625	Solid	Ethylbenzene	Montana VPH	3.0		mg/kg	43
004	CMR-WB15-4.0-5.0-190625	Solid	Naphthalene	Montana VPH	4.2		mg/kg	43
004	CMR-WB15-4.0-5.0-190625	Solid	m+p - Xylenes	Montana VPH	0.46		mg/kg	43
004	CMR-WB15-4.0-5.0-190625	Solid	o - Xylenes	Montana VPH	1.4		mg/kg	43
004	CMR-WB15-4.0-5.0-190625	Solid	TPH	Montana VPH	440		mg/kg	44
004	CMR-WB15-4.0-5.0-190625	Solid	Antimony	6020B	0.27	J	mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Arsenic	6020B	3.0		mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Barium	6020B	130		mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Beryllium	6020B	0.097	J	mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Cadmium	6020B	0.12	J	mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Chromium	6020B	35		mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Cobalt	6020B	6.2		mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Copper	6020B	16		mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Lead	6020B	9.5		mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Nickel	6020B	21		mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Silver	6020B	0.070	J	mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Vanadium	6020B	57		mg/kg	45
004	CMR-WB15-4.0-5.0-190625	Solid	Zinc	6020B	68		mg/kg	45

(77 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-001
Description: CMR-WB14-5.0-6.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1120
% Solids: 94.1 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/05/2019 1240	JM1		21696	5.68

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	36		19	7.5	ug/kg	1
Benzene	71-43-2	8260B	ND		4.7	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.7	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.7	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.7	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.7	2.8	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.7	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.7	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.7	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.7	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.7	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.7	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.7	2.8	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.7	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.7	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.7	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.7	2.8	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.7	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.7	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.7	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.7	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.7	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		230	23	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.7	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.4	3.7	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.7	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.7	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.7	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.4	3.7	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.7	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.7	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.7	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.7	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.7	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.7	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.7	1.9	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-001
Description: CMR-WB14-5.0-6.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1120
% Solids: 94.1 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/05/2019 1240	JM1		21696	5.68

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.7	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.7	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.7	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.7	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.7	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.7	2.8	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.4	3.7	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.7	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.7	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		107	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-001
Description: CMR-WB14-5.0-6.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1120
% Solids: 94.1 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/05/2019 1922	SCD	06/30/2019 0956	21213

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		2.8	0.87	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		2.8	1.0	ug/kg	1
Anthracene	120-12-7	8270D	ND		2.8	0.53	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		2.8	0.62	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		2.8	0.69	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		2.8	0.52	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		2.8	0.68	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		2.8	0.50	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		14	5.2	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		14	5.2	ug/kg	1
Carbazole	86-74-8	8270D	ND		14	5.2	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		14	5.2	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		14	5.2	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		14	5.2	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		14	5.2	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		14	5.2	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		14	5.2	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		14	5.2	ug/kg	1
Chrysene	218-01-9	8270D	ND		2.8	0.47	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		2.8	0.53	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		14	5.2	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		70	26	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		70	26	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		70	26	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		14	5.2	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		14	5.2	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		14	5.2	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		14	7.8	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		14	5.2	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		14	5.2	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		70	26	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		70	26	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		28	10	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		28	10	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		14	5.2	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		70	26	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		2.8	0.44	ug/kg	1
Fluorene	86-73-7	8270D	ND		2.8	0.60	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		14	5.2	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		14	5.2	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		70	26	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		14	5.2	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		2.8	1.0	ug/kg	1
Isophorone	78-59-1	8270D	ND		14	5.2	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-001
Description: CMR-WB14-5.0-6.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1120
% Solids: 94.1 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/05/2019 1922	SCD	06/30/2019 0956	21213

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		2.8	1.0	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		14	5.2	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		28	10	ug/kg	1
Naphthalene	91-20-3	8270D	ND		2.8	1.0	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		28	10	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		28	10	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		28	10	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		14	5.2	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		28	10	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		70	26	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		14	5.2	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		14	5.2	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		70	26	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		2.8	0.76	ug/kg	1
Phenol	108-95-2	8270D	ND		14	5.2	ug/kg	1
Pyrene	129-00-0	8270D	ND		2.8	0.52	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		35	10	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		70	10	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		70	26	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		14	5.2	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		14	5.2	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		76	33-102
2-Fluorophenol		68	35-115
Nitrobenzene-d5		70	22-109
Phenol-d5		64	33-122
Terphenyl-d14		71	41-120
2,4,6-Tribromophenol		88	30-117

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-001
Description: CMR-WB14-5.0-6.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1120
% Solids: 94.1 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0314	CHG	06/27/2019 1715	21005

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		10	10	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		84	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-001
Description: CMR-WB14-5.0-6.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1120
% Solids: 94.1 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0940	CHG	06/27/2019 1715	21007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		128	40-140
2-Fluorobiphenyl (fractionation 1)		128	40-140
o - Terphenyl (aromatic)		94	40-140

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-001
Description: CMR-WB14-5.0-6.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1120
% Solids: 94.1 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1745	JJG		21743

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.1	0.83	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	0.83	J	4.1	0.83	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-001
Description: CMR-WB14-5.0-6.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1120
% Solids: 94.1 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1745	JJG		21742

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.28	0.038	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.4	0.55	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.28	0.034	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.28	0.060	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.28	0.14	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.28	0.044	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.28	0.062	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.28	0.031	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF26025-001
Description: CMR-WB14-5.0-6.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1120
% Solids: 94.1 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1745	JJG		21740

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	2.4	J	8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		98	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB14-5.0-6.0-190625
Date Sampled: 06/25/2019 1120
Date Received: 06/26/2019

Laboratory ID: UF26025-001
Matrix: Solid
% Solids: 94.1 06/27/2019 0013

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/05/2019 1713	LLL	07/01/2019 0831	21083
1	7471B	7471B	1	06/28/2019 1810	TJW	06/27/2019 1855	20938
2	3050B	6020B	1	07/07/2019 2352	LLL	07/01/2019 0831	21083

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.32	J	0.52	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	2.3		0.52	0.21	mg/kg	1
Barium	7440-39-3	6020B	530		1.3	0.32	mg/kg	1
Beryllium	7440-41-7	6020B	0.095	J	0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	0.11	J	0.13	0.026	mg/kg	1
Chromium	7440-47-3	6020B	28		1.3	0.57	mg/kg	1
Cobalt	7440-48-4	6020B	9.2		1.3	0.31	mg/kg	1
Copper	7440-50-8	6020B	20		1.3	0.34	mg/kg	1
Lead	7439-92-1	6020B	7.4		0.26	0.070	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.086	0.021	mg/kg	1
Nickel	7440-02-0	6020B	25		1.3	0.31	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.3	0.49	mg/kg	1
Silver	7440-22-4	6020B	ND		0.26	0.062	mg/kg	2
Vanadium	7440-62-2	6020B	60		1.3	0.26	mg/kg	1
Zinc	7440-66-6	6020B	71		2.6	0.52	mg/kg	1

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H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
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J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-002
Description: CMR-WB14-20.0-21.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1125
% Solids: 91.7 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/05/2019 1303	JM1		21696	5.79

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	94		19	7.5	ug/kg	1
Benzene	71-43-2	8260B	ND		4.7	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.7	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.7	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.7	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.7	2.8	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.8	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.7	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.7	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.7	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.7	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.7	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.7	2.8	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.7	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.7	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.7	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.7	2.8	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.7	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.7	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.7	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.7	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.7	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		240	24	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.7	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.4	3.8	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.7	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.7	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.7	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.4	3.8	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.7	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.7	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.7	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.7	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.7	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.7	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.7	1.9	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-002
Description: CMR-WB14-20.0-21.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1125
% Solids: 91.7 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/05/2019 1303	JM1		21696	5.79

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.7	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.7	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.7	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.7	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.7	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.7	2.8	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.4	3.8	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.7	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.7	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		89	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-002
Description: CMR-WB14-20.0-21.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1125
% Solids: 91.7 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/06/2019 0300	SCD	06/30/2019 0956	21213

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		2.9	0.88	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		2.9	1.0	ug/kg	1
Anthracene	120-12-7	8270D	ND		2.9	0.54	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		2.9	0.63	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		2.9	0.70	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	5.1		2.9	0.53	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	2.7	J	2.9	0.69	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		2.9	0.51	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		14	5.3	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		14	5.3	ug/kg	1
Carbazole	86-74-8	8270D	ND		14	5.3	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		14	5.3	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		14	5.3	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		14	5.3	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		14	5.3	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		14	5.3	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		14	5.3	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		14	5.3	ug/kg	1
Chrysene	218-01-9	8270D	ND		2.9	0.48	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		2.9	0.54	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		14	5.3	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		71	27	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		71	27	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		71	27	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		14	5.3	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		14	5.3	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		14	5.3	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		14	7.9	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		14	5.3	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		14	5.3	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		71	27	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		71	27	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		29	11	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		29	11	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		14	5.3	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		71	27	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		2.9	0.45	ug/kg	1
Fluorene	86-73-7	8270D	ND		2.9	0.61	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		14	5.3	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		14	5.3	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		71	27	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		14	5.3	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		2.9	1.1	ug/kg	1
Isophorone	78-59-1	8270D	ND		14	5.3	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-002
Description: CMR-WB14-20.0-21.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1125
% Solids: 91.7 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/06/2019 0300	SCD	06/30/2019 0956	21213

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		2.9	1.1	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		14	5.3	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		29	11	ug/kg	1
Naphthalene	91-20-3	8270D	ND		2.9	1.0	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		29	11	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		29	11	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		29	11	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		14	5.3	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		29	11	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		71	27	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		14	5.3	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		14	5.3	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		71	27	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		2.9	0.76	ug/kg	1
Phenol	108-95-2	8270D	ND		14	5.3	ug/kg	1
Pyrene	129-00-0	8270D	ND		2.9	0.53	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		35	11	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		71	11	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		71	27	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		14	5.3	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		14	5.3	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		71	33-102
2-Fluorophenol		68	35-115
Nitrobenzene-d5		76	22-109
Phenol-d5		71	33-122
Terphenyl-d14		98	41-120
2,4,6-Tribromophenol		98	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-002
Description: CMR-WB14-20.0-21.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1125
% Solids: 91.7 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0343	CHG	06/27/2019 1715	21005

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		89	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-002
Description: CMR-WB14-20.0-21.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1125
% Solids: 91.7 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 1010	CHG	06/27/2019 1715	21007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		126	40-140
2-Fluorobiphenyl (fractionation 1)		125	40-140
o - Terphenyl (aromatic)		99	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-002
Description: CMR-WB14-20.0-21.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1125
% Solids: 91.7 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1813	JJG		21743

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		3.8	0.76	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		3.8	0.76	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-002
Description: CMR-WB14-20.0-21.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1125
% Solids: 91.7 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1813	JJG		21742

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.25	0.035	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.3	0.51	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.25	0.031	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.25	0.055	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.25	0.13	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.25	0.041	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.25	0.057	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.25	0.028	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF26025-002
Description: CMR-WB14-20.0-21.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1125
% Solids: 91.7 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1813	JJG		21740

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		97	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-002
Description: CMR-WB14-20.0-21.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1125
% Solids: 91.7 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/05/2019 1719	LLL	07/01/2019 0831	21083
1	7471B	7471B	1	06/28/2019 1813	TJW	06/27/2019 1855	20938
2	3050B	6020B	1	07/07/2019 2358	LLL	07/01/2019 0831	21083

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.34	J	0.47	0.19	mg/kg	1
Arsenic	7440-38-2	6020B	3.4		0.47	0.19	mg/kg	1
Barium	7440-39-3	6020B	150		1.2	0.29	mg/kg	1
Beryllium	7440-41-7	6020B	0.070	J	0.095	0.032	mg/kg	1
Cadmium	7440-43-9	6020B	0.56		0.12	0.024	mg/kg	1
Chromium	7440-47-3	6020B	27		1.2	0.52	mg/kg	1
Cobalt	7440-48-4	6020B	6.2		1.2	0.28	mg/kg	1
Copper	7440-50-8	6020B	47		1.2	0.31	mg/kg	1
Lead	7439-92-1	6020B	9.7		0.24	0.064	mg/kg	1
Mercury	7439-97-6	7471B	0.027	J	0.083	0.020	mg/kg	1
Nickel	7440-02-0	6020B	28		1.2	0.28	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.2	0.45	mg/kg	1
Silver	7440-22-4	6020B	0.12	J	0.24	0.057	mg/kg	2
Vanadium	7440-62-2	6020B	59		1.2	0.24	mg/kg	1
Zinc	7440-66-6	6020B	74		2.4	0.47	mg/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-003
Description: CMR-WB14-20.0-21.0-190625-DUP
Matrix: Solid
Date Sampled: 06/25/2019 1130
% Solids: 91.0 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/05/2019 1325	JM1		21696	5.72

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	96		19	7.7	ug/kg	1
Benzene	71-43-2	8260B	ND		4.8	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.8	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.8	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.8	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.8	2.9	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.8	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.8	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.8	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.8	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.8	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.8	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.8	2.9	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.8	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.8	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.8	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.8	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.8	2.9	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.8	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.8	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.8	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.8	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.8	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.8	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		240	24	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.8	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.6	3.8	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.8	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.8	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.8	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.6	3.8	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.8	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.8	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.8	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.8	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.8	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.8	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.8	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.8	1.9	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-003
Description: CMR-WB14-20.0-21.0-190625-DUP
Matrix: Solid
Date Sampled: 06/25/2019 1130
% Solids: 91.0 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	07/05/2019 1325	JM1		21696	5.72

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.8	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.8	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.8	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.8	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.8	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.8	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.8	2.9	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.6	3.8	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.8	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.8	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-003
Description: CMR-WB14-20.0-21.0-190625-DUP
Matrix: Solid
Date Sampled: 06/25/2019 1130
% Solids: 91.0 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/06/2019 0325	SCD	06/30/2019 0956	21213

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		2.8	0.87	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		2.8	1.0	ug/kg	1
Anthracene	120-12-7	8270D	ND		2.8	0.54	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		2.8	0.62	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		2.8	0.69	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	5.4		2.8	0.53	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	3.4		2.8	0.68	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		2.8	0.50	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		14	5.3	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		14	5.3	ug/kg	1
Carbazole	86-74-8	8270D	ND		14	5.3	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		14	5.3	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		14	5.3	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		14	5.3	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		14	5.3	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		14	5.3	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		14	5.3	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		14	5.3	ug/kg	1
Chrysene	218-01-9	8270D	ND		2.8	0.47	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		2.8	0.54	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		14	5.3	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		70	26	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		70	26	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		70	26	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		14	5.3	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		14	5.3	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		14	5.3	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		14	7.8	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		14	5.3	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		14	5.3	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		70	26	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		70	26	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		28	11	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		28	11	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		14	5.3	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		70	26	ug/kg	1
Fluoranthene	206-44-0	8270D	0.73	J	2.8	0.44	ug/kg	1
Fluorene	86-73-7	8270D	ND		2.8	0.60	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		14	5.3	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		14	5.3	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		70	26	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		14	5.3	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		2.8	1.1	ug/kg	1
Isophorone	78-59-1	8270D	ND		14	5.3	ug/kg	1

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-003
Description: CMR-WB14-20.0-21.0-190625-DUP
Matrix: Solid
Date Sampled: 06/25/2019 1130
% Solids: 91.0 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/06/2019 0325	SCD	06/30/2019 0956	21213

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		2.8	1.0	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		14	5.3	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		28	11	ug/kg	1
Naphthalene	91-20-3	8270D	1.0	J	2.8	1.0	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		28	11	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		28	11	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		28	11	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		14	5.3	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		28	11	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		70	26	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		14	5.3	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		14	5.3	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		70	26	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		2.8	0.76	ug/kg	1
Phenol	108-95-2	8270D	ND		14	5.3	ug/kg	1
Pyrene	129-00-0	8270D	ND		2.8	0.53	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		35	11	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		70	11	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		70	26	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		14	5.3	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		14	5.3	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		68	33-102
2-Fluorophenol		71	35-115
Nitrobenzene-d5		73	22-109
Phenol-d5		74	33-122
Terphenyl-d14		90	41-120
2,4,6-Tribromophenol		95	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
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N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-003
Description: CMR-WB14-20.0-21.0-190625-DUP
Matrix: Solid
Date Sampled: 06/25/2019 1130
% Solids: 91.0 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0413	CHG	06/27/2019 1715	21005

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		85	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-003
Description: CMR-WB14-20.0-21.0-190625-DUP
Matrix: Solid
Date Sampled: 06/25/2019 1130
% Solids: 91.0 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 1039	CHG	06/27/2019 1715	21007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		108	40-140
2-Fluorobiphenyl (fractionation 1)		108	40-140
o - Terphenyl (aromatic)		85	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-003
Description: CMR-WB14-20.0-21.0-190625-DUP
Matrix: Solid
Date Sampled: 06/25/2019 1130
% Solids: 91.0 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1841	JJG		21743

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.1	0.81	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.1	0.81	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-003
Description: CMR-WB14-20.0-21.0-190625-DUP
Matrix: Solid
Date Sampled: 06/25/2019 1130
% Solids: 91.0 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1841	JJG		21742

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.27	0.037	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.4	0.54	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.27	0.033	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.27	0.058	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.27	0.14	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.27	0.043	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.27	0.060	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.27	0.030	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF26025-003
Description: CMR-WB14-20.0-21.0-190625-DUP
Matrix: Solid
Date Sampled: 06/25/2019 1130
% Solids: 91.0 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1841	JJG		21740

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-003
Description: CMR-WB14-20.0-21.0-190625-DUP
Matrix: Solid
Date Sampled: 06/25/2019 1130
% Solids: 91.0 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/05/2019 1725	LLL	07/01/2019 0831	21083
1	7471B	7471B	1	06/28/2019 1816	TJW	06/27/2019 1855	20938
2	3050B	6020B	1	07/08/2019 0004	LLL	07/01/2019 0831	21083

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.30	J	0.52	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	2.9		0.52	0.21	mg/kg	1
Barium	7440-39-3	6020B	200		1.4	0.32	mg/kg	1
Beryllium	7440-41-7	6020B	0.073	J	0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	0.36		0.14	0.026	mg/kg	1
Chromium	7440-47-3	6020B	28		1.4	0.58	mg/kg	1
Cobalt	7440-48-4	6020B	5.7		1.4	0.31	mg/kg	1
Copper	7440-50-8	6020B	52		1.4	0.34	mg/kg	1
Lead	7439-92-1	6020B	9.3		0.26	0.071	mg/kg	1
Mercury	7439-97-6	7471B	0.044	J	0.078	0.019	mg/kg	1
Nickel	7440-02-0	6020B	27		1.4	0.31	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.49	mg/kg	1
Silver	7440-22-4	6020B	0.13	J	0.26	0.063	mg/kg	2
Vanadium	7440-62-2	6020B	61		1.4	0.26	mg/kg	1
Zinc	7440-66-6	6020B	68		2.6	0.52	mg/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-004
Description: CMR-WB15-4.0-5.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1300
% Solids: 89.6 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	07/03/2019 1126	JM1		21574	4.89

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1300	250	ug/kg	1
Benzene	71-43-2	8260B	ND		310	130	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		310	130	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		310	130	ug/kg	1
Bromoform	75-25-2	8260B	ND		310	130	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		310	130	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1300	250	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		310	130	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		310	130	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		310	130	ug/kg	1
Chloroethane	75-00-3	8260B	ND		310	130	ug/kg	1
Chloroform	67-66-3	8260B	ND		310	130	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		310	130	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		310	130	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		310	130	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		310	130	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		310	130	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		310	130	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		310	130	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		310	130	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		310	130	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		310	130	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		310	130	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		310	130	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		310	130	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		310	130	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		310	130	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		310	130	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		310	130	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		16000	1600	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		310	130	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		630	250	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		310	130	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		310	130	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		310	130	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		630	250	ug/kg	1
Methylcyclohexane	108-87-2	8260B	180	J	310	130	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		310	130	ug/kg	1
Naphthalene	91-20-3	8260B	ND		310	130	ug/kg	1
Styrene	100-42-5	8260B	ND		310	130	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		310	130	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		310	130	ug/kg	1
Toluene	108-88-3	8260B	ND		310	130	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		310	130	ug/kg	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-004
Description: CMR-WB15-4.0-5.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1300
% Solids: 89.6 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	07/03/2019 1126	JM1		21574	4.89

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		310	130	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		310	130	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		310	130	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		310	130	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		310	130	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		310	130	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		310	130	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		630	250	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		310	130	ug/kg	1
o - Xylenes	95-47-6	8260B	190	J	310	130	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		108	53-142
Bromofluorobenzene		112	47-138
Toluene-d8		116	68-124

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-004
Description: CMR-WB15-4.0-5.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1300
% Solids: 89.6 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	07/05/2019 2036	SCD	06/30/2019 0956	21213

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		300	93	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		300	110	ug/kg	1
Anthracene	120-12-7	8270D	ND		300	57	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		300	66	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		300	74	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		300	56	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		300	73	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		300	54	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		1500	560	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		1500	560	ug/kg	1
Carbazole	86-74-8	8270D	ND		1500	560	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		1500	560	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		1500	560	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		1500	560	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		1500	560	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		1500	560	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		1500	560	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		1500	560	ug/kg	1
Chrysene	218-01-9	8270D	ND		300	50	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		300	57	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		1500	560	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		7500	2800	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		7500	2800	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		7500	2800	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		1500	560	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1500	560	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		1500	560	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		1500	830	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		1500	560	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		1500	560	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		7500	2800	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		7500	2800	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		3000	1100	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		3000	1100	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		1500	560	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		7500	2800	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		300	47	ug/kg	1
Fluorene	86-73-7	8270D	ND		300	64	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		1500	560	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		1500	560	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		7500	2800	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		1500	560	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		300	110	ug/kg	1
Isophorone	78-59-1	8270D	ND		1500	560	ug/kg	1

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-004
Description: CMR-WB15-4.0-5.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1300
% Solids: 89.6 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	07/05/2019 2036	SCD	06/30/2019 0956	21213

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		300	110	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		1500	560	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		3000	1100	ug/kg	1
Naphthalene	91-20-3	8270D	ND		300	110	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		3000	1100	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		3000	1100	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		3000	1100	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		1500	560	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		3000	1100	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		7500	2800	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		1500	560	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		1500	560	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		7500	2800	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		300	80	ug/kg	1
Phenol	108-95-2	8270D	ND		1500	560	ug/kg	1
Pyrene	129-00-0	8270D	ND		300	56	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		3700	1100	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		7500	1100	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		7500	2800	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		1500	560	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		1500	560	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		95	33-102
2-Fluorophenol	N	32	35-115
Nitrobenzene-d5	N	114	22-109
Phenol-d5		48	33-122
Terphenyl-d14	N	136	41-120
2,4,6-Tribromophenol		56	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-004
Description: CMR-WB15-4.0-5.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1300
% Solids: 89.6 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 0443	CHG	06/27/2019 1715	21005

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	260		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	880		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		65	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-004
Description: CMR-WB15-4.0-5.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1300
% Solids: 89.6 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	07/06/2019 1109	CHG	06/27/2019 1715	21007

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	200		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		132	40-140
2-Fluorobiphenyl (fractionation 1)		137	40-140
o - Terphenyl (aromatic)		100	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-004
Description: CMR-WB15-4.0-5.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1300
% Solids: 89.6 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1909	JJG		21743

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	34		4.2	0.83	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	220		4.2	0.83	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	726	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26025-004
Description: CMR-WB15-4.0-5.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1300
% Solids: 89.6 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1909	JJG		21742

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.28	0.038	mg/kg	1
C9 - C10 Aromatics		Montana VPH	140		1.4	0.56	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	3.0		0.28	0.034	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.28	0.060	mg/kg	1
Naphthalene	91-20-3	Montana VPH	4.2		0.28	0.14	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.28	0.044	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	0.46		0.28	0.062	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	1.4		0.28	0.031	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	300	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF26025-004
Description: CMR-WB15-4.0-5.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1300
% Solids: 89.6 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/05/2019 1909	JJG		21740

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	440		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	721	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-004
Description: CMR-WB15-4.0-5.0-190625
Matrix: Solid
Date Sampled: 06/25/2019 1300
% Solids: 89.6 06/27/2019 0013
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	07/05/2019 1731	LLL	07/01/2019 0831	21083
1	7471B	7471B	1	06/28/2019 1818	TJW	06/27/2019 1855	20938
2	3050B	6020B	1	07/08/2019 0021	LLL	07/01/2019 0831	21083

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.27	J	0.51	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	3.0		0.51	0.21	mg/kg	1
Barium	7440-39-3	6020B	130		1.3	0.32	mg/kg	1
Beryllium	7440-41-7	6020B	0.097	J	0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	0.12	J	0.13	0.026	mg/kg	1
Chromium	7440-47-3	6020B	35		1.3	0.57	mg/kg	1
Cobalt	7440-48-4	6020B	6.2		1.3	0.31	mg/kg	1
Copper	7440-50-8	6020B	16		1.3	0.33	mg/kg	1
Lead	7439-92-1	6020B	9.5		0.26	0.070	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.092	0.022	mg/kg	1
Nickel	7440-02-0	6020B	21		1.3	0.31	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.3	0.49	mg/kg	1
Silver	7440-22-4	6020B	0.070	J	0.26	0.062	mg/kg	2
Vanadium	7440-62-2	6020B	57		1.3	0.26	mg/kg	1
Zinc	7440-66-6	6020B	68		2.6	0.51	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-005
Description: TB-27-20190625
Matrix: Aqueous
Date Sampled: 06/25/2019
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/07/2019 1458	ECB		21776

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26025-005
Description: TB-27-20190625
Matrix: Aqueous
Date Sampled: 06/25/2019
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/07/2019 1458	ECB		21776

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21574-001
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	07/02/2019 1740
Benzene	ND		1	250	100	ug/kg	07/02/2019 1740
Bromochloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Bromodichloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Bromoform	ND		1	250	100	ug/kg	07/02/2019 1740
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	07/02/2019 1740
2-Butanone (MEK)	ND		1	1000	200	ug/kg	07/02/2019 1740
Carbon disulfide	ND		1	250	100	ug/kg	07/02/2019 1740
Carbon tetrachloride	ND		1	250	100	ug/kg	07/02/2019 1740
Chlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Chloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Chloroform	ND		1	250	100	ug/kg	07/02/2019 1740
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	07/02/2019 1740
Cyclohexane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	07/02/2019 1740
Dibromochloromethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Dichlorodifluoromethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1-Dichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
1,2-Dichloropropane	ND		1	250	100	ug/kg	07/02/2019 1740
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	07/02/2019 1740
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	07/02/2019 1740
1,4-Dioxane	ND		1	13000	1300	ug/kg	07/02/2019 1740
Ethylbenzene	ND		1	250	100	ug/kg	07/02/2019 1740
2-Hexanone	ND		1	500	200	ug/kg	07/02/2019 1740
Isopropylbenzene	ND		1	250	100	ug/kg	07/02/2019 1740
Methyl acetate	ND		1	250	100	ug/kg	07/02/2019 1740
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	07/02/2019 1740
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	07/02/2019 1740
Methylcyclohexane	ND		1	250	100	ug/kg	07/02/2019 1740
Methylene chloride	ND		1	250	100	ug/kg	07/02/2019 1740
Naphthalene	ND		1	250	100	ug/kg	07/02/2019 1740
Styrene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Tetrachloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
Toluene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	07/02/2019 1740

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21574-001
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	07/02/2019 1740
Trichloroethene	ND		1	250	100	ug/kg	07/02/2019 1740
Trichlorofluoromethane	ND		1	250	100	ug/kg	07/02/2019 1740
Vinyl chloride	ND		1	250	100	ug/kg	07/02/2019 1740
Xylenes (total)	ND		1	500	200	ug/kg	07/02/2019 1740
m+p - Xylenes	ND		1	250	100	ug/kg	07/02/2019 1740
o - Xylenes	ND		1	250	100	ug/kg	07/02/2019 1740

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		105	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		106	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21574-002
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	5200		1	104	60-140	07/02/2019 1718
Benzene	2500	2500		1	101	70-130	07/02/2019 1718
Bromochloromethane	2500	2500		1	99	70-130	07/02/2019 1718
Bromodichloromethane	2500	2600		1	103	70-130	07/02/2019 1718
Bromoform	2500	2500		1	99	70-130	07/02/2019 1718
Bromomethane (Methyl bromide)	2500	1700	N	1	68	70-130	07/02/2019 1718
2-Butanone (MEK)	5000	5600		1	113	60-140	07/02/2019 1718
Carbon disulfide	2500	2200		1	89	70-130	07/02/2019 1718
Carbon tetrachloride	2500	2600		1	105	70-130	07/02/2019 1718
Chlorobenzene	2500	2600		1	105	70-130	07/02/2019 1718
Chloroethane	2500	2300		1	92	70-130	07/02/2019 1718
Chloroform	2500	2500		1	99	70-130	07/02/2019 1718
Chloromethane (Methyl chloride)	2500	1900		1	78	60-140	07/02/2019 1718
Cyclohexane	2500	2600		1	105	70-130	07/02/2019 1718
1,2-Dibromo-3-chloropropane (DBCP)	2500	2400		1	95	70-130	07/02/2019 1718
Dibromochloromethane	2500	2600		1	103	70-130	07/02/2019 1718
1,2-Dibromoethane (EDB)	2500	2700		1	107	70-130	07/02/2019 1718
1,2-Dichlorobenzene	2500	2700		1	106	70-130	07/02/2019 1718
1,3-Dichlorobenzene	2500	2700		1	108	70-130	07/02/2019 1718
1,4-Dichlorobenzene	2500	2700		1	107	70-130	07/02/2019 1718
Dichlorodifluoromethane	2500	1600		1	66	60-140	07/02/2019 1718
1,1-Dichloroethane	2500	2500		1	101	70-130	07/02/2019 1718
1,2-Dichloroethane	2500	2500		1	101	70-130	07/02/2019 1718
1,1-Dichloroethene	2500	2400		1	95	70-130	07/02/2019 1718
cis-1,2-Dichloroethene	2500	2500		1	98	70-130	07/02/2019 1718
trans-1,2-Dichloroethene	2500	2500		1	98	70-130	07/02/2019 1718
1,2-Dichloropropane	2500	2500		1	101	70-130	07/02/2019 1718
cis-1,3-Dichloropropene	2500	2600		1	105	70-130	07/02/2019 1718
trans-1,3-Dichloropropene	2500	2700		1	107	70-130	07/02/2019 1718
1,4-Dioxane	25000	25000		1	100	60-140	07/02/2019 1718
Ethylbenzene	2500	2700		1	107	70-130	07/02/2019 1718
2-Hexanone	5000	5600		1	113	70-130	07/02/2019 1718
Isopropylbenzene	2500	2700		1	106	70-130	07/02/2019 1718
Methyl acetate	2500	1900		1	74	70-130	07/02/2019 1718
Methyl tertiary butyl ether (MTBE)	2500	2400		1	97	70-130	07/02/2019 1718
4-Methyl-2-pentanone	5000	4800		1	96	70-130	07/02/2019 1718
Methylcyclohexane	2500	2900		1	118	70-130	07/02/2019 1718
Methylene chloride	2500	2200		1	88	70-130	07/02/2019 1718
Naphthalene	2500	2400		1	98	70-130	07/02/2019 1718
Styrene	2500	2700		1	106	70-130	07/02/2019 1718
1,1,2,2-Tetrachloroethane	2500	2600		1	105	70-130	07/02/2019 1718
Tetrachloroethene	2500	2800		1	112	70-130	07/02/2019 1718
Toluene	2500	2600		1	104	70-130	07/02/2019 1718
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	2900		1	115	70-130	07/02/2019 1718

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21574-002
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2700		1	106	70-130	07/02/2019 1718
1,2,4-Trichlorobenzene	2500	2700		1	108	70-130	07/02/2019 1718
1,1,1-Trichloroethane	2500	2400		1	98	70-130	07/02/2019 1718
1,1,2-Trichloroethane	2500	2600		1	103	70-130	07/02/2019 1718
Trichloroethene	2500	2600		1	102	70-130	07/02/2019 1718
Trichlorofluoromethane	2500	2600		1	102	70-130	07/02/2019 1718
Vinyl chloride	2500	2100		1	83	70-130	07/02/2019 1718
Xylenes (total)	5000	5300		1	106	70-130	07/02/2019 1718
m+p - Xylenes	2500	2700		1	107	70-130	07/02/2019 1718
o - Xylenes	2500	2600		1	105	70-130	07/02/2019 1718

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		98	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MS

Sample ID: UF26025-004MS
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	ND	4300	6100	N	1	142	70-130	07/03/2019 1910
Benzene	ND	2200	2700		1	124	70-130	07/03/2019 1910
Bromochloromethane	ND	2200	2700		1	124	70-130	07/03/2019 1910
Bromodichloromethane	ND	2200	2700		1	124	70-130	07/03/2019 1910
Bromoform	ND	2200	2800		1	128	70-130	07/03/2019 1910
Bromomethane (Methyl bromide)	ND	2200	1600		1	77	70-130	07/03/2019 1910
2-Butanone (MEK)	ND	4300	6400	N	1	149	70-130	07/03/2019 1910
Carbon disulfide	ND	2200	2300		1	105	70-130	07/03/2019 1910
Carbon tetrachloride	ND	2200	2700		1	124	70-130	07/03/2019 1910
Chlorobenzene	ND	2200	2700		1	127	70-130	07/03/2019 1910
Chloroethane	ND	2200	2100		1	97	70-130	07/03/2019 1910
Chloroform	ND	2200	2700		1	125	70-130	07/03/2019 1910
Chloromethane (Methyl chloride)	ND	2200	1800		1	86	60-140	07/03/2019 1910
Cyclohexane	ND	2200	2600		1	123	70-130	07/03/2019 1910
1,2-Dibromo-3-chloropropane (DBCP)	ND	2200	2700		1	126	70-130	07/03/2019 1910
Dibromochloromethane	ND	2200	2700		1	125	70-130	07/03/2019 1910
1,2-Dibromoethane (EDB)	ND	2200	2800		1	130	70-130	07/03/2019 1910
1,2-Dichlorobenzene	ND	2200	2700		1	126	70-130	07/03/2019 1910
1,3-Dichlorobenzene	ND	2200	2700		1	126	70-130	07/03/2019 1910
1,4-Dichlorobenzene	ND	2200	2700		1	126	70-130	07/03/2019 1910
Dichlorodifluoromethane	ND	2200	1100	N	1	51	60-140	07/03/2019 1910
1,1-Dichloroethane	ND	2200	2600		1	123	70-130	07/03/2019 1910
1,2-Dichloroethane	ND	2200	2700		1	123	70-130	07/03/2019 1910
1,1-Dichloroethene	ND	2200	2400		1	111	70-130	07/03/2019 1910
cis-1,2-Dichloroethene	ND	2200	2600		1	121	70-130	07/03/2019 1910
trans-1,2-Dichloroethene	ND	2200	2600		1	120	70-130	07/03/2019 1910
1,2-Dichloropropane	ND	2200	2700		1	124	70-130	07/03/2019 1910
cis-1,3-Dichloropropene	ND	2200	2800		1	129	70-130	07/03/2019 1910
trans-1,3-Dichloropropene	ND	2200	2800		1	128	70-130	07/03/2019 1910
1,4-Dioxane	ND	22000	29000		1	133	60-140	07/03/2019 1910
Ethylbenzene	ND	2200	2700		1	126	70-130	07/03/2019 1910
2-Hexanone	ND	4300	6500	N	1	150	70-130	07/03/2019 1910
Isopropylbenzene	ND	2200	2800		1	129	70-130	07/03/2019 1910
Methyl acetate	ND	2200	2300		1	107	70-130	07/03/2019 1910
Methyl tertiary butyl ether (MTBE)	ND	2200	2600		1	123	70-130	07/03/2019 1910
4-Methyl-2-pentanone	ND	4300	5300		1	123	70-130	07/03/2019 1910
Methylcyclohexane	180	2200	3200	N	1	140	70-130	07/03/2019 1910
Methylene chloride	ND	2200	2300		1	107	70-130	07/03/2019 1910
Naphthalene	ND	2200	2600		1	122	70-130	07/03/2019 1910
Styrene	ND	2200	2800	N	1	131	70-130	07/03/2019 1910
1,1,2,2-Tetrachloroethane	ND	2200	2600		1	122	70-130	07/03/2019 1910
Tetrachloroethene	ND	2200	2800		1	130	70-130	07/03/2019 1910
Toluene	ND	2200	2600		1	122	70-130	07/03/2019 1910
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	2200	2600		1	119	70-130	07/03/2019 1910

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MS

Sample ID: UF26025-004MS
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	ND	2200	2800		1	129	70-130	07/03/2019 1910
1,2,4-Trichlorobenzene	ND	2200	2700		1	127	70-130	07/03/2019 1910
1,1,1-Trichloroethane	ND	2200	2500		1	117	70-130	07/03/2019 1910
1,1,2-Trichloroethane	ND	2200	5000	N	1	231	70-130	07/03/2019 1910
Trichloroethene	ND	2200	2700		1	126	70-130	07/03/2019 1910
Trichlorofluoromethane	ND	2200	2300		1	107	70-130	07/03/2019 1910
Vinyl chloride	ND	2200	1900		1	89	70-130	07/03/2019 1910
Xylenes (total)	ND	4300	5700	N	1	133	70-130	07/03/2019 1910
m+p - Xylenes	ND	2200	2800		1	128	70-130	07/03/2019 1910
o - Xylenes	190	2200	3000		1	129	70-130	07/03/2019 1910

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		105	53-142
Bromofluorobenzene		109	47-138
Toluene-d8		109	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MSD

Sample ID: UF26025-004MD
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acetone	ND	5100	7700	N,+	1	151	23	70-130	20	07/03/2019 1933
Benzene	ND	2600	3300		1	129	20	70-130	20	07/03/2019 1933
Bromochloromethane	ND	2600	3200		1	127	19	70-130	20	07/03/2019 1933
Bromodichloromethane	ND	2600	3300	+	1	129	21	70-130	20	07/03/2019 1933
Bromoform	ND	2600	3400	N,+	1	135	22	70-130	20	07/03/2019 1933
Bromomethane (Methyl bromide)	ND	2600	2100	+	1	84	26	70-130	20	07/03/2019 1933
2-Butanone (MEK)	ND	5100	8100	N,+	1	158	22	70-130	20	07/03/2019 1933
Carbon disulfide	ND	2600	2800		1	108	20	70-130	20	07/03/2019 1933
Carbon tetrachloride	ND	2600	3300		1	128	19	70-130	20	07/03/2019 1933
Chlorobenzene	ND	2600	3400	N,+	1	133	21	70-130	20	07/03/2019 1933
Chloroethane	ND	2600	2600		1	100	20	70-130	20	07/03/2019 1933
Chloroform	ND	2600	3300		1	129	20	70-130	20	07/03/2019 1933
Chloromethane (Methyl chloride)	ND	2600	2200		1	86	17	60-140	20	07/03/2019 1933
Cyclohexane	ND	2600	3200		1	126	19	70-130	20	07/03/2019 1933
1,2-Dibromo-3-chloropropane (DBCP)	ND	2600	3500	N,+	1	139	26	70-130	20	07/03/2019 1933
Dibromochloromethane	ND	2600	3400	N,+	1	134	24	70-130	20	07/03/2019 1933
1,2-Dibromoethane (EDB)	ND	2600	3600	N,+	1	140	24	70-130	20	07/03/2019 1933
1,2-Dichlorobenzene	ND	2600	3300	N	1	131	20	70-130	20	07/03/2019 1933
1,3-Dichlorobenzene	ND	2600	3300	N	1	131	20	70-130	20	07/03/2019 1933
1,4-Dichlorobenzene	ND	2600	3300		1	130	20	70-130	20	07/03/2019 1933
Dichlorodifluoromethane	ND	2600	1500	N,+	1	57	27	60-140	20	07/03/2019 1933
1,1-Dichloroethane	ND	2600	3200		1	127	20	70-130	20	07/03/2019 1933
1,2-Dichloroethane	ND	2600	3300	+	1	128	21	70-130	20	07/03/2019 1933
1,1-Dichloroethene	ND	2600	2900		1	113	19	70-130	20	07/03/2019 1933
cis-1,2-Dichloroethene	ND	2600	3200		1	124	19	70-130	20	07/03/2019 1933
trans-1,2-Dichloroethene	ND	2600	3100		1	122	19	70-130	20	07/03/2019 1933
1,2-Dichloropropane	ND	2600	3300	+	1	129	21	70-130	20	07/03/2019 1933
cis-1,3-Dichloropropene	ND	2600	3500	N,+	1	136	22	70-130	20	07/03/2019 1933
trans-1,3-Dichloropropene	ND	2600	3500	N,+	1	137	24	70-130	20	07/03/2019 1933
1,4-Dioxane	ND	26000	37000	N,+	1	145	25	60-140	20	07/03/2019 1933
Ethylbenzene	ND	2600	3400	N,+	1	133	22	70-130	20	07/03/2019 1933
2-Hexanone	ND	5100	8100	N,+	1	158	22	70-130	20	07/03/2019 1933
Isopropylbenzene	ND	2600	3500	N,+	1	137	22	70-130	20	07/03/2019 1933
Methyl acetate	ND	2600	3000	+	1	119	27	70-130	20	07/03/2019 1933
Methyl tertiary butyl ether (MTBE)	ND	2600	3200		1	127	20	70-130	20	07/03/2019 1933
4-Methyl-2-pentanone	ND	5100	6600	+	1	129	21	70-130	20	07/03/2019 1933
Methylcyclohexane	180	2600	4000	N,+	1	148	21	70-130	20	07/03/2019 1933
Methylene chloride	ND	2600	2800		1	109	19	70-130	20	07/03/2019 1933
Naphthalene	ND	2600	3300	+	1	128	22	70-130	20	07/03/2019 1933
Styrene	ND	2600	3500	N,+	1	137	21	70-130	20	07/03/2019 1933
1,1,2,2-Tetrachloroethane	ND	2600	3200		1	125	19	70-130	20	07/03/2019 1933
Tetrachloroethene	ND	2600	3500	N,+	1	136	21	70-130	20	07/03/2019 1933
Toluene	ND	2600	3300	+	1	130	23	70-130	20	07/03/2019 1933
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	2600	3100		1	123	20	70-130	20	07/03/2019 1933

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MSD

Sample ID: UF26025-004MD
Batch: 21574
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
1,2,3-Trichlorobenzene	ND	2600	3500	N,+	1	136	22	70-130	20	07/03/2019 1933
1,2,4-Trichlorobenzene	ND	2600	3300	N	1	131	20	70-130	20	07/03/2019 1933
1,1,1-Trichloroethane	ND	2600	3100		1	121	20	70-130	20	07/03/2019 1933
1,1,2-Trichloroethane	ND	2600	6200	N,+	1	243	22	70-130	20	07/03/2019 1933
Trichloroethene	ND	2600	3400	N,+	1	132	22	70-130	20	07/03/2019 1933
Trichlorofluoromethane	ND	2600	2800	+	1	111	21	70-130	20	07/03/2019 1933
Vinyl chloride	ND	2600	2300		1	89	17	70-130	20	07/03/2019 1933
Xylenes (total)	ND	5100	7100	N,+	1	139	21	70-130	20	07/03/2019 1933
m+p - Xylenes	ND	2600	3400	N,+	1	135	22	70-130	20	07/03/2019 1933
o - Xylenes	190	2600	3700	N,+	1	136	21	70-130	20	07/03/2019 1933

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		111	53-142
Bromofluorobenzene		116	47-138
Toluene-d8		117	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21696-001
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	07/05/2019 0950
Benzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Bromochloromethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Bromoform	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	07/05/2019 0950
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	07/05/2019 0950
Carbon disulfide	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Chlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Chloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Chloroform	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	07/05/2019 0950
Cyclohexane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	07/05/2019 0950
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,4-Dioxane	ND		1	250	25	ug/kg	07/05/2019 0950
Ethylbenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
2-Hexanone	ND		1	10	4.0	ug/kg	07/05/2019 0950
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Methyl acetate	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	07/05/2019 0950
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Methylene chloride	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Naphthalene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Styrene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Toluene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21696-001
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Trichloroethene	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
Vinyl chloride	ND		1	5.0	3.0	ug/kg	07/05/2019 0950
Xylenes (total)	ND		1	10	4.0	ug/kg	07/05/2019 0950
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	07/05/2019 0950
o - Xylenes	ND		1	5.0	2.0	ug/kg	07/05/2019 0950

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21696-002
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	110		1	105	60-140	07/05/2019 0928
Benzene	50	49		1	99	70-130	07/05/2019 0928
Bromochloromethane	50	48		1	97	70-130	07/05/2019 0928
Bromodichloromethane	50	49		1	98	70-130	07/05/2019 0928
Bromoform	50	51		1	101	70-130	07/05/2019 0928
Bromomethane (Methyl bromide)	50	50		1	100	70-130	07/05/2019 0928
2-Butanone (MEK)	100	100		1	104	60-140	07/05/2019 0928
Carbon disulfide	50	53		1	106	70-130	07/05/2019 0928
Carbon tetrachloride	50	49		1	98	70-130	07/05/2019 0928
Chlorobenzene	50	50		1	100	70-130	07/05/2019 0928
Chloroethane	50	50		1	99	70-130	07/05/2019 0928
Chloroform	50	49		1	98	70-130	07/05/2019 0928
Chloromethane (Methyl chloride)	50	45		1	91	60-140	07/05/2019 0928
Cyclohexane	50	47		1	94	70-130	07/05/2019 0928
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	93	70-130	07/05/2019 0928
Dibromochloromethane	50	50		1	99	70-130	07/05/2019 0928
1,2-Dibromoethane (EDB)	50	51		1	101	70-130	07/05/2019 0928
1,2-Dichlorobenzene	50	51		1	102	70-130	07/05/2019 0928
1,3-Dichlorobenzene	50	51		1	101	70-130	07/05/2019 0928
1,4-Dichlorobenzene	50	51		1	102	70-130	07/05/2019 0928
Dichlorodifluoromethane	50	46		1	92	60-140	07/05/2019 0928
1,1-Dichloroethane	50	49		1	97	70-130	07/05/2019 0928
1,2-Dichloroethane	50	48		1	96	70-130	07/05/2019 0928
1,1-Dichloroethene	50	50		1	99	70-130	07/05/2019 0928
cis-1,2-Dichloroethene	50	48		1	96	70-130	07/05/2019 0928
trans-1,2-Dichloroethene	50	48		1	97	70-130	07/05/2019 0928
1,2-Dichloropropane	50	48		1	95	70-130	07/05/2019 0928
cis-1,3-Dichloropropene	50	51		1	101	70-130	07/05/2019 0928
trans-1,3-Dichloropropene	50	51		1	103	70-130	07/05/2019 0928
1,4-Dioxane	500	500		1	101	60-140	07/05/2019 0928
Ethylbenzene	50	50		1	101	70-130	07/05/2019 0928
2-Hexanone	100	110		1	113	70-130	07/05/2019 0928
Isopropylbenzene	50	51		1	101	70-130	07/05/2019 0928
Methyl acetate	50	37		1	74	70-130	07/05/2019 0928
Methyl tertiary butyl ether (MTBE)	50	49		1	99	70-130	07/05/2019 0928
4-Methyl-2-pentanone	100	92		1	92	70-130	07/05/2019 0928
Methylcyclohexane	50	51		1	102	70-130	07/05/2019 0928
Methylene chloride	50	47		1	93	70-130	07/05/2019 0928
Naphthalene	50	49		1	98	70-130	07/05/2019 0928
Styrene	50	51		1	103	70-130	07/05/2019 0928
1,1,2,2-Tetrachloroethane	50	47		1	94	70-130	07/05/2019 0928
Tetrachloroethene	50	50		1	101	70-130	07/05/2019 0928
Toluene	50	48		1	96	70-130	07/05/2019 0928
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	51		1	101	70-130	07/05/2019 0928

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21696-002
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	52		1	104	70-130	07/05/2019 0928
1,2,4-Trichlorobenzene	50	52		1	104	70-130	07/05/2019 0928
1,1,1-Trichloroethane	50	48		1	96	70-130	07/05/2019 0928
1,1,2-Trichloroethane	50	49		1	97	70-130	07/05/2019 0928
Trichloroethene	50	50		1	99	70-130	07/05/2019 0928
Trichlorofluoromethane	50	49		1	98	70-130	07/05/2019 0928
Vinyl chloride	50	45		1	90	70-130	07/05/2019 0928
Xylenes (total)	100	100		1	101	70-130	07/05/2019 0928
m+p - Xylenes	50	51		1	101	70-130	07/05/2019 0928
o - Xylenes	50	51		1	102	70-130	07/05/2019 0928

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		86	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - Duplicate

Sample ID: UF26025-002DU
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Sample Amount (ug/kg)	Result (ug/kg)	Q	Dil	% RPD	% RPD Limit	Analysis Date
Acetone	94	45	+	1	71	20	07/05/2019 1906
Benzene	ND	ND		1	0.00	20	07/05/2019 1906
Bromochloromethane	ND	ND		1	0.00	20	07/05/2019 1906
Bromodichloromethane	ND	ND		1	0.00	20	07/05/2019 1906
Bromoform	ND	ND		1	0.00	20	07/05/2019 1906
Bromomethane (Methyl bromide)	ND	ND		1	0.00	20	07/05/2019 1906
2-Butanone (MEK)	ND	ND		1	0.00	20	07/05/2019 1906
Carbon disulfide	ND	ND		1	0.00	20	07/05/2019 1906
Carbon tetrachloride	ND	ND		1	0.00	20	07/05/2019 1906
Chlorobenzene	ND	ND		1	0.00	20	07/05/2019 1906
Chloroethane	ND	ND		1	0.00	20	07/05/2019 1906
Chloroform	ND	ND		1	0.00	20	07/05/2019 1906
Chloromethane (Methyl chloride)	ND	ND		1	0.00	20	07/05/2019 1906
Cyclohexane	ND	ND		1	0.00	20	07/05/2019 1906
1,2-Dibromo-3-chloropropane (DBCP)	ND	ND		1	0.00	20	07/05/2019 1906
Dibromochloromethane	ND	ND		1	0.00	20	07/05/2019 1906
1,2-Dibromoethane (EDB)	ND	ND		1	0.00	20	07/05/2019 1906
1,2-Dichlorobenzene	ND	ND		1	0.00	20	07/05/2019 1906
1,3-Dichlorobenzene	ND	ND		1	0.00	20	07/05/2019 1906
1,4-Dichlorobenzene	ND	ND		1	0.00	20	07/05/2019 1906
Dichlorodifluoromethane	ND	ND		1	0.00	20	07/05/2019 1906
1,1-Dichloroethane	ND	ND		1	0.00	20	07/05/2019 1906
1,2-Dichloroethane	ND	ND		1	0.00	20	07/05/2019 1906
1,1-Dichloroethene	ND	ND		1	0.00	20	07/05/2019 1906
cis-1,2-Dichloroethene	ND	ND		1	0.00	20	07/05/2019 1906
trans-1,2-Dichloroethene	ND	ND		1	0.00	20	07/05/2019 1906
1,2-Dichloropropane	ND	ND		1	0.00	20	07/05/2019 1906
cis-1,3-Dichloropropene	ND	ND		1	0.00	20	07/05/2019 1906
trans-1,3-Dichloropropene	ND	ND		1	0.00	20	07/05/2019 1906
1,4-Dioxane	ND	ND		1	0.00	20	07/05/2019 1906
Ethylbenzene	ND	ND		1	0.00	20	07/05/2019 1906
2-Hexanone	ND	ND		1	0.00	20	07/05/2019 1906
Isopropylbenzene	ND	ND		1	0.00	20	07/05/2019 1906
Methyl acetate	ND	ND		1	0.00	20	07/05/2019 1906
Methyl tertiary butyl ether (MTBE)	ND	ND		1	0.00	20	07/05/2019 1906
4-Methyl-2-pentanone	ND	ND		1	0.00	20	07/05/2019 1906
Methylcyclohexane	ND	ND		1	0.00	20	07/05/2019 1906
Methylene chloride	ND	ND		1	0.00	20	07/05/2019 1906
Naphthalene	ND	ND		1	0.00	20	07/05/2019 1906
Styrene	ND	ND		1	0.00	20	07/05/2019 1906
1,1,2,2-Tetrachloroethane	ND	ND		1	0.00	20	07/05/2019 1906
Tetrachloroethene	ND	ND		1	0.00	20	07/05/2019 1906
Toluene	ND	ND		1	0.00	20	07/05/2019 1906
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	ND		1	0.00	20	07/05/2019 1906

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - Duplicate

Sample ID: UF26025-002DU
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Sample Amount (ug/kg)	Result (ug/kg)	Q	Dil	% RPD	% RPD Limit	Analysis Date
1,2,3-Trichlorobenzene	ND	ND		1	0.00	20	07/05/2019 1906
1,2,4-Trichlorobenzene	ND	ND		1	0.00	20	07/05/2019 1906
1,1,1-Trichloroethane	ND	ND		1	0.00	20	07/05/2019 1906
1,1,2-Trichloroethane	ND	ND		1	0.00	20	07/05/2019 1906
Trichloroethene	ND	ND		1	0.00	20	07/05/2019 1906
Trichlorofluoromethane	ND	ND		1	0.00	20	07/05/2019 1906
Vinyl chloride	ND	ND		1	0.00	20	07/05/2019 1906
Xylenes (total)	ND	ND		1	0.00	20	07/05/2019 1906
m+p - Xylenes	ND	ND		1	0.00	20	07/05/2019 1906
o - Xylenes	ND	ND		1	0.00	20	07/05/2019 1906

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		107	47-138
Toluene-d8		107	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MS

Sample ID: UF26025-003MS
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	96	100	120	N	1	26	70-130	07/05/2019 1843
Benzene	ND	50	45		1	91	70-130	07/05/2019 1843
Bromochloromethane	ND	50	44		1	88	70-130	07/05/2019 1843
Bromodichloromethane	ND	50	43		1	87	70-130	07/05/2019 1843
Bromoform	ND	50	43		1	86	70-130	07/05/2019 1843
Bromomethane (Methyl bromide)	ND	50	48		1	97	70-130	07/05/2019 1843
2-Butanone (MEK)	ND	100	95		1	95	70-130	07/05/2019 1843
Carbon disulfide	ND	50	52		1	105	70-130	07/05/2019 1843
Carbon tetrachloride	ND	50	52		1	105	70-130	07/05/2019 1843
Chlorobenzene	ND	50	44		1	89	70-130	07/05/2019 1843
Chloroethane	ND	50	50		1	100	70-130	07/05/2019 1843
Chloroform	ND	50	46		1	91	70-130	07/05/2019 1843
Chloromethane (Methyl chloride)	ND	50	45		1	91	60-140	07/05/2019 1843
Cyclohexane	ND	50	51		1	102	70-130	07/05/2019 1843
1,2-Dibromo-3-chloropropane (DBCP)	ND	50	43		1	87	70-130	07/05/2019 1843
Dibromochloromethane	ND	50	43		1	86	70-130	07/05/2019 1843
1,2-Dibromoethane (EDB)	ND	50	44		1	88	70-130	07/05/2019 1843
1,2-Dichlorobenzene	ND	50	42		1	85	70-130	07/05/2019 1843
1,3-Dichlorobenzene	ND	50	44		1	87	70-130	07/05/2019 1843
1,4-Dichlorobenzene	ND	50	42		1	85	70-130	07/05/2019 1843
Dichlorodifluoromethane	ND	50	50		1	100	60-140	07/05/2019 1843
1,1-Dichloroethane	ND	50	48		1	96	70-130	07/05/2019 1843
1,2-Dichloroethane	ND	50	42		1	84	70-130	07/05/2019 1843
1,1-Dichloroethene	ND	50	51		1	103	70-130	07/05/2019 1843
cis-1,2-Dichloroethene	ND	50	45		1	90	70-130	07/05/2019 1843
trans-1,2-Dichloroethene	ND	50	48		1	97	70-130	07/05/2019 1843
1,2-Dichloropropane	ND	50	42		1	85	70-130	07/05/2019 1843
cis-1,3-Dichloropropene	ND	50	43		1	87	70-130	07/05/2019 1843
trans-1,3-Dichloropropene	ND	50	44		1	89	70-130	07/05/2019 1843
1,4-Dioxane	ND	500	510		1	103	60-140	07/05/2019 1843
Ethylbenzene	ND	50	46		1	93	70-130	07/05/2019 1843
2-Hexanone	ND	100	97		1	97	70-130	07/05/2019 1843
Isopropylbenzene	ND	50	47		1	94	70-130	07/05/2019 1843
Methyl acetate	ND	50	33	N	1	66	70-130	07/05/2019 1843
Methyl tertiary butyl ether (MTBE)	ND	50	43		1	86	70-130	07/05/2019 1843
4-Methyl-2-pentanone	ND	100	81		1	82	70-130	07/05/2019 1843
Methylcyclohexane	ND	50	53		1	107	70-130	07/05/2019 1843
Methylene chloride	ND	50	42		1	84	70-130	07/05/2019 1843
Naphthalene	ND	50	36		1	73	70-130	07/05/2019 1843
Styrene	ND	50	44		1	88	70-130	07/05/2019 1843
1,1,2,2-Tetrachloroethane	ND	50	44		1	89	70-130	07/05/2019 1843
Tetrachloroethene	ND	50	49		1	99	70-130	07/05/2019 1843
Toluene	ND	50	46		1	92	70-130	07/05/2019 1843
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	50	58		1	116	70-130	07/05/2019 1843

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MS

Sample ID: UF26025-003MS
Batch: 21696
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	ND	50	34	N	1	68	70-130	07/05/2019 1843
1,2,4-Trichlorobenzene	ND	50	34	N	1	69	70-130	07/05/2019 1843
1,1,1-Trichloroethane	ND	50	49		1	98	70-130	07/05/2019 1843
1,1,2-Trichloroethane	ND	50	43		1	87	70-130	07/05/2019 1843
Trichloroethene	ND	50	47		1	95	70-130	07/05/2019 1843
Trichlorofluoromethane	ND	50	54		1	108	70-130	07/05/2019 1843
Vinyl chloride	ND	50	49		1	97	70-130	07/05/2019 1843
Xylenes (total)	ND	100	92		1	92	70-130	07/05/2019 1843
m+p - Xylenes	ND	50	47		1	93	70-130	07/05/2019 1843
o - Xylenes	ND	50	45		1	91	70-130	07/05/2019 1843

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		93	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		107	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21776-001
Batch: 21776
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/07/2019 1412
Benzene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Bromoform	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/07/2019 1412
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/07/2019 1412
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Chloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Chloroform	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Cyclohexane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/07/2019 1412
1,4-Dioxane	ND		1	20	13	ug/L	07/07/2019 1412
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
2-Hexanone	ND		1	10	2.0	ug/L	07/07/2019 1412
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Methyl acetate	ND		1	1.0	0.40	ug/L	07/07/2019 1412
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/07/2019 1412
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/07/2019 1412
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/07/2019 1412
Methylene chloride	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Naphthalene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Styrene	ND		1	0.50	0.41	ug/L	07/07/2019 1412
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Toluene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/07/2019 1412

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21776-001
Batch: 21776
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Trichloroethene	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/07/2019 1412
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/07/2019 1412
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/07/2019 1412
o - Xylenes	ND		1	0.50	0.40	ug/L	07/07/2019 1412

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21776-002
Batch: 21776
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	210	N	1	214	60-140	07/07/2019 1302
Benzene	50	51		1	102	70-130	07/07/2019 1302
Bromochloromethane	50	46		1	92	70-130	07/07/2019 1302
Bromodichloromethane	50	48		1	96	70-130	07/07/2019 1302
Bromoform	50	51		1	101	70-130	07/07/2019 1302
Bromomethane (Methyl bromide)	50	50		1	100	70-130	07/07/2019 1302
2-Butanone (MEK)	100	150	N	1	153	70-130	07/07/2019 1302
Carbon disulfide	50	51		1	102	70-130	07/07/2019 1302
Carbon tetrachloride	50	46		1	92	70-130	07/07/2019 1302
Chlorobenzene	50	51		1	103	70-130	07/07/2019 1302
Chloroethane	50	53		1	107	70-130	07/07/2019 1302
Chloroform	50	47		1	94	70-130	07/07/2019 1302
Chloromethane (Methyl chloride)	50	47		1	95	60-140	07/07/2019 1302
Cyclohexane	50	44		1	88	70-130	07/07/2019 1302
1,2-Dibromo-3-chloropropane (DBCP)	50	52		1	104	70-130	07/07/2019 1302
Dibromochloromethane	50	50		1	100	70-130	07/07/2019 1302
1,2-Dibromoethane (EDB)	50	51		1	102	70-130	07/07/2019 1302
1,2-Dichlorobenzene	50	51		1	103	70-130	07/07/2019 1302
1,3-Dichlorobenzene	50	51		1	102	70-130	07/07/2019 1302
1,4-Dichlorobenzene	50	51		1	101	70-130	07/07/2019 1302
Dichlorodifluoromethane	50	44		1	87	60-140	07/07/2019 1302
1,1-Dichloroethane	50	49		1	97	70-130	07/07/2019 1302
1,2-Dichloroethane	50	47		1	94	70-130	07/07/2019 1302
1,1-Dichloroethene	50	46		1	92	70-130	07/07/2019 1302
cis-1,2-Dichloroethene	50	47		1	93	70-130	07/07/2019 1302
trans-1,2-Dichloroethene	50	47		1	94	70-130	07/07/2019 1302
1,2-Dichloropropane	50	51		1	101	70-130	07/07/2019 1302
cis-1,3-Dichloropropene	50	52		1	104	70-130	07/07/2019 1302
trans-1,3-Dichloropropene	50	51		1	102	70-130	07/07/2019 1302
1,4-Dioxane	500	590		1	117	60-140	07/07/2019 1302
Ethylbenzene	50	52		1	105	70-130	07/07/2019 1302
2-Hexanone	100	120		1	122	70-130	07/07/2019 1302
Isopropylbenzene	50	53		1	106	70-130	07/07/2019 1302
Methyl acetate	50	40		1	81	70-130	07/07/2019 1302
Methyl tertiary butyl ether (MTBE)	50	51		1	102	70-130	07/07/2019 1302
4-Methyl-2-pentanone	100	100		1	100	70-130	07/07/2019 1302
Methylcyclohexane	50	52		1	103	70-130	07/07/2019 1302
Methylene chloride	50	47		1	94	70-130	07/07/2019 1302
Naphthalene	50	50		1	101	70-130	07/07/2019 1302
Styrene	50	53		1	107	70-130	07/07/2019 1302
1,1,2,2-Tetrachloroethane	50	50		1	99	70-130	07/07/2019 1302
Tetrachloroethene	50	51		1	103	70-130	07/07/2019 1302
Toluene	50	50		1	101	70-130	07/07/2019 1302
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	98	70-130	07/07/2019 1302

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21776-002
Batch: 21776
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	51		1	102	70-130	07/07/2019 1302
1,2,4-Trichlorobenzene	50	51		1	103	70-130	07/07/2019 1302
1,1,1-Trichloroethane	50	47		1	93	70-130	07/07/2019 1302
1,1,2-Trichloroethane	50	51		1	101	70-130	07/07/2019 1302
Trichloroethene	50	49		1	99	70-130	07/07/2019 1302
Trichlorofluoromethane	50	46		1	93	70-130	07/07/2019 1302
Vinyl chloride	50	44		1	88	70-130	07/07/2019 1302
Xylenes (total)	100	100		1	103	70-130	07/07/2019 1302
m+p - Xylenes	50	51		1	102	70-130	07/07/2019 1302
o - Xylenes	50	52		1	104	70-130	07/07/2019 1302

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		89	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		99	70-130

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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21213-001
Batch: 21213
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/30/2019 956

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	07/02/2019 1045
Acenaphthylene	ND		1	2.7	0.95	ug/kg	07/02/2019 1045
Anthracene	ND		1	2.7	0.51	ug/kg	07/02/2019 1045
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	07/02/2019 1045
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	07/02/2019 1045
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	07/02/2019 1045
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	07/02/2019 1045
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	07/02/2019 1045
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/02/2019 1045
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	07/02/2019 1045
Carbazole	ND		1	13	5.0	ug/kg	07/02/2019 1045
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	07/02/2019 1045
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	07/02/2019 1045
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	07/02/2019 1045
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	07/02/2019 1045
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	07/02/2019 1045
2-Chlorophenol	ND		1	13	5.0	ug/kg	07/02/2019 1045
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/02/2019 1045
Chrysene	ND		1	2.7	0.45	ug/kg	07/02/2019 1045
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	07/02/2019 1045
Dibenzofuran	ND		1	13	5.0	ug/kg	07/02/2019 1045
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	07/02/2019 1045
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	07/02/2019 1045
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	07/02/2019 1045
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	07/02/2019 1045
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	07/02/2019 1045
Diethylphthalate	ND		1	13	5.0	ug/kg	07/02/2019 1045
Dimethyl phthalate	ND		1	13	7.4	ug/kg	07/02/2019 1045
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	07/02/2019 1045
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	07/02/2019 1045
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	07/02/2019 1045
2,4-Dinitrophenol	ND		1	67	25	ug/kg	07/02/2019 1045
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	07/02/2019 1045
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	07/02/2019 1045
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	07/02/2019 1045
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	07/02/2019 1045
Fluoranthene	ND		1	2.7	0.42	ug/kg	07/02/2019 1045
Fluorene	ND		1	2.7	0.57	ug/kg	07/02/2019 1045
Hexachlorobenzene	ND		1	13	5.0	ug/kg	07/02/2019 1045
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	07/02/2019 1045
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	07/02/2019 1045
Hexachloroethane	ND		1	13	5.0	ug/kg	07/02/2019 1045
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	07/02/2019 1045
Isophorone	ND		1	13	5.0	ug/kg	07/02/2019 1045

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21213-001
Batch: 21213
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/30/2019 956

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	07/02/2019 1045
2-Methylphenol	ND		1	13	5.0	ug/kg	07/02/2019 1045
3+4-Methylphenol	ND		1	27	10	ug/kg	07/02/2019 1045
Naphthalene	ND		1	2.7	0.97	ug/kg	07/02/2019 1045
2-Nitroaniline	ND		1	27	10	ug/kg	07/02/2019 1045
3-Nitroaniline	ND		1	27	10	ug/kg	07/02/2019 1045
4-Nitroaniline	ND		1	27	10	ug/kg	07/02/2019 1045
Nitrobenzene	ND		1	13	5.0	ug/kg	07/02/2019 1045
2-Nitrophenol	ND		1	27	10	ug/kg	07/02/2019 1045
4-Nitrophenol	ND		1	67	25	ug/kg	07/02/2019 1045
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	07/02/2019 1045
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	07/02/2019 1045
Pentachlorophenol	ND		1	67	25	ug/kg	07/02/2019 1045
Phenanthrene	ND		1	2.7	0.72	ug/kg	07/02/2019 1045
Phenol	ND		1	13	5.0	ug/kg	07/02/2019 1045
Pyrene	ND		1	2.7	0.50	ug/kg	07/02/2019 1045
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	07/02/2019 1045
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	07/02/2019 1045
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	07/02/2019 1045
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	07/02/2019 1045
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	07/02/2019 1045

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		74	33-102
2-Fluorophenol		71	35-115
Nitrobenzene-d5		69	22-109
Phenol-d5		77	33-122
Terphenyl-d14		104	41-120
2,4,6-Tribromophenol		69	30-117

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21213-002
Batch: 21213
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/30/2019 956

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	85		1	64	12-111	07/02/2019 1110
Acenaphthylene	130	94		1	70	44-122	07/02/2019 1110
Anthracene	130	96		1	72	16-122	07/02/2019 1110
Benzo(a)anthracene	130	110		1	80	40-121	07/02/2019 1110
Benzo(a)pyrene	130	99		1	75	36-114	07/02/2019 1110
Benzo(b)fluoranthene	130	98		1	74	38-123	07/02/2019 1110
Benzo(g,h,i)perylene	130	120		1	89	43-120	07/02/2019 1110
Benzo(k)fluoranthene	130	100		1	76	40-126	07/02/2019 1110
4-Bromophenyl phenyl ether	130	92		1	69	30-130	07/02/2019 1110
Butyl benzyl phthalate	130	130		1	94	48-124	07/02/2019 1110
Carbazole	130	99		1	74	47-125	07/02/2019 1110
bis (2-Chloro-1-methylethyl) ether	130	91		1	68	41-113	07/02/2019 1110
4-Chloro-3-methyl phenol	130	100		1	75	48-120	07/02/2019 1110
bis(2-Chloroethoxy)methane	130	85		1	64	38-115	07/02/2019 1110
bis(2-Chloroethyl)ether	130	90		1	68	46-122	07/02/2019 1110
2-Chloronaphthalene	130	86		1	65	37-106	07/02/2019 1110
2-Chlorophenol	130	86		1	65	44-122	07/02/2019 1110
4-Chlorophenyl phenyl ether	130	95		1	71	32-107	07/02/2019 1110
Chrysene	130	99		1	74	41-124	07/02/2019 1110
Dibenzo(a,h)anthracene	130	110		1	84	38-125	07/02/2019 1110
Dibenzofuran	130	93		1	70	45-128	07/02/2019 1110
1,2-Dichlorobenzene	130	82		1	62	39-94	07/02/2019 1110
1,3-Dichlorobenzene	130	79		1	60	30-130	07/02/2019 1110
1,4-Dichlorobenzene	130	77		1	58	39-92	07/02/2019 1110
3,3'-Dichlorobenzidine	130	88		1	66	10-119	07/02/2019 1110
2,4-Dichlorophenol	130	93		1	70	30-96	07/02/2019 1110
Diethylphthalate	130	97		1	73	30-130	07/02/2019 1110
Dimethyl phthalate	130	100		1	75	24-127	07/02/2019 1110
2,4-Dimethylphenol	130	140		1	109	30-130	07/02/2019 1110
Di-n-butyl phthalate	130	100		1	75	35-108	07/02/2019 1110
4,6-Dinitro-2-methylphenol	130	88		1	66	53-150	07/02/2019 1110
2,4-Dinitrophenol	270	160		1	61	32-115	07/02/2019 1110
2,4-Dinitrotoluene	130	100		1	77	40-130	07/02/2019 1110
2,6-Dinitrotoluene	130	98		1	74	46-118	07/02/2019 1110
Di-n-octylphthalate	130	110		1	80	49-118	07/02/2019 1110
bis(2-Ethylhexyl)phthalate	130	110		1	83	33-123	07/02/2019 1110
Fluoranthene	130	100		1	76	26-133	07/02/2019 1110
Fluorene	130	91		1	69	19-108	07/02/2019 1110
Hexachlorobenzene	130	96		1	72	10-125	07/02/2019 1110
Hexachlorobutadiene	130	90		1	68	47-116	07/02/2019 1110
Hexachlorocyclopentadiene	670	430		1	64	48-127	07/02/2019 1110
Hexachloroethane	130	83		1	63	18-154	07/02/2019 1110
Indeno(1,2,3-c,d)pyrene	130	120		1	87	42-123	07/02/2019 1110
Isophorone	130	96		1	72	30-130	07/02/2019 1110

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21213-002
Batch: 21213
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/30/2019 956

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	90		1	67	10-107	07/02/2019 1110
2-Methylphenol	130	92		1	69	33-103	07/02/2019 1110
3+4-Methylphenol	130	99		1	74	18-121	07/02/2019 1110
Naphthalene	130	86		1	65	10-112	07/02/2019 1110
2-Nitroaniline	130	100		1	78	46-128	07/02/2019 1110
3-Nitroaniline	130	70		1	53	30-130	07/02/2019 1110
4-Nitroaniline	130	93		1	70	51-129	07/02/2019 1110
Nitrobenzene	130	96		1	72	49-142	07/02/2019 1110
2-Nitrophenol	130	86		1	64	33-114	07/02/2019 1110
4-Nitrophenol	270	180		1	66	27-138	07/02/2019 1110
N-Nitrosodi-n-propylamine	130	96		1	72	45-112	07/02/2019 1110
N-Nitrosodiphenylamine (Diphenylamine)	130	93		1	70	49-123	07/02/2019 1110
Pentachlorophenol	270	150		1	58	36-108	07/02/2019 1110
Phenanthrene	130	91		1	68	16-123	07/02/2019 1110
Phenol	130	94		1	70	39-108	07/02/2019 1110
Pyrene	130	110		1	82	34-121	07/02/2019 1110
1,2,4,5-Tetrachlorobenzene	130	77		1	58	30-130	07/02/2019 1110
2,3,4,6-Tetrachlorophenol	130	91		1	69	53-125	07/02/2019 1110
1,2,4-Trichlorobenzene	130	87		1	65	30-130	07/02/2019 1110
2,4,5-Trichlorophenol	130	89		1	67	32-105	07/02/2019 1110
2,4,6-Trichlorophenol	130	83		1	62	31-102	07/02/2019 1110

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		67	33-102
2-Fluorophenol		63	35-115
Nitrobenzene-d5		66	22-109
Phenol-d5		67	33-122
Terphenyl-d14		88	41-120
2,4,6-Tribromophenol		68	30-117

LOQ = Limit of Quantitation
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N = Recovery is out of criteria
+ = RPD is out of criteria

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF26025-004MS
Batch: 21213
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/30/2019 956

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	ND	150	ND	N	100	0.00	12-111	07/05/2019 2101
Acenaphthylene	ND	150	ND	N	100	0.00	44-122	07/05/2019 2101
Anthracene	ND	150	180		100	120	16-122	07/05/2019 2101
Benzo(a)anthracene	ND	150	190	N	100	127	40-121	07/05/2019 2101
Benzo(a)pyrene	ND	150	300	N	100	205	36-114	07/05/2019 2101
Benzo(b)fluoranthene	ND	150	ND	N	100	0.00	38-123	07/05/2019 2101
Benzo(g,h,i)perylene	ND	150	ND	N	100	0.00	43-120	07/05/2019 2101
Benzo(k)fluoranthene	ND	150	ND	N	100	0.00	40-126	07/05/2019 2101
4-Bromophenyl phenyl ether	ND	150	140		100	99	30-130	07/05/2019 2101
Butyl benzyl phthalate	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
Carbazole	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
bis (2-Chloro-1-methylethyl) ether	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
4-Chloro-3-methyl phenol	ND	150	640	N	100	440	30-130	07/05/2019 2101
bis(2-Chloroethoxy)methane	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
bis(2-Chloroethyl)ether	ND	150	770	N	100	529	30-130	07/05/2019 2101
2-Chloronaphthalene	ND	150	24000	N	100	16400	30-130	07/05/2019 2101
2-Chlorophenol	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
4-Chlorophenyl phenyl ether	ND	150	460	N	100	312	30-130	07/05/2019 2101
Chrysene	ND	150	180		100	124	41-124	07/05/2019 2101
Dibenzo(a,h)anthracene	ND	150	ND	N	100	0.00	38-125	07/05/2019 2101
Dibenzofuran	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
1,2-Dichlorobenzene	ND	730	ND	N	100	0.00	39-94	07/05/2019 2101
1,3-Dichlorobenzene	ND	730	ND	N	100	0.00	30-130	07/05/2019 2101
1,4-Dichlorobenzene	ND	730	ND	N	100	0.00	39-92	07/05/2019 2101
3,3'-Dichlorobenzidine	ND	150	2100	N	100	1430	10-119	07/05/2019 2101
2,4-Dichlorophenol	ND	150	810	N	100	554	30-130	07/05/2019 2101
Diethylphthalate	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
Dimethyl phthalate	ND	150	5300	N	100	3610	30-130	07/05/2019 2101
2,4-Dimethylphenol	ND	150	1000	N	100	682	30-130	07/05/2019 2101
Di-n-butyl phthalate	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
4,6-Dinitro-2-methylphenol	ND	150	1700	N	100	1180	30-130	07/05/2019 2101
2,4-Dinitrophenol	ND	290	3400	N	100	1170	30-130	07/05/2019 2101
2,4-Dinitrotoluene	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
2,6-Dinitrotoluene	ND	150	520	N	100	353	30-130	07/05/2019 2101
Di-n-octylphthalate	ND	150	1100	N	100	718	30-130	07/05/2019 2101
bis(2-Ethylhexyl)phthalate	ND	150	880	N	100	604	30-130	07/05/2019 2101
Fluoranthene	ND	150	ND	N	100	0.00	26-133	07/05/2019 2101
Fluorene	ND	150	160		100	106	19-108	07/05/2019 2101
Hexachlorobenzene	ND	150	110		100	78	10-130	07/05/2019 2101
Hexachlorobutadiene	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
Hexachlorocyclopentadiene	ND	730	ND	N	100	0.00	30-130	07/05/2019 2101
Hexachloroethane	ND	150	610	N	100	418	30-130	07/05/2019 2101
Indeno(1,2,3-c,d)pyrene	ND	150	ND	N	100	0.00	42-123	07/05/2019 2101
Isophorone	ND	150	530	N	100	359	30-130	07/05/2019 2101

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF26025-004MS
Batch: 21213
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/30/2019 956

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	ND	150	170	N	100	119	10-107	07/05/2019 2101
2-Methylphenol	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
3+4-Methylphenol	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
Naphthalene	ND	150	160		100	111	10-112	07/05/2019 2101
2-Nitroaniline	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
3-Nitroaniline	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
4-Nitroaniline	ND	150	1400	N	100	929	30-130	07/05/2019 2101
Nitrobenzene	ND	150	600	N	100	411	30-130	07/05/2019 2101
2-Nitrophenol	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
4-Nitrophenol	ND	290	2500	N	100	857	30-130	07/05/2019 2101
N-Nitrosodi-n-propylamine	ND	150	220	N	100	153	30-130	07/05/2019 2101
N-Nitrosodiphenylamine (Diphenylamine)	ND	150	390	N	100	268	30-130	07/05/2019 2101
Pentachlorophenol	ND	290	ND	N	100	0.00	30-130	07/05/2019 2101
Phenanthrene	ND	150	160		100	110	16-123	07/05/2019 2101
Phenol	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
Pyrene	ND	150	170		100	119	34-121	07/05/2019 2101
1,2,4,5-Tetrachlorobenzene	ND	150	ND	N	100	0.00	30-130	07/05/2019 2101
2,3,4,6-Tetrachlorophenol	ND	150	ND	N	100	0.00	53-125	07/05/2019 2101
1,2,4-Trichlorobenzene	ND	730	ND	N	100	0.00	30-130	07/05/2019 2101
2,4,5-Trichlorophenol	ND	150	390	N	100	264	30-130	07/05/2019 2101
2,4,6-Trichlorophenol	ND	150	440	N	100	297	30-130	07/05/2019 2101

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		88	33-102
2-Fluorophenol	N	31	35-115
Nitrobenzene-d5		91	22-109
Phenol-d5		47	33-122
Terphenyl-d14		120	41-120
2,4,6-Tribromophenol		47	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF26025-004MD
Batch: 21213
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/30/2019 956

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acenaphthene	ND	140	ND	N	100	0.00	0.00	12-111	30	07/05/2019 2125
Acenaphthylene	ND	140	ND	N	100	0.00	0.00	44-122	30	07/05/2019 2125
Anthracene	ND	140	150		100	106	14	16-122	30	07/05/2019 2125
Benzo(a)anthracene	ND	140	210	N	100	145	12	40-121	30	07/05/2019 2125
Benzo(a)pyrene	ND	140	290	N	100	203	3.2	36-114	30	07/05/2019 2125
Benzo(b)fluoranthene	ND	140	ND	N	100	0.00	0.00	38-123	30	07/05/2019 2125
Benzo(g,h,i)perylene	ND	140	ND	N	100	0.00	0.00	43-120	30	07/05/2019 2125
Benzo(k)fluoranthene	ND	140	ND	N	100	0.00	0.00	40-126	30	07/05/2019 2125
4-Bromophenyl phenyl ether	ND	140	100		100	70	36	30-130	40	07/05/2019 2125
Butyl benzyl phthalate	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
Carbazole	ND	140	160	+	100	112	200	30-130	40	07/05/2019 2125
bis (2-Chloro-1-methylethyl) ether	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
4-Chloro-3-methyl phenol	ND	140	380	N,+	100	267	51	30-130	40	07/05/2019 2125
bis(2-Chloroethoxy)methane	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
bis(2-Chloroethyl)ether	ND	140	770	N	100	539	0.037	30-130	40	07/05/2019 2125
2-Chloronaphthalene	ND	140	23000	N	100	16200	3.1	30-130	40	07/05/2019 2125
2-Chlorophenol	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
4-Chlorophenyl phenyl ether	ND	140	480	N	100	335	5.1	30-130	40	07/05/2019 2125
Chrysene	ND	140	200	N	100	142	12	41-124	30	07/05/2019 2125
Dibenzo(a,h)anthracene	ND	140	ND	N	100	0.00	0.00	38-125	30	07/05/2019 2125
Dibenzofuran	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
1,2-Dichlorobenzene	ND	720	ND	N	100	0.00	0.00	39-94	40	07/05/2019 2125
1,3-Dichlorobenzene	ND	720	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
1,4-Dichlorobenzene	ND	720	ND	N	100	0.00	0.00	39-92	40	07/05/2019 2125
3,3'-Dichlorobenzidine	ND	140	2100	N	100	1440	1.9	10-119	40	07/05/2019 2125
2,4-Dichlorophenol	ND	140	870	N	100	605	6.8	30-130	40	07/05/2019 2125
Diethylphthalate	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
Dimethyl phthalate	ND	140	5300	N	100	3680	0.13	30-130	40	07/05/2019 2125
2,4-Dimethylphenol	ND	140	490	N,+	100	341	68	30-130	40	07/05/2019 2125
Di-n-butyl phthalate	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
4,6-Dinitro-2-methylphenol	ND	140	1700	N	100	1210	0.72	30-130	40	07/05/2019 2125
2,4-Dinitrophenol	ND	290	3500	N	100	1210	2.0	30-130	40	07/05/2019 2125
2,4-Dinitrotoluene	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
2,6-Dinitrotoluene	ND	140	690	N	100	482	29	30-130	40	07/05/2019 2125
Di-n-octylphthalate	ND	140	1000	N	100	712	2.8	30-130	40	07/05/2019 2125
bis(2-Ethylhexyl)phthalate	ND	140	870	N	100	603	2.1	30-130	40	07/05/2019 2125
Fluoranthene	ND	140	170	+	100	118	200	26-133	30	07/05/2019 2125
Fluorene	ND	140	170	N	100	119	9.2	19-108	30	07/05/2019 2125
Hexachlorobenzene	ND	140	110		100	76	4.7	10-130	40	07/05/2019 2125
Hexachlorobutadiene	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
Hexachlorocyclopentadiene	ND	720	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
Hexachloroethane	ND	140	2800	N,+	100	1920	130	30-130	40	07/05/2019 2125
Indeno(1,2,3-c,d)pyrene	ND	140	ND	N	100	0.00	0.00	42-123	30	07/05/2019 2125
Isophorone	ND	140	520	N	100	363	0.85	30-130	40	07/05/2019 2125

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF26025-004MD
Batch: 21213
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/30/2019 956

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
2-Methylnaphthalene	ND	140	190	N	100	133	9.0	10-107	30	07/05/2019 2125
2-Methylphenol	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
3+4-Methylphenol	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
Naphthalene	ND	140	190	N	100	134	17	10-112	30	07/05/2019 2125
2-Nitroaniline	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
3-Nitroaniline	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
4-Nitroaniline	ND	140	1200	N	100	811	16	30-130	40	07/05/2019 2125
Nitrobenzene	ND	140	400	N,+	100	275	42	30-130	40	07/05/2019 2125
2-Nitrophenol	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
4-Nitrophenol	ND	290	810	N,+	100	283	100	30-130	40	07/05/2019 2125
N-Nitrosodi-n-propylamine	ND	140	150		100	106	38	30-130	40	07/05/2019 2125
N-Nitrosodiphenylamine (Diphenylamine)	ND	140	380	N	100	266	2.7	30-130	40	07/05/2019 2125
Pentachlorophenol	ND	290	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
Phenanthrene	ND	140	140		100	100	11	16-123	30	07/05/2019 2125
Phenol	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
Pyrene	ND	140	200	N	100	141	15	34-121	30	07/05/2019 2125
1,2,4,5-Tetrachlorobenzene	ND	140	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
2,3,4,6-Tetrachlorophenol	ND	140	ND	N	100	0.00	0.00	53-125	40	07/05/2019 2125
1,2,4-Trichlorobenzene	ND	720	ND	N	100	0.00	0.00	30-130	40	07/05/2019 2125
2,4,5-Trichlorophenol	ND	140	370	N	100	261	3.0	30-130	40	07/05/2019 2125
2,4,6-Trichlorophenol	ND	140	ND	N,+	100	0.00	200	30-130	40	07/05/2019 2125

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		88	33-102
2-Fluorophenol	N	28	35-115
Nitrobenzene-d5		29	22-109
Phenol-d5		44	33-122
Terphenyl-d14	N	128	41-120
2,4,6-Tribromophenol		55	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ21005-001
Batch: 21005
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	07/05/2019 2246
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	07/05/2019 2246

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ21005-002
Batch: 21005
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	40		1	101	40-140	07/05/2019 2316
C9 - C18 Aliphatics	30	19		1	65	40-140	07/05/2019 2316

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		91	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MS

Sample ID: UF26025-004MS
Batch: 21005
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	260	45	370	N	1	257	40-140	07/06/2019 0513
C9 - C18 Aliphatics	880	33	1000	N	1	387	40-140	07/06/2019 0513

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		69	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MSD

Sample ID: UF26025-004MD
Batch: 21005
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	260	45	330	N	1	165	11	40-140	50	07/06/2019 0542
C9 - C18 Aliphatics	880	33	790	N	1	-273	24	40-140	50	07/06/2019 0542

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ21007-001
Batch: 21007
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	07/06/2019 0612

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		128	40-140
2-Fluorobiphenyl (fractionation 1)		127	40-140
o - Terphenyl (aromatic)		98	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ21007-002
Batch: 21007
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	69		1	82	40-140	07/06/2019 0642

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		113	40-140
2-Fluorobiphenyl (fractionation 1)		113	40-140
o - Terphenyl (aromatic)		94	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MS

Sample ID: UF26025-004MS
Batch: 21007
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	200	95	280		1	85	40-140	07/06/2019 1139

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		130	40-140
2-Fluorobiphenyl (fractionation 1)		134	40-140
o - Terphenyl (aromatic)		98	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MSD

Sample ID: UF26025-004MD
Batch: 21007
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/27/2019 1715

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	200	95	270		1	76	3.2	40-140	50	07/06/2019 1209

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)	N	144	40-140
2-Fluorobiphenyl (fractionation 1)	N	145	40-140
o - Terphenyl (aromatic)		113	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21740-001
Batch: 21740
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	07/05/2019 1545

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - LCS

Sample ID: UQ21740-002
Batch: 21740
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	20		1	108	70-130	07/05/2019 1449

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21740-003
Batch: 21740
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	104	3.5	70-130	25	07/05/2019 1517

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		85	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MS

Sample ID: UF26025-004MS
Batch: 21740
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	440	21	380	N	1	-539	70-130	07/05/2019 2033

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)	N	651	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MSD

Sample ID: UF26025-004MD
Batch: 21740
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	440	21	290	N	1	-944	25	70-130	25	07/05/2019 2101

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)	N	179	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21742-001
Batch: 21742
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	07/05/2019 1545
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	07/05/2019 1545
Ethylbenzene	ND		1	0.25	0.031	mg/kg	07/05/2019 1545
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	07/05/2019 1545
Naphthalene	ND		1	0.25	0.13	mg/kg	07/05/2019 1545
Toluene	ND		1	0.25	0.040	mg/kg	07/05/2019 1545
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	07/05/2019 1545
o - Xylenes	ND		1	0.25	0.028	mg/kg	07/05/2019 1545

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21742-002
Batch: 21742
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	07/05/2019 1517
C9 - C10 Aromatics	1.3	1.2		1	96	70-130	07/05/2019 1517
Ethylbenzene	1.3	1.2		1	96	70-130	07/05/2019 1517
Methyl tertiary butyl ether (MTBE)	1.3	1.0		1	80	70-130	07/05/2019 1517
Naphthalene	1.3	1.0		1	80	70-130	07/05/2019 1517
Toluene	1.3	1.2		1	96	70-130	07/05/2019 1517
m+p - Xylenes	2.5	2.5		1	100	70-130	07/05/2019 1517
o - Xylenes	1.3	1.2		1	96	70-130	07/05/2019 1517

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21742-003
Batch: 21742
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	8.0	70-130	25	07/05/2019 1449
C9 - C10 Aromatics	1.3	1.3		1	104	8.0	70-130	25	07/05/2019 1449
Ethylbenzene	1.3	1.3		1	104	8.0	70-130	25	07/05/2019 1449
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	9.5	70-130	25	07/05/2019 1449
Naphthalene	1.3	1.1		1	88	9.5	70-130	25	07/05/2019 1449
Toluene	1.3	1.3		1	104	8.0	70-130	25	07/05/2019 1449
m+p - Xylenes	2.5	2.6		1	104	3.9	70-130	25	07/05/2019 1449
o - Xylenes	1.3	1.3		1	104	8.0	70-130	25	07/05/2019 1449

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MS

Sample ID: UF26025-004MS
Batch: 21742
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	ND	1.3	1.3		1	104	70-130	07/05/2019 2033
C9 - C10 Aromatics	140	1.3	100	N	1	-3120	70-130	07/05/2019 2033
Ethylbenzene	3.0	1.3	3.6	N	1	48	70-130	07/05/2019 2033
Methyl tertiary butyl ether (MTBE)	ND	1.3	1.1		1	88	70-130	07/05/2019 2033
Naphthalene	4.2	1.3	8.2	N	1	320	70-130	07/05/2019 2033
Toluene	ND	1.3	1.3		1	104	70-130	07/05/2019 2033
m+p - Xylenes	0.46	2.5	3.1		1	106	70-130	07/05/2019 2033
o - Xylenes	1.4	1.3	2.7		1	104	70-130	07/05/2019 2033

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)	N	367	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MSD

Sample ID: UF26025-004MD
Batch: 21742
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	ND	1.3	1.5		1	120	14	70-130	25	07/05/2019 2101
C9 - C10 Aromatics	140	1.3	73	N,+	1	-5470	34	70-130	25	07/05/2019 2101
Ethylbenzene	3.0	1.3	2.9	N	1	-8.0	22	70-130	25	07/05/2019 2101
Methyl tertiary butyl ether (MTBE)	ND	1.3	1.2		1	96	8.7	70-130	25	07/05/2019 2101
Naphthalene	4.2	1.3	6.5	N	1	184	23	70-130	25	07/05/2019 2101
Toluene	ND	1.3	1.5		1	120	14	70-130	25	07/05/2019 2101
m+p - Xylenes	0.46	2.5	3.2		1	110	3.2	70-130	25	07/05/2019 2101
o - Xylenes	1.4	1.3	2.4		1	80	12	70-130	25	07/05/2019 2101

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)	N	331	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21743-001
Batch: 21743
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/05/2019 1545
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	07/05/2019 1545

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21743-002
Batch: 21743
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.3		1	106	70-130	07/05/2019 1449
C9 - C12 Aliphatics, Adjusted	3.8	4.0		1	108	70-130	07/05/2019 1449

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21743-003
Batch: 21743
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.1		1	101	4.5	70-130	25	07/05/2019 1517
C9 - C12 Aliphatics, Adjusted	3.8	3.8		1	101	6.8	70-130	25	07/05/2019 1517

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MS

Sample ID: UF26025-004MS
Batch: 21743
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	34	5.0	30	N	1	-72	70-130	07/05/2019 2033
C9 - C12 Aliphatics, Adjusted	220	3.8	190	N	1	-827	70-130	07/05/2019 2033

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)	N	753	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MSD

Sample ID: UF26025-004MD
Batch: 21743
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	34	5.0	20	N,+	1	-272	40	70-130	25	07/05/2019 2101
C9 - C12 Aliphatics, Adjusted	220	3.8	140	N,+	1	-2120	29	70-130	25	07/05/2019 2101

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)	N	779	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ21083-001
Batch: 21083
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	07/05/2019 1601
Arsenic	ND		1	0.50	0.20	mg/kg	07/05/2019 1601
Barium	ND		1	1.3	0.31	mg/kg	07/05/2019 1601
Beryllium	ND		1	0.10	0.034	mg/kg	07/05/2019 1601
Cadmium	ND		1	0.13	0.025	mg/kg	07/05/2019 1601
Chromium	ND		1	1.3	0.55	mg/kg	07/05/2019 1601
Cobalt	ND		1	1.3	0.30	mg/kg	07/05/2019 1601
Copper	ND		1	1.3	0.33	mg/kg	07/05/2019 1601
Lead	ND		1	0.25	0.068	mg/kg	07/05/2019 1601
Nickel	ND		1	1.3	0.30	mg/kg	07/05/2019 1601
Selenium	ND		1	1.3	0.47	mg/kg	07/05/2019 1601
Silver	ND		1	0.25	0.060	mg/kg	07/05/2019 1601
Vanadium	ND		1	1.3	0.25	mg/kg	07/05/2019 1601
Zinc	ND		1	2.5	0.50	mg/kg	07/05/2019 1601

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ21083-002
Batch: 21083
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	51		1	103	80-120	07/05/2019 1607
Arsenic	50	48		1	97	80-120	07/05/2019 1607
Barium	50	49		1	98	80-120	07/05/2019 1607
Beryllium	50	48		1	95	80-120	07/05/2019 1607
Cadmium	50	50		1	99	80-120	07/05/2019 1607
Chromium	50	44		1	88	80-120	07/05/2019 1607
Cobalt	50	51		1	103	80-120	07/05/2019 1607
Copper	50	50		1	101	80-120	07/05/2019 1607
Lead	50	54		1	108	80-120	07/05/2019 1607
Nickel	50	48		1	96	80-120	07/05/2019 1607
Selenium	50	47		1	93	80-120	07/05/2019 1607
Silver	50	56		1	112	80-120	07/05/2019 1607
Vanadium	50	44		1	88	80-120	07/05/2019 1607
Zinc	50	48		1	97	80-120	07/05/2019 1607

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UF26025-004MS
Batch: 21083
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	0.27	55	29	N	1	53	75-125	07/05/2019 1736
Arsenic	3.0	55	45		1	76	75-125	07/05/2019 1736
Barium	130	55	250	N	1	203	75-125	07/05/2019 1736
Beryllium	0.097	55	6.0	N	1	11	75-125	07/05/2019 1736
Cadmium	0.12	55	55		1	99	75-125	07/05/2019 1736
Chromium	35	55	93		1	106	75-125	07/05/2019 1736
Cobalt	6.2	55	51		1	81	75-125	07/05/2019 1736
Copper	16	55	59		1	77	75-125	07/05/2019 1736
Lead	9.5	55	71		1	111	75-125	07/05/2019 1736
Nickel	21	55	63		1	76	75-125	07/05/2019 1736
Selenium	ND	55	52		1	94	75-125	07/05/2019 1736
Silver	0.070	55	59		1	107	75-125	07/08/2019 0027
Vanadium	57	55	130	N	1	142	75-125	07/05/2019 1736
Zinc	68	55	130		1	118	75-125	07/05/2019 1736

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF26025-004MD
Batch: 21083
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 07/01/2019 831

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Antimony	0.27	48	22	N,+	1	45	30	75-125	20	07/05/2019 1742
Arsenic	3.0	48	39		1	75	15	75-125	20	07/05/2019 1742
Barium	130	48	230	N	1	197	7.7	75-125	20	07/05/2019 1742
Beryllium	0.097	48	4.7	N,+	1	9.8	23	75-125	20	07/05/2019 1742
Cadmium	0.12	48	48		1	101	12	75-125	20	07/05/2019 1742
Chromium	35	48	87		1	109	7.3	75-125	20	07/05/2019 1742
Cobalt	6.2	48	44		1	79	14	75-125	20	07/05/2019 1742
Copper	16	48	50	N	1	70	17	75-125	20	07/05/2019 1742
Lead	9.5	48	63		1	113	11	75-125	20	07/05/2019 1742
Nickel	21	48	56	N	1	74	12	75-125	20	07/05/2019 1742
Selenium	ND	48	44		1	93	15	75-125	20	07/05/2019 1742
Silver	0.070	48	52		1	108	13	75-125	20	07/08/2019 0033
Vanadium	57	48	130	N	1	148	5.7	75-125	20	07/05/2019 1742
Zinc	68	48	130	N	1	128	3.2	75-125	20	07/05/2019 1742

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20938-001
Batch: 20938
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/27/2019 1855

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/28/2019 1745

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20938-002
Batch: 20938
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/27/2019 1855

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.86		1	104	80-120	06/28/2019 1748

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody

and

Miscellaneous Documents

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Chain of Custody Record

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www.shealylab.com

Number 90159

Client: Ramboll	Report to Contact: Michael Wilson / Daniel Price	Telephone No. / E-mail: dprice@ramboll.com mwilson@ramboll.com	Quote No.
Address: 7500 College Blvd #1905	Sampler's Signature: x	Analysis (Attach list if more space is needed)	Page 1 of 1
City: Overland Park / State: KS / Zip Code: 66210	Printed Name: Elizabeth Bonicki		
Project Name: CMR-RIAM - West Rail			UF26025 KMN2
Project No.: 1690012344-003	P.O. No.		

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Grab / Composite	Matrix: Aqueous	Soil	Other Solids	No. of Containers by Preservative Type: Unpres.	HNO3	HCl	NaOH	H2SO4	MeOH	VOCs	SVOCs/EPHs	VPH	Metals	Remarks / Cooler I.D.
CMR-WB14-5.0-6.0-190625	6-25-2019	11:20	G		X		2				1	2	X	X	X	X	Cooler 001
CMR-WB14-20.0-21.0-190625	6-25-2019	11:25	G		X		2				1	2	X	X	X	X	Cooler 001
CMR-WB14-20.0-21.0-190625-DUP	6-25-2019	11:30	G		X		2				1	2	X	X	X	X	Cooler 001
CMR-WB15-4.0-5.0-190625	6-25-2019	13:00	G		X		6				3	6	X	X	X	X	Extra volume for MS/MSD Cooler 001

6-25-2019

Turn Around Time Required (Prior lab approval required for expedited TAT.) ☒ Standard ☐ Rush (Specify)	**Sample Disposal** ☐ Return to Client ☐ Disposal by Lab	**Possible Hazard Identification** ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown	**QC Requirements (Specify)**

	Date	Time		Date	Time
1. Relinquished by	6-25-2019	17:45	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: Fed Ex	6-26-19	1020	4. Laboratory received by: L Hile	6-26-19	1020

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack Receipt Temp. 3.4 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 09-01-2014

SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 06-26-2019 Lot #: UF26025

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

3.4 / 3.4 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 5 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☑ Yes	☐ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # _____

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA _____. Time of preservation NA _____. If more than one preservative is needed, please note in the comments below.

Sample(s) 005(2) _____ were received with bubbles >6 mm in diameter.

Samples(s) NA _____ were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA _____.

SR barcode labels applied by: MEC Date: 06-26-2019

Comments: WE RECEIVED 2 40ML HCL VIALS FOR TRIP BLANK THAT IS NOT LISTED ON THE COC.

MEMO

Date: **July 23, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF26052, 1 Groundwater Samples, 2 Water Samples

Data validation and usability assessment was conducted for data package UF26052 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB14D-190625	UF26052-001
CMR-190625-EB	UF26052-002
TB-26-20190625	UF26052-003

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of phenol. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all phenol results have been validated as estimated.

Blank Detections
During analysis, zinc, acetone, and bis(2-ethylhexyl)phthalate was detected in trip and method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All zinc, acetone, and bis(2-ethylhexyl)phthalate results below the RL or below 5x the blank result have been validated as non-detect (U).

Hold Time
All samples were analyzed by the lab within their hold time requirements. However, due to QC issues during the initial analysis some samples were reanalyzed outside of hold time. While these out of hold time results are generally usable, the results within hold time should be used preferentially.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF26052

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 1 GW, 2 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Zinc detected in equipment blank. Project sample detection of zinc validated as non-detect (U).
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	Project sample detection of zinc validated as non-detect (U).

SDG No. UF26052

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 1 GW, 2 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	Samples rerun due to surrogates out of criteria. All results ND. In hold time results should be used preferentially.
Blanks	Acetone and bis(2-ethylhexyl)phthalate detected in blank sample(s). Project sample detections of acetone and bis(2-ethylhexyl)phthalate validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	No issues	No issues
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported, no action taken.	No MS/MSD results reported, no action taken.
Laboratory Control Sample	LCS out of high for acetone. See above. LCS out low for phenol. All phenol results validated as estimated (J, UJ).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/A
Other Non-conformances	No other non-conformances noted.	No other non-conformances noted.
Overall Assessment of Data	Project sample detections of acetone and bis(2-ethylhexyl)phthalate validated as non-detect (U). Phenol results validated as estimated (J, UJ).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM - West Rail

Project Number: 1690012344-003

Lot Number:**UF26052**

Date Completed:07/11/2019

07/12/2019 12:54 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

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Case Narrative
Ramboll US Corporation
Lot Number: UF26052

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21720 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections above the LOQ for this compound in the samples associated with this batch; therefore, data quality is not impacted.

Semivolatiles
The method blank associated with batch 21123 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for bis(2-ethylhexyl)phthalate have been flagged with a “B” qualifier.

The LCS associated with batch 21123 had phenol recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Montana EPH
Samples -001 and -002 had surrogates recovered outside of the acceptnace limits. Both samples were re-extracted and re-analyzed outside of the holding time. A reduced initial volume was used for re-extraction due to insufficient sample volume; the reporting limits have been raised accordingly. Both sets of data are reported.

Sample Summary
Ramboll US Corporation
Lot Number: UF26052

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB14D-190625	Aqueous	06/25/2019 1330	06/26/2019
002	CMR-190625-EB	Aqueous	06/25/2019 1650	06/26/2019
003	TB-28-20190625	Aqueous	06/25/2019	06/26/2019

(3 samples)

Detection Summary

Ramboll US Corporation

Lot Number: UF26052

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB14D-190625	Aqueous	Acetone	8260B	7.2	J	ug/L	6
001	CMR-WB14D-190625	Aqueous	1,2-Dichloroethane	8260B	0.93		ug/L	6
001	CMR-WB14D-190625	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	2.3	BJ	ug/L	8
001	CMR-WB14D-190625	Aqueous	Barium	6020B	17		ug/L	17
001	CMR-WB14D-190625	Aqueous	Cobalt	6020B	2.5	J	ug/L	17
001	CMR-WB14D-190625	Aqueous	Copper	6020B	4.0	J	ug/L	17
001	CMR-WB14D-190625	Aqueous	Nickel	6020B	26		ug/L	17
001	CMR-WB14D-190625	Aqueous	Zinc	6020B	11		ug/L	17
002	CMR-190625-EB	Aqueous	Acetone	8260B	8.4	J	ug/L	18
002	CMR-190625-EB	Aqueous	Carbon disulfide	8260B	0.67		ug/L	18
002	CMR-190625-EB	Aqueous	Chloroform	8260B	0.91		ug/L	18
002	CMR-190625-EB	Aqueous	Toluene	8260B	0.47	J	ug/L	18
002	CMR-190625-EB	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.81	BJ	ug/L	20
002	CMR-190625-EB	Aqueous	2-Methylnaphthalene	8270D	0.11	J	ug/L	21
002	CMR-190625-EB	Aqueous	Naphthalene	8270D	0.11	J	ug/L	21
002	CMR-190625-EB	Aqueous	Zinc	6020B	5.0	J	ug/L	29
003	TB-28-20190625	Aqueous	Acetone	8260B	5.1	J	ug/L	30

(17 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/06/2019 1657	BWS		21720
2	5030B	8260B	1	07/09/2019 2342	STM		22058

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	7.2	J	10	2.0	ug/L	2
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	0.93		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/06/2019 1657	BWS		21720
2	5030B	8260B	1	07/09/2019 2342	STM		22058

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		95	70-130		99	70-130
Bromofluorobenzene		103	70-130		95	70-130
Toluene-d8		101	70-130		102	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	07/06/2019 2315	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	2.3	BJ	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	07/06/2019 2315	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		57	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		64	38-127
Phenol-d5		37	28-128
Terphenyl-d14		91	10-148
2,4,6-Tribromophenol		82	35-144

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 2005	CHG	06/27/2019 1005	20903
2	Montana EPH	Montana EPH	1	07/05/2019 1818	DAL1	07/03/2019 0912	21484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)	N	31	40-140		65	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 2005	CHG	06/27/2019 1005	20903
2	Montana EPH	Montana EPH	1	07/05/2019 1818	DAL1	07/03/2019 0912	21484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		330	330	ug/L	2
C9 - C18 Aliphatics		Montana EPH	ND		330	330	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)	N	31	40-140		65	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/29/2019 0202	CHG	06/27/2019 1005	20904
2	Montana EPH	Montana EPH	1	07/05/2019 2146	DAL1	07/03/2019 0912	21485

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		48	40-140		99	40-140
2-Fluorobiphenyl (fractionation 1)		94	40-140		100	40-140
o - Terphenyl (aromatic)		81	40-140		79	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/29/2019 0202	CHG	06/27/2019 1005	20904
2	Montana EPH	Montana EPH	1	07/05/2019 2146	DAL1	07/03/2019 0912	21485

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		330	330	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		48	40-140		99	40-140
2-Fluorobiphenyl (fractionation 1)		94	40-140		100	40-140
o - Terphenyl (aromatic)		81	40-140		79	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1750	JJG		21450

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1750	JJG		21449

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		84	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1750	JJG		21447

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-001
Description: CMR-WB14D-190625
Matrix: Aqueous
Date Sampled: 06/25/2019 1330
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	07/01/2019 1926	JMH	06/30/2019 1528	21226
1	3005A	6020B	1	07/02/2019 1742	BNW	06/27/2019 0834	20900
2	3005A	6020B	1	07/05/2019 1303	LLL	06/27/2019 0834	20900

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	ND		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	17		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	2.5	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	4.0	J	5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	26		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	11		10	2.5	ug/L	2

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/06/2019 1452	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	8.4	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	0.67		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	0.91		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	0.47	J	0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/06/2019 1452	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		94	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	07/06/2019 2340	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.81	BJ	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	07/06/2019 2340	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	0.11	J	0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	0.11	J	0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		71	37-129
2-Fluorophenol		47	24-127
Nitrobenzene-d5		81	38-127
Phenol-d5		53	28-128
Terphenyl-d14		100	10-148
2,4,6-Tribromophenol		87	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 2035	CHG	06/27/2019 1005	20903
2	Montana EPH	Montana EPH	1	07/05/2019 1848	DAL1	07/03/2019 0912	21484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		63	40-140		80	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/28/2019 2035	CHG	06/27/2019 1005	20903
2	Montana EPH	Montana EPH	1	07/05/2019 1848	DAL1	07/03/2019 0912	21484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		310	310	ug/L	2
C9 - C18 Aliphatics		Montana EPH	ND		310	310	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		63	40-140		80	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/29/2019 0231	CHG	06/27/2019 1005	20904
2	Montana EPH	Montana EPH	1	07/05/2019 2216	DAL1	07/03/2019 0912	21485

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)	N	34	40-140		104	40-140
2-Fluorobiphenyl (fractionation 1)		72	40-140		105	40-140
o - Terphenyl (aromatic)		75	40-140		85	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/29/2019 0231	CHG	06/27/2019 1005	20904
2	Montana EPH	Montana EPH	1	07/05/2019 2216	DAL1	07/03/2019 0912	21485

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		310	310	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)	N	34	40-140		104	40-140
2-Fluorobiphenyl (fractionation 1)		72	40-140		105	40-140
o - Terphenyl (aromatic)		75	40-140		85	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1818	JJG		21450

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		90	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1818	JJG		21449

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		85	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	07/02/2019 1818	JJG		21447

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-002
Description: CMR-190625-EB
Matrix: Aqueous
Date Sampled: 06/25/2019 1650
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	07/01/2019 1934	JMH	06/30/2019 1528	21226
1	3005A	6020B	1	07/02/2019 1748	BNW	06/27/2019 0834	20900
2	3005A	6020B	1	07/05/2019 1309	LLL	06/27/2019 0834	20900

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	ND		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	ND		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	ND		5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	ND		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	5.0	J	10	2.5	ug/L	2

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-003
Description: TB-28-20190625
Matrix: Aqueous
Date Sampled: 06/25/2019
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/06/2019 1517	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	5.1	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF26052-003
Description: TB-28-20190625
Matrix: Aqueous
Date Sampled: 06/25/2019
Date Received: 06/26/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/06/2019 1517	BWS		21720

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		96	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21720-001
Batch: 21720
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/06/2019 1352
Benzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Bromoform	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/06/2019 1352
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/06/2019 1352
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Chloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Chloroform	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Cyclohexane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/06/2019 1352
1,4-Dioxane	ND		1	20	13	ug/L	07/06/2019 1352
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
2-Hexanone	ND		1	10	2.0	ug/L	07/06/2019 1352
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Methyl acetate	ND		1	1.0	0.40	ug/L	07/06/2019 1352
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/06/2019 1352
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/06/2019 1352
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/06/2019 1352
Methylene chloride	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Naphthalene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Styrene	ND		1	0.50	0.41	ug/L	07/06/2019 1352
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Toluene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/06/2019 1352

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21720-001
Batch: 21720
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Trichloroethene	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/06/2019 1352
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/06/2019 1352
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/06/2019 1352
o - Xylenes	ND		1	0.50	0.40	ug/L	07/06/2019 1352

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		94	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21720-002
Batch: 21720
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	160	N	1	156	60-140	07/06/2019 1239
Benzene	50	49		1	98	70-130	07/06/2019 1239
Bromochloromethane	50	45		1	90	70-130	07/06/2019 1239
Bromodichloromethane	50	48		1	96	70-130	07/06/2019 1239
Bromoform	50	50		1	100	70-130	07/06/2019 1239
Bromomethane (Methyl bromide)	50	43		1	87	70-130	07/06/2019 1239
2-Butanone (MEK)	100	120		1	121	70-130	07/06/2019 1239
Carbon disulfide	50	50		1	100	70-130	07/06/2019 1239
Carbon tetrachloride	50	43		1	86	70-130	07/06/2019 1239
Chlorobenzene	50	49		1	99	70-130	07/06/2019 1239
Chloroethane	50	48		1	96	70-130	07/06/2019 1239
Chloroform	50	45		1	89	70-130	07/06/2019 1239
Chloromethane (Methyl chloride)	50	44		1	88	60-140	07/06/2019 1239
Cyclohexane	50	42		1	84	70-130	07/06/2019 1239
1,2-Dibromo-3-chloropropane (DBCP)	50	51		1	102	70-130	07/06/2019 1239
Dibromochloromethane	50	49		1	97	70-130	07/06/2019 1239
1,2-Dibromoethane (EDB)	50	50		1	100	70-130	07/06/2019 1239
1,2-Dichlorobenzene	50	50		1	100	70-130	07/06/2019 1239
1,3-Dichlorobenzene	50	49		1	99	70-130	07/06/2019 1239
1,4-Dichlorobenzene	50	50		1	99	70-130	07/06/2019 1239
Dichlorodifluoromethane	50	43		1	87	60-140	07/06/2019 1239
1,1-Dichloroethane	50	48		1	95	70-130	07/06/2019 1239
1,2-Dichloroethane	50	47		1	94	70-130	07/06/2019 1239
1,1-Dichloroethene	50	45		1	90	70-130	07/06/2019 1239
cis-1,2-Dichloroethene	50	45		1	91	70-130	07/06/2019 1239
trans-1,2-Dichloroethene	50	46		1	92	70-130	07/06/2019 1239
1,2-Dichloropropane	50	49		1	98	70-130	07/06/2019 1239
cis-1,3-Dichloropropene	50	50		1	101	70-130	07/06/2019 1239
trans-1,3-Dichloropropene	50	49		1	99	70-130	07/06/2019 1239
1,4-Dioxane	500	390		1	78	60-140	07/06/2019 1239
Ethylbenzene	50	50		1	101	70-130	07/06/2019 1239
2-Hexanone	100	110		1	109	70-130	07/06/2019 1239
Isopropylbenzene	50	51		1	103	70-130	07/06/2019 1239
Methyl acetate	50	37		1	73	70-130	07/06/2019 1239
Methyl tertiary butyl ether (MTBE)	50	50		1	99	70-130	07/06/2019 1239
4-Methyl-2-pentanone	100	96		1	96	70-130	07/06/2019 1239
Methylcyclohexane	50	51		1	101	70-130	07/06/2019 1239
Methylene chloride	50	45		1	90	70-130	07/06/2019 1239
Naphthalene	50	50		1	99	70-130	07/06/2019 1239
Styrene	50	51		1	102	70-130	07/06/2019 1239
1,1,2,2-Tetrachloroethane	50	49		1	98	70-130	07/06/2019 1239
Tetrachloroethene	50	51		1	101	70-130	07/06/2019 1239
Toluene	50	49		1	97	70-130	07/06/2019 1239
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	50		1	100	70-130	07/06/2019 1239

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21720-002
Batch: 21720
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	49		1	98	70-130	07/06/2019 1239
1,2,4-Trichlorobenzene	50	50		1	100	70-130	07/06/2019 1239
1,1,1-Trichloroethane	50	45		1	90	70-130	07/06/2019 1239
1,1,2-Trichloroethane	50	49		1	97	70-130	07/06/2019 1239
Trichloroethene	50	48		1	97	70-130	07/06/2019 1239
Trichlorofluoromethane	50	44		1	89	70-130	07/06/2019 1239
Vinyl chloride	50	40		1	81	70-130	07/06/2019 1239
Xylenes (total)	100	99		1	99	70-130	07/06/2019 1239
m+p - Xylenes	50	49		1	98	70-130	07/06/2019 1239
o - Xylenes	50	51		1	101	70-130	07/06/2019 1239

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		99	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ22058-001
Batch: 22058
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/09/2019 2242

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		96	70-130
Bromofluorobenzene		93	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ22058-002
Batch: 22058
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	88		1	88	60-140	07/09/2019 2138

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		93	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21123-001
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Acenaphthylene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	07/05/2019 1135
Carbazole	ND		1	0.80	0.040	ug/L	07/05/2019 1135
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	07/05/2019 1135
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	07/05/2019 1135
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	07/05/2019 1135
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	07/05/2019 1135
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	07/05/2019 1135
2-Chlorophenol	ND		1	0.80	0.15	ug/L	07/05/2019 1135
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	07/05/2019 1135
Chrysene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Dibenzofuran	ND		1	0.80	0.16	ug/L	07/05/2019 1135
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	07/05/2019 1135
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	07/05/2019 1135
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	07/05/2019 1135
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
Diethylphthalate	ND		1	4.0	0.19	ug/L	07/05/2019 1135
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	07/05/2019 1135
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	07/05/2019 1135
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	07/05/2019 1135
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	07/05/2019 1135
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	07/05/2019 1135
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	07/05/2019 1135
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	07/05/2019 1135
bis(2-Ethylhexyl)phthalate	0.62	J	1	4.0	0.38	ug/L	07/05/2019 1135
Fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Fluorene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	07/05/2019 1135
Hexachloroethane	ND		1	0.80	0.17	ug/L	07/05/2019 1135
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Isophorone	ND		1	0.80	0.22	ug/L	07/05/2019 1135

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21123-001
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
2-Methylphenol	ND		1	0.80	0.21	ug/L	07/05/2019 1135
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	07/05/2019 1135
Naphthalene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
2-Nitroaniline	ND		1	1.6	0.66	ug/L	07/05/2019 1135
3-Nitroaniline	ND		1	1.6	0.15	ug/L	07/05/2019 1135
4-Nitroaniline	ND		1	1.6	1.3	ug/L	07/05/2019 1135
Nitrobenzene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
2-Nitrophenol	ND		1	1.6	0.44	ug/L	07/05/2019 1135
4-Nitrophenol	ND		1	4.0	2.1	ug/L	07/05/2019 1135
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	07/05/2019 1135
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	07/05/2019 1135
Pentachlorophenol	ND		1	4.0	1.3	ug/L	07/05/2019 1135
Phenanthrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Phenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
Pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	07/05/2019 1135
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	07/05/2019 1135
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	07/05/2019 1135
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	07/05/2019 1135

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		64	37-129
2-Fluorophenol		44	24-127
Nitrobenzene-d5		68	38-127
Phenol-d5		40	28-128
Terphenyl-d14		95	10-148
2,4,6-Tribromophenol		56	35-144

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21123-002
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.7		1	59	30-122	07/06/2019 2045
Acenaphthylene	8.0	5.1		1	63	30-130	07/06/2019 2045
Anthracene	8.0	5.6		1	70	30-123	07/06/2019 2045
Benzo(a)anthracene	8.0	5.9		1	74	40-125	07/06/2019 2045
Benzo(a)pyrene	8.0	5.9		1	74	40-128	07/06/2019 2045
Benzo(b)fluoranthene	8.0	6.8		1	85	30-130	07/06/2019 2045
Benzo(g,h,i)perylene	8.0	6.0		1	75	30-130	07/06/2019 2045
Benzo(k)fluoranthene	8.0	6.0		1	76	30-130	07/06/2019 2045
4-Bromophenyl phenyl ether	8.0	5.3		1	67	30-124	07/06/2019 2045
Butyl benzyl phthalate	8.0	6.3		1	79	54-135	07/06/2019 2045
Carbazole	8.0	5.8		1	72	45-101	07/06/2019 2045
bis (2-Chloro-1-methylethyl) ether	8.0	6.2		1	77	42-124	07/06/2019 2045
4-Chloro-3-methyl phenol	8.0	4.7		1	58	30-123	07/06/2019 2045
bis(2-Chloroethoxy)methane	8.0	4.8		1	60	44-127	07/06/2019 2045
bis(2-Chloroethyl)ether	8.0	5.6		1	70	46-120	07/06/2019 2045
2-Chloronaphthalene	8.0	4.8		1	60	46-100	07/06/2019 2045
2-Chlorophenol	8.0	4.2		1	52	50-117	07/06/2019 2045
4-Chlorophenyl phenyl ether	8.0	4.9		1	61	30-121	07/06/2019 2045
Chrysene	8.0	6.2		1	78	30-130	07/06/2019 2045
Dibenzo(a,h)anthracene	8.0	6.3		1	78	30-130	07/06/2019 2045
Dibenzofuran	8.0	4.8		1	61	30-118	07/06/2019 2045
1,2-Dichlorobenzene	8.0	4.3		1	53	32-111	07/06/2019 2045
1,3-Dichlorobenzene	8.0	4.2		1	52	28-110	07/06/2019 2045
1,4-Dichlorobenzene	8.0	4.3		1	53	29-112	07/06/2019 2045
3,3'-Dichlorobenzidine	8.0	4.1		1	52	10-126	07/06/2019 2045
2,4-Dichlorophenol	8.0	4.5		1	56	30-121	07/06/2019 2045
Diethylphthalate	8.0	5.7		1	72	40-125	07/06/2019 2045
Dimethyl phthalate	8.0	5.6		1	71	40-127	07/06/2019 2045
2,4-Dimethylphenol	8.0	5.9		1	74	20-125	07/06/2019 2045
Di-n-butyl phthalate	8.0	6.1		1	76	40-127	07/06/2019 2045
4,6-Dinitro-2-methylphenol	8.0	6.3		1	78	56-128	07/06/2019 2045
2,4-Dinitrophenol	16	8.9		1	56	11-126	07/06/2019 2045
2,4-Dinitrotoluene	8.0	5.7		1	71	59-127	07/06/2019 2045
2,6-Dinitrotoluene	8.0	5.4		1	67	59-126	07/06/2019 2045
Di-n-octylphthalate	8.0	4.2		1	53	50-136	07/06/2019 2045
bis(2-Ethylhexyl)phthalate	8.0	5.4		1	67	56-128	07/06/2019 2045
Fluoranthene	8.0	5.6		1	71	40-128	07/06/2019 2045
Fluorene	8.0	5.0		1	62	30-124	07/06/2019 2045
Hexachlorobenzene	8.0	5.6		1	70	30-125	07/06/2019 2045
Hexachlorobutadiene	8.0	4.1		1	51	24-110	07/06/2019 2045
Hexachlorocyclopentadiene	40	17		1	42	16-96	07/06/2019 2045
Hexachloroethane	8.0	4.0		1	51	31-110	07/06/2019 2045
Indeno(1,2,3-c,d)pyrene	8.0	5.8		1	72	30-130	07/06/2019 2045
Isophorone	8.0	5.3		1	66	57-123	07/06/2019 2045

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21123-002
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.6		1	58	40-132	07/06/2019 2045
2-Methylphenol	8.0	6.2		1	78	56-119	07/06/2019 2045
3+4-Methylphenol	8.0	5.8		1	73	53-119	07/06/2019 2045
Naphthalene	8.0	4.6		1	58	30-130	07/06/2019 2045
2-Nitroaniline	8.0	5.9		1	73	60-124	07/06/2019 2045
3-Nitroaniline	8.0	5.8		1	72	43-123	07/06/2019 2045
4-Nitroaniline	8.0	6.0		1	76	30-135	07/06/2019 2045
Nitrobenzene	8.0	5.0		1	63	51-122	07/06/2019 2045
2-Nitrophenol	8.0	5.4		1	68	51-118	07/06/2019 2045
4-Nitrophenol	16	10		1	65	53-130	07/06/2019 2045
N-Nitrosodi-n-propylamine	8.0	5.9		1	73	54-127	07/06/2019 2045
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.6		1	69	30-123	07/06/2019 2045
Pentachlorophenol	16	11		1	67	42-131	07/06/2019 2045
Phenanthrene	8.0	5.3		1	66	40-123	07/06/2019 2045
Phenol	8.0	3.8	N	1	47	49-117	07/06/2019 2045
Pyrene	8.0	6.2		1	77	40-126	07/06/2019 2045
1,2,4,5-Tetrachlorobenzene	8.0	4.4		1	55	30-130	07/06/2019 2045
2,3,4,6-Tetrachlorophenol	8.0	5.3		1	66	30-130	07/06/2019 2045
1,2,4-Trichlorobenzene	8.0	4.4		1	55	20-90	07/06/2019 2045
2,4,5-Trichlorophenol	8.0	4.8		1	60	30-123	07/06/2019 2045
2,4,6-Trichlorophenol	8.0	5.1		1	64	30-125	07/06/2019 2045

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		62	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		65	38-127
Phenol-d5		48	28-128
Terphenyl-d14		90	10-148
2,4,6-Tribromophenol		81	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20903-001
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	06/28/2019 1501
C9 - C18 Aliphatics	ND		1	100	100	ug/L	06/28/2019 1501

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20903-002
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	300		1	75	40-140	06/28/2019 1531
C9 - C18 Aliphatics	300	160		1	52	40-140	06/28/2019 1531

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		67	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20903-003
Batch: 20903
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	320		1	80	6.8	40-140	25	06/28/2019 1601
C9 - C18 Aliphatics	300	160		1	55	5.0	40-140	25	06/28/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		73	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20904-001
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	06/28/2019 2105

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		97	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		81	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20904-002
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	560		1	66	40-140	06/28/2019 2135

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		91	40-140
o - Terphenyl (aromatic)		72	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20904-003
Batch: 20904
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/27/2019 1005

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	620		1	73	9.8	40-140	25	06/28/2019 2205

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		64	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		79	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ21484-001
Batch: 21484
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	07/05/2019 1524
C9 - C18 Aliphatics	ND		1	100	100	ug/L	07/05/2019 1524

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		78	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ21484-002
Batch: 21484
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	330		1	84	40-140	07/05/2019 1602
C9 - C18 Aliphatics	300	190		1	65	40-140	07/05/2019 1602

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		77	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ21484-003
Batch: 21484
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	350		1	89	5.7	40-140	25	07/05/2019 1632
C9 - C18 Aliphatics	300	210		1	70	7.6	40-140	25	07/05/2019 1632

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		81	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ21485-001
Batch: 21485
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	07/05/2019 1917

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		103	40-140
2-Fluorobiphenyl (fractionation 1)		104	40-140
o - Terphenyl (aromatic)		83	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ21485-002
Batch: 21485
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	640		1	75	40-140	07/05/2019 1947

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		104	40-140
2-Fluorobiphenyl (fractionation 1)		106	40-140
o - Terphenyl (aromatic)		84	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ21485-003
Batch: 21485
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	620		1	73	3.2	40-140	25	07/05/2019 2017

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		100	40-140
2-Fluorobiphenyl (fractionation 1)		102	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21447-001
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21447-002
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	400		1	108	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21447-003
Batch: 21447
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	400		1	106	2.0	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21449-001
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	07/02/2019 1208
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	07/02/2019 1208
Ethylbenzene	ND		1	5.0	0.62	ug/L	07/02/2019 1208
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	07/02/2019 1208
Naphthalene	ND		1	5.0	0.70	ug/L	07/02/2019 1208
Toluene	ND		1	5.0	0.53	ug/L	07/02/2019 1208
m+p - Xylenes	ND		1	5.0	1.2	ug/L	07/02/2019 1208
o - Xylenes	ND		1	5.0	0.58	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21449-002
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	26		1	103	70-130	07/02/2019 1112
C9 - C10 Aromatics	25	27		1	106	70-130	07/02/2019 1112
Ethylbenzene	25	26		1	103	70-130	07/02/2019 1112
Methyl tertiary butyl ether (MTBE)	25	24		1	96	70-130	07/02/2019 1112
Naphthalene	25	24		1	95	70-130	07/02/2019 1112
Toluene	25	25		1	101	70-130	07/02/2019 1112
m+p - Xylenes	50	52		1	104	70-130	07/02/2019 1112
o - Xylenes	25	25		1	101	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21449-003
Batch: 21449
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	26		1	102	0.78	70-130	25	07/02/2019 1140
C9 - C10 Aromatics	25	25		1	99	6.6	70-130	25	07/02/2019 1140
Ethylbenzene	25	25		1	101	2.0	70-130	25	07/02/2019 1140
Methyl tertiary butyl ether (MTBE)	25	25		1	101	5.7	70-130	25	07/02/2019 1140
Naphthalene	25	23		1	93	2.1	70-130	25	07/02/2019 1140
Toluene	25	25		1	100	1.6	70-130	25	07/02/2019 1140
m+p - Xylenes	50	50		1	101	3.1	70-130	25	07/02/2019 1140
o - Xylenes	25	25		1	99	2.0	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21450-001
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/02/2019 1208
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/02/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21450-002
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	112	70-130	07/02/2019 1112
C9 - C12 Aliphatics, Adjusted	75	79		1	105	70-130	07/02/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21450-003
Batch: 21450
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	110	1.8	70-130	25	07/02/2019 1140
C9 - C12 Aliphatics, Adjusted	75	77		1	103	1.7	70-130	25	07/02/2019 1140

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20900-001
Batch: 20900
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/27/2019 834

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	07/02/2019 1543
Arsenic	ND		1	2.0	1.3	ug/L	07/02/2019 1543
Barium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Beryllium	ND		1	0.40	0.15	ug/L	07/02/2019 1543
Cadmium	ND		1	0.50	0.13	ug/L	07/02/2019 1543
Chromium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Cobalt	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Copper	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Lead	ND		1	1.0	0.25	ug/L	07/02/2019 1543
Nickel	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Selenium	ND		1	5.0	1.3	ug/L	07/02/2019 1543
Silver	ND		1	1.0	0.25	ug/L	07/02/2019 1543
Vanadium	ND		1	5.0	2.5	ug/L	07/02/2019 1543
Zinc	ND		1	10	2.5	ug/L	07/02/2019 1543

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20900-002
Batch: 20900
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/27/2019 834

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	96		1	96	80-120	07/02/2019 1549
Arsenic	100	100		1	103	80-120	07/02/2019 1549
Barium	100	98		1	98	80-120	07/02/2019 1549
Beryllium	100	99		1	99	80-120	07/02/2019 1549
Cadmium	100	96		1	96	80-120	07/02/2019 1549
Chromium	100	100		1	101	80-120	07/02/2019 1549
Cobalt	100	100		1	102	80-120	07/02/2019 1549
Copper	100	98		1	98	80-120	07/02/2019 1549
Lead	100	100		1	100	80-120	07/02/2019 1549
Nickel	100	100		1	101	80-120	07/02/2019 1549
Selenium	100	98		1	98	80-120	07/02/2019 1549
Silver	100	100		1	102	80-120	07/02/2019 1549
Vanadium	100	100		1	100	80-120	07/02/2019 1549
Zinc	100	96		1	96	80-120	07/02/2019 1549

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ21226-001
Batch: 21226
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/30/2019 1528

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	07/01/2019 1921

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ21226-002
Batch: 21226
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/30/2019 1528

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	95	80-120	07/01/2019 1924

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UF26052-001MS
Batch: 21226
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/30/2019 1528

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	ND	0.0020	0.0021		1	103	85-115	07/01/2019 1929

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF26052-001MD
Batch: 21226
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/30/2019 1528

Parameter	Sample Amount (mg/L)	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Mercury	ND	0.0020	0.0020		1	102	0.67	85-115	20	07/01/2019 1931

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody

and

Miscellaneous Documents

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Chain of Custody Record

Number 90160

Client: Ramboll	Report to Contact: Michael Wilson / Daniel Price	Telephone No. / E-mail: dprice@ramboll.com mwilson@ramboll.com	Quote No.: 21552
Address: 7500 College Blvd #1905	Sampler's Signature: x	Analysis (Attach list if more space is needed)	Page 1 of 1
City: Overland Park / State: KS / Zip Code: 66210	Printed Name: Elizabeth Bonucci		UF26052 KMNS
Project Name: CMR-RIAIM-West Rail			
Project No.: 1690492344-003	P.O. No.		

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Grab / Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No of Containers by Preservative Type: Unpres.	HNO3	HCl	NaOH	Other	VOCs	SVOCs	EPHs	VPHs	Metals	Remarks / Cooler I.D.
CMR-WP14D-190625	6-25-2019	13:30	G	X			2		1	7		X	X	X	X	X	Cooler 003
CMR-190625-EB	6-25-2019	16:50	G	X			2		1	7		X	X	X	X	X	Equipment Blank Cooler 003

Erin Brown 6-25-2019

Turn Around Time Required (Prior lab approval required for expedited TAT.): X Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by	6-25-2019	17:45	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: FedEX	6-26-19	1020	4. Laboratory received by: Erin Brown	6-26-19	1020

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY — Received on Ice (Circle): (Yes) / No — Ice Pack — Receipt Temp. 3.1 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 08-01-2014

SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: Ramboll Cooler Inspected by/date: ETB / 6/26/19 Lot #: UF26052

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: ETB

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

3.1 / 3.1 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☑ Yes	☐ No		21. Was the quote number listed on the container label? If yes, Quote # 21552

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: ETB Date: 6/26/19

Comments:

MEMO

Date: **July 23, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF28032, 1 Groundwater Sample, 1 Water Sample

Data validation and usability assessment was conducted for data package UF28032 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-MW100-190626	UF28032-001
TB-28-20190627	UF28032-002

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of phenol. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all phenol results have been validated as estimated.

Blank Detections
During analysis, zinc, acetone, and bis(2-ethylhexyl)phthalate were detected in trip and method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All zinc, acetone, and bis(2-ethylhexyl)phthalate results below the RL or below 5x the blank result have been validated as non-detect (U).

Hold Time
All samples were analyzed by the lab within their hold time requirements. However, due to QC issues during the initial analysis some samples were reanalyzed outside of hold time. While these out of hold time results are generally usable, the results within hold time should be used preferentially.

Calibration Range Exceedances
During analysis naphthalene was detected above the calibration range of the instrument. Results outside of calibration range are unreliable due to reduced accuracy. The sample was rerun at a dilution and naphthalene was then detected within range. The result within calibration range should be used for project purposes.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF28032

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 1 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Zinc detected in method blank. Project sample detection of zinc validated as non-detect (U).
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	Project sample detection of zinc validated as non-detect (U).

SDG No. UF28032

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 1 GW, 1 Water

Reviewer Name R Huening

Completion Date July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	VOC analysis had naphthalene out of calibration range. Sample was rerun at dilution out of hold time. Naphthalene result from dilution was within range. Diluted result should be used though it is validated as estimated (J).	No issues
Blanks	Acetone and bis(2-ethylhexyl)phthalate detected in blank sample(s). Project sample detections of acetone and bis(2-ethylhexyl)phthalate validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	No issues	Surrogates out due to matrix interference, no action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported, no action taken.	No MS/MSD results reported, no action taken.
Laboratory Control Sample	LCS out low for phenol. All phenol results validated as estimated (J, UJ).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/A
Other Non-conformances	No other non-conformances noted.	No other non-conformances noted.
Overall Assessment of Data	Project sample detections of acetone and bis(2-ethylhexyl)phthalate validated as non-detect (U). Phenol results validated as estimated (J, UJ). Project sample detection of naphthalene validated as estimated (J).	No validation action warranted.

SDG No. UF28032 **Site** Calumet Montana Refining

Laboratory Shealy Environmental **Number of Samples/Matrix** 1 GW, 1 Water

Reviewer Name R Huening **Completion Date** July 16, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
	Diluted naphthalene result should be used though it is validated as estimated (J).	

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF28032**

Date Completed:07/15/2019

07/15/2019 1:29 PM
Approved and released by:
Project Manager: Kelly M. Nance

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF28032

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
Sample -001 had naphthalene recovered above the instrument's calibration range in the initial analysis. A 5X dilution was analyzed outside of the 14-day holding time. Both sets of data are reported.

Semivolatiles
The method blank associated with batch 21123 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. There were no detections for this compound in the samples associated with this method blank.

The laboratory control sample (LCS) associated with batch 21123 had phenol recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Montana VPH
Sample -001 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene and MTBE, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Sample -001 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The method blank associated with batch 21526 had zinc detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for zinc have been flagged with a “B” qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF28032

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-MW100-190626	Aqueous	06/27/2019 1412	06/28/2019
002	TB-28-20190627	Aqueous	06/27/2019	06/28/2019

(2 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF28032

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-MW100-190626	Aqueous	Acetone	8260B	12		ug/L	6
001	CMR-MW100-190626	Aqueous	Benzene	8260B	170		ug/L	6
001	CMR-MW100-190626	Aqueous	2-Butanone (MEK)	8260B	2.6	J	ug/L	6
001	CMR-MW100-190626	Aqueous	Cyclohexane	8260B	4.6		ug/L	6
001	CMR-MW100-190626	Aqueous	1,2-Dichloroethane	8260B	3.7		ug/L	6
001	CMR-MW100-190626	Aqueous	cis-1,2-Dichloroethene	8260B	0.53		ug/L	6
001	CMR-MW100-190626	Aqueous	Ethylbenzene	8260B	31		ug/L	6
001	CMR-MW100-190626	Aqueous	Isopropylbenzene	8260B	4.7		ug/L	6
001	CMR-MW100-190626	Aqueous	Methylcyclohexane	8260B	4.1	J	ug/L	6
001	CMR-MW100-190626	Aqueous	Toluene	8260B	2.5		ug/L	6
001	CMR-MW100-190626	Aqueous	Xylenes (total)	8260B	28		ug/L	7
001	CMR-MW100-190626	Aqueous	m+p - Xylenes	8260B	19		ug/L	7
001	CMR-MW100-190626	Aqueous	o - Xylenes	8260B	9.1		ug/L	7
001	CMR-MW100-190626	Aqueous	Naphthalene	8260B	590	H	ug/L	8
001	CMR-MW100-190626	Aqueous	Acenaphthene	8270D	5.6		ug/L	10
001	CMR-MW100-190626	Aqueous	Dibenzofuran	8270D	4.5	J	ug/L	10
001	CMR-MW100-190626	Aqueous	Fluorene	8270D	5.5		ug/L	10
001	CMR-MW100-190626	Aqueous	2-Methylnaphthalene	8270D	570		ug/L	11
001	CMR-MW100-190626	Aqueous	Naphthalene	8270D	350		ug/L	11
001	CMR-MW100-190626	Aqueous	Phenanthrene	8270D	2.7	J	ug/L	11
001	CMR-MW100-190626	Aqueous	C11 - C22 Aromatics	Montana EPH	2300		ug/L	13
001	CMR-MW100-190626	Aqueous	C9 - C12 Aliphatics,	Montana VPH	330	J	ug/L	14
001	CMR-MW100-190626	Aqueous	Benzene	Montana VPH	140		ug/L	15
001	CMR-MW100-190626	Aqueous	C9 - C10 Aromatics	Montana VPH	570		ug/L	15
001	CMR-MW100-190626	Aqueous	Ethylbenzene	Montana VPH	32		ug/L	15
001	CMR-MW100-190626	Aqueous	Naphthalene	Montana VPH	580		ug/L	15
001	CMR-MW100-190626	Aqueous	m+p - Xylenes	Montana VPH	20	J	ug/L	15
001	CMR-MW100-190626	Aqueous	o - Xylenes	Montana VPH	10	J	ug/L	15
001	CMR-MW100-190626	Aqueous	TPH	Montana VPH	1700		ug/L	16
001	CMR-MW100-190626	Aqueous	Arsenic	6020B	48		ug/L	17
001	CMR-MW100-190626	Aqueous	Barium	6020B	3300		ug/L	17
001	CMR-MW100-190626	Aqueous	Cobalt	6020B	2.6	J	ug/L	17
001	CMR-MW100-190626	Aqueous	Copper	6020B	1.4	J	ug/L	17
001	CMR-MW100-190626	Aqueous	Lead	6020B	0.44	J	ug/L	17
001	CMR-MW100-190626	Aqueous	Nickel	6020B	7.4		ug/L	17
001	CMR-MW100-190626	Aqueous	Zinc	6020B	12	B	ug/L	17
002	TB-28-20190627	Aqueous	Acetone	8260B	2.4	J	ug/L	18

(37 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/10/2019 1346	BWS		22116
2	5030B	8260B	5	07/12/2019 0444	STM		22333

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	12		10	2.0	ug/L	1
Benzene	71-43-2	8260B	170		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	2.6	J	10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	4.6		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	3.7		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	0.53		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	31		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	4.7		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	4.1	J	5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	280	E	0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	2.5		0.50	0.40	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/10/2019 1346	BWS		22116
2	5030B	8260B	5	07/12/2019 0444	STM		22333

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	28		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	19		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	9.1		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130	H	95	70-130
Bromofluorobenzene		101	70-130	H	93	70-130
Toluene-d8		96	70-130	H	101	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/10/2019 1346	BWS		22116
2	5030B	8260B	5	07/12/2019 0444	STM		22333

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	12	HJ	50	10	ug/L	2
Benzene	71-43-2	8260B	150	H	2.5	2.0	ug/L	2
Bromochloromethane	74-97-5	8260B	ND	H	2.5	2.0	ug/L	2
Bromodichloromethane	75-27-4	8260B	ND	H	2.5	2.0	ug/L	2
Bromoform	75-25-2	8260B	ND	H	2.5	2.0	ug/L	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND	H	2.5	2.0	ug/L	2
2-Butanone (MEK)	78-93-3	8260B	ND	H	50	10	ug/L	2
Carbon disulfide	75-15-0	8260B	ND	H	2.5	2.0	ug/L	2
Carbon tetrachloride	56-23-5	8260B	ND	H	2.5	2.0	ug/L	2
Chlorobenzene	108-90-7	8260B	ND	H	2.5	2.0	ug/L	2
Chloroethane	75-00-3	8260B	ND	H	2.5	2.0	ug/L	2
Chloroform	67-66-3	8260B	ND	H	2.5	2.0	ug/L	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND	H	2.5	2.0	ug/L	2
Cyclohexane	110-82-7	8260B	ND	H	2.5	2.0	ug/L	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND	H	2.5	2.0	ug/L	2
Dibromochloromethane	124-48-1	8260B	ND	H	2.5	2.0	ug/L	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND	H	2.5	2.0	ug/L	2
1,2-Dichlorobenzene	95-50-1	8260B	ND	H	2.5	2.0	ug/L	2
1,3-Dichlorobenzene	541-73-1	8260B	ND	H	2.5	2.0	ug/L	2
1,4-Dichlorobenzene	106-46-7	8260B	ND	H	2.5	2.0	ug/L	2
Dichlorodifluoromethane	75-71-8	8260B	ND	H	2.5	2.0	ug/L	2
1,1-Dichloroethane	75-34-3	8260B	ND	H	2.5	2.0	ug/L	2
1,2-Dichloroethane	107-06-2	8260B	ND	H	2.5	2.0	ug/L	2
1,1-Dichloroethene	75-35-4	8260B	ND	H	2.5	2.0	ug/L	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND	H	2.5	2.0	ug/L	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND	H	2.5	2.0	ug/L	2
1,2-Dichloropropane	78-87-5	8260B	ND	H	2.5	2.0	ug/L	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND	H	2.5	2.0	ug/L	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND	H	2.5	0.55	ug/L	2
1,4-Dioxane	123-91-1	8260B	ND	H	100	67	ug/L	2
Ethylbenzene	100-41-4	8260B	27	H	2.5	2.0	ug/L	2
2-Hexanone	591-78-6	8260B	ND	H	50	10	ug/L	2
Isopropylbenzene	98-82-8	8260B	4.0	H	2.5	2.0	ug/L	2
Methyl acetate	79-20-9	8260B	ND	H	5.0	2.0	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND	H	2.5	2.0	ug/L	2
4-Methyl-2-pentanone	108-10-1	8260B	ND	H	50	10	ug/L	2
Methylcyclohexane	108-87-2	8260B	3.0	HJ	25	2.0	ug/L	2
Methylene chloride	75-09-2	8260B	ND	H	2.5	2.0	ug/L	2
Naphthalene	91-20-3	8260B	590	H	2.5	2.0	ug/L	2
Styrene	100-42-5	8260B	ND	H	2.5	2.1	ug/L	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND	H	2.5	2.0	ug/L	2
Tetrachloroethene	127-18-4	8260B	ND	H	2.5	2.0	ug/L	2
Toluene	108-88-3	8260B	2.2	HJ	2.5	2.0	ug/L	2

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/10/2019 1346	BWS		22116
2	5030B	8260B	5	07/12/2019 0444	STM		22333

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND	H	5.0	2.1	ug/L	2
1,2,3-Trichlorobenzene	87-61-6	8260B	ND	H	2.5	2.0	ug/L	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND	H	2.5	2.0	ug/L	2
1,1,1-Trichloroethane	71-55-6	8260B	ND	H	2.5	2.0	ug/L	2
1,1,2-Trichloroethane	79-00-5	8260B	ND	H	2.5	2.0	ug/L	2
Trichloroethene	79-01-6	8260B	ND	H	2.5	2.0	ug/L	2
Trichlorofluoromethane	75-69-4	8260B	ND	H	2.5	2.0	ug/L	2
Vinyl chloride	75-01-4	8260B	ND	H	2.5	2.0	ug/L	2
Xylenes (total)	1330-20-7	8260B	24	H	5.0	2.0	ug/L	2
m+p - Xylenes	179601-23-1	8260B	16	H	2.5	2.0	ug/L	2
o - Xylenes	95-47-6	8260B	7.7	H	2.5	2.0	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130	H	95	70-130
Bromofluorobenzene		101	70-130	H	93	70-130
Toluene-d8		96	70-130	H	101	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	25	07/07/2019 0006	SCD	06/28/2019 1501	21123
2	3520C	8270D	125	07/07/2019 0148	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	5.6		4.0	1.0	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		4.0	1.0	ug/L	1
Anthracene	120-12-7	8270D	ND		4.0	1.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		4.0	1.0	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		4.0	1.0	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		4.0	1.0	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		4.0	1.0	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		4.0	1.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		20	3.8	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		100	5.3	ug/L	1
Carbazole	86-74-8	8270D	ND		20	1.0	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		20	4.3	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		20	6.5	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		20	1.5	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		20	4.0	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		20	3.8	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		20	3.8	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		20	4.0	ug/L	1
Chrysene	218-01-9	8270D	ND		4.0	1.0	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		4.0	1.0	ug/L	1
Dibenzofuran	132-64-9	8270D	4.5	J	20	4.0	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		20	4.3	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		20	4.5	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		20	4.0	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		100	20	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		20	4.8	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		100	4.8	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		100	4.5	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		20	3.8	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		100	11	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		100	22	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		100	33	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		40	9.0	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		40	8.5	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		100	12	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		100	9.5	ug/L	1
Fluoranthene	206-44-0	8270D	ND		4.0	1.0	ug/L	1
Fluorene	86-73-7	8270D	5.5		4.0	1.0	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		20	3.8	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		20	4.3	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		100	28	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		20	4.3	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		4.0	1.0	ug/L	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	25	07/07/2019 0006	SCD	06/28/2019 1501	21123
2	3520C	8270D	125	07/07/2019 0148	SCD	06/28/2019 1501	21123

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		20	5.5	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	570		20	5.0	ug/L	2
2-Methylphenol	95-48-7	8270D	ND		20	5.3	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		40	12	ug/L	1
Naphthalene	91-20-3	8270D	350		4.0	1.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		40	17	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		40	3.8	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		40	33	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		20	4.3	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		40	11	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		100	52	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		20	7.0	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		20	13	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		100	34	ug/L	1
Phenanthrene	85-01-8	8270D	2.7	J	4.0	1.0	ug/L	1
Phenol	108-95-2	8270D	ND		20	4.8	ug/L	1
Pyrene	129-00-0	8270D	ND		4.0	1.0	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		20	6.3	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		20	14	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		20	9.3	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		20	4.8	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		20	5.5	ug/L	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		60	37-129		58	37-129
2-Fluorophenol		34	24-127		34	24-127
Nitrobenzene-d5		67	38-127		69	38-127
Phenol-d5		50	28-128		31	28-128
Terphenyl-d14		57	10-148		69	10-148
2,4,6-Tribromophenol		60	35-144		75	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/05/2019 1738	DAL1	07/03/2019 0912	21484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		61	40-140

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/05/2019 2116	DAL1	07/03/2019 0912	21485

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	2300		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		106	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		66	40-140

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/05/2019 1421	JJG		21823

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		380	75	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	330	J	380	75	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	436	70-130

LOQ = Limit of Quantitation
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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/05/2019 1421	JJG		21822

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	140		25	2.6	ug/L	1
C9 - C10 Aromatics		Montana VPH	570		130	25	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	32		25	3.1	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		25	6.0	ug/L	1
Naphthalene	91-20-3	Montana VPH	580		25	3.5	ug/L	1
Toluene	108-88-3	Montana VPH	ND		25	2.7	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	20	J	25	6.0	ug/L	1
o - Xylenes	95-47-6	Montana VPH	10	J	25	2.9	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	318	70-130

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	07/05/2019 1421	JJG		21821

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1700		880	180	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	440	70-130

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF28032-001
Description: CMR-MW100-190626
Matrix: Aqueous
Date Sampled: 06/27/2019 1412
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	07/01/2019 2042	JMH	07/01/2019 1338	21297
1	3005A	6020B	1	07/11/2019 0303	BNW	07/03/2019 1529	21526

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	48		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	3300		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	2.6	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	1.4	J	5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	0.44	J	1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	7.4		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	12	B	10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF28032-002
Description: TB-28-20190627
Matrix: Aqueous
Date Sampled: 06/27/2019
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/10/2019 1214	BWS		22116

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	2.4	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF28032-002
Description: TB-28-20190627
Matrix: Aqueous
Date Sampled: 06/27/2019
Date Received: 06/28/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/10/2019 1214	BWS		22116

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		107	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ22116-001
Batch: 22116
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/10/2019 1138
Benzene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Bromoform	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/10/2019 1138
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/10/2019 1138
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Chloroethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Chloroform	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Cyclohexane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/10/2019 1138
1,4-Dioxane	ND		1	20	13	ug/L	07/10/2019 1138
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
2-Hexanone	ND		1	10	2.0	ug/L	07/10/2019 1138
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Methyl acetate	ND		1	1.0	0.40	ug/L	07/10/2019 1138
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/10/2019 1138
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/10/2019 1138
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/10/2019 1138
Methylene chloride	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Naphthalene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Styrene	ND		1	0.50	0.41	ug/L	07/10/2019 1138
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Toluene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/10/2019 1138

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ22116-001
Batch: 22116
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Trichloroethene	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/10/2019 1138
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/10/2019 1138
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/10/2019 1138
o - Xylenes	ND		1	0.50	0.40	ug/L	07/10/2019 1138

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		95	70-130

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ22116-002
Batch: 22116
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	120		1	122	60-140	07/10/2019 0954
Benzene	50	49		1	98	70-130	07/10/2019 0954
Bromochloromethane	50	46		1	92	70-130	07/10/2019 0954
Bromodichloromethane	50	46		1	92	70-130	07/10/2019 0954
Bromoform	50	39		1	78	70-130	07/10/2019 0954
Bromomethane (Methyl bromide)	50	45		1	90	70-130	07/10/2019 0954
2-Butanone (MEK)	100	110		1	110	70-130	07/10/2019 0954
Carbon disulfide	50	50		1	100	70-130	07/10/2019 0954
Carbon tetrachloride	50	47		1	94	70-130	07/10/2019 0954
Chlorobenzene	50	46		1	92	70-130	07/10/2019 0954
Chloroethane	50	48		1	96	70-130	07/10/2019 0954
Chloroform	50	46		1	92	70-130	07/10/2019 0954
Chloromethane (Methyl chloride)	50	40		1	79	60-140	07/10/2019 0954
Cyclohexane	50	45		1	89	70-130	07/10/2019 0954
1,2-Dibromo-3-chloropropane (DBCP)	50	45		1	90	70-130	07/10/2019 0954
Dibromochloromethane	50	45		1	90	70-130	07/10/2019 0954
1,2-Dibromoethane (EDB)	50	48		1	97	70-130	07/10/2019 0954
1,2-Dichlorobenzene	50	45		1	91	70-130	07/10/2019 0954
1,3-Dichlorobenzene	50	44		1	88	70-130	07/10/2019 0954
1,4-Dichlorobenzene	50	42		1	83	70-130	07/10/2019 0954
Dichlorodifluoromethane	50	38		1	75	60-140	07/10/2019 0954
1,1-Dichloroethane	50	48		1	96	70-130	07/10/2019 0954
1,2-Dichloroethane	50	48		1	95	70-130	07/10/2019 0954
1,1-Dichloroethene	50	54		1	108	70-130	07/10/2019 0954
cis-1,2-Dichloroethene	50	46		1	93	70-130	07/10/2019 0954
trans-1,2-Dichloroethene	50	49		1	98	70-130	07/10/2019 0954
1,2-Dichloropropane	50	47		1	94	70-130	07/10/2019 0954
cis-1,3-Dichloropropene	50	48		1	95	70-130	07/10/2019 0954
trans-1,3-Dichloropropene	50	45		1	90	70-130	07/10/2019 0954
1,4-Dioxane	500	540		1	107	60-140	07/10/2019 0954
Ethylbenzene	50	48		1	96	70-130	07/10/2019 0954
2-Hexanone	100	95		1	95	70-130	07/10/2019 0954
Isopropylbenzene	50	49		1	98	70-130	07/10/2019 0954
Methyl acetate	50	41		1	81	70-130	07/10/2019 0954
Methyl tertiary butyl ether (MTBE)	50	53		1	106	70-130	07/10/2019 0954
4-Methyl-2-pentanone	100	97		1	97	70-130	07/10/2019 0954
Methylcyclohexane	50	49		1	98	70-130	07/10/2019 0954
Methylene chloride	50	48		1	97	70-130	07/10/2019 0954
Naphthalene	50	46		1	92	70-130	07/10/2019 0954
Styrene	50	49		1	98	70-130	07/10/2019 0954
1,1,2,2-Tetrachloroethane	50	46		1	92	70-130	07/10/2019 0954
Tetrachloroethene	50	48		1	95	70-130	07/10/2019 0954
Toluene	50	48		1	96	70-130	07/10/2019 0954
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	47		1	93	70-130	07/10/2019 0954

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ22116-002
Batch: 22116
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	44		1	88	70-130	07/10/2019 0954
1,2,4-Trichlorobenzene	50	45		1	89	70-130	07/10/2019 0954
1,1,1-Trichloroethane	50	45		1	90	70-130	07/10/2019 0954
1,1,2-Trichloroethane	50	48		1	96	70-130	07/10/2019 0954
Trichloroethene	50	49		1	98	70-130	07/10/2019 0954
Trichlorofluoromethane	50	43		1	87	70-130	07/10/2019 0954
Vinyl chloride	50	41		1	82	70-130	07/10/2019 0954
Xylenes (total)	100	96		1	96	70-130	07/10/2019 0954
m+p - Xylenes	50	47		1	95	70-130	07/10/2019 0954
o - Xylenes	50	48		1	97	70-130	07/10/2019 0954

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	70-130
Bromofluorobenzene		95	70-130
Toluene-d8		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ22333-001
Batch: 22333
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/11/2019 2204
Benzene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Bromoform	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/11/2019 2204
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/11/2019 2204
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Chloroethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Chloroform	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Cyclohexane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/11/2019 2204
1,4-Dioxane	ND		1	20	13	ug/L	07/11/2019 2204
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
2-Hexanone	ND		1	10	2.0	ug/L	07/11/2019 2204
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Methyl acetate	ND		1	1.0	0.40	ug/L	07/11/2019 2204
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/11/2019 2204
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/11/2019 2204
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/11/2019 2204
Methylene chloride	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Naphthalene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Styrene	ND		1	0.50	0.41	ug/L	07/11/2019 2204
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Toluene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/11/2019 2204

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ22333-001
Batch: 22333
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Trichloroethene	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/11/2019 2204
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/11/2019 2204
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/11/2019 2204
o - Xylenes	ND		1	0.50	0.40	ug/L	07/11/2019 2204

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		97	70-130
Bromofluorobenzene		93	70-130
Toluene-d8		99	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ22333-002
Batch: 22333
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	94		1	94	60-140	07/11/2019 2106
Benzene	50	47		1	94	70-130	07/11/2019 2106
Bromochloromethane	50	46		1	93	70-130	07/11/2019 2106
Bromodichloromethane	50	47		1	95	70-130	07/11/2019 2106
Bromoform	50	48		1	96	70-130	07/11/2019 2106
Bromomethane (Methyl bromide)	50	50		1	101	70-130	07/11/2019 2106
2-Butanone (MEK)	100	93		1	93	70-130	07/11/2019 2106
Carbon disulfide	50	41		1	82	70-130	07/11/2019 2106
Carbon tetrachloride	50	47		1	95	70-130	07/11/2019 2106
Chlorobenzene	50	47		1	94	70-130	07/11/2019 2106
Chloroethane	50	48		1	97	70-130	07/11/2019 2106
Chloroform	50	46		1	91	70-130	07/11/2019 2106
Chloromethane (Methyl chloride)	50	52		1	104	60-140	07/11/2019 2106
Cyclohexane	50	41		1	81	70-130	07/11/2019 2106
1,2-Dibromo-3-chloropropane (DBCP)	50	46		1	92	70-130	07/11/2019 2106
Dibromochloromethane	50	50		1	100	70-130	07/11/2019 2106
1,2-Dibromoethane (EDB)	50	49		1	98	70-130	07/11/2019 2106
1,2-Dichlorobenzene	50	48		1	96	70-130	07/11/2019 2106
1,3-Dichlorobenzene	50	48		1	96	70-130	07/11/2019 2106
1,4-Dichlorobenzene	50	47		1	93	70-130	07/11/2019 2106
Dichlorodifluoromethane	50	42		1	85	60-140	07/11/2019 2106
1,1-Dichloroethane	50	44		1	87	70-130	07/11/2019 2106
1,2-Dichloroethane	50	47		1	93	70-130	07/11/2019 2106
1,1-Dichloroethene	50	48		1	96	70-130	07/11/2019 2106
cis-1,2-Dichloroethene	50	45		1	89	70-130	07/11/2019 2106
trans-1,2-Dichloroethene	50	49		1	99	70-130	07/11/2019 2106
1,2-Dichloropropane	50	46		1	92	70-130	07/11/2019 2106
cis-1,3-Dichloropropene	50	48		1	96	70-130	07/11/2019 2106
trans-1,3-Dichloropropene	50	49		1	98	70-130	07/11/2019 2106
1,4-Dioxane	500	510		1	101	60-140	07/11/2019 2106
Ethylbenzene	50	48		1	96	70-130	07/11/2019 2106
2-Hexanone	100	98		1	98	70-130	07/11/2019 2106
Isopropylbenzene	50	52		1	104	70-130	07/11/2019 2106
Methyl acetate	50	35		1	71	70-130	07/11/2019 2106
Methyl tertiary butyl ether (MTBE)	50	43		1	87	70-130	07/11/2019 2106
4-Methyl-2-pentanone	100	91		1	91	70-130	07/11/2019 2106
Methylcyclohexane	50	48		1	96	70-130	07/11/2019 2106
Methylene chloride	50	41		1	82	70-130	07/11/2019 2106
Naphthalene	50	52		1	103	70-130	07/11/2019 2106
Styrene	50	50		1	101	70-130	07/11/2019 2106
1,1,2,2-Tetrachloroethane	50	48		1	96	70-130	07/11/2019 2106
Tetrachloroethene	50	49		1	97	70-130	07/11/2019 2106
Toluene	50	48		1	96	70-130	07/11/2019 2106
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	45		1	91	70-130	07/11/2019 2106

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ22333-002
Batch: 22333
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	53		1	105	70-130	07/11/2019 2106
1,2,4-Trichlorobenzene	50	50		1	100	70-130	07/11/2019 2106
1,1,1-Trichloroethane	50	44		1	89	70-130	07/11/2019 2106
1,1,2-Trichloroethane	50	49		1	97	70-130	07/11/2019 2106
Trichloroethene	50	48		1	96	70-130	07/11/2019 2106
Trichlorofluoromethane	50	45		1	90	70-130	07/11/2019 2106
Vinyl chloride	50	50		1	101	70-130	07/11/2019 2106
Xylenes (total)	100	100		1	100	70-130	07/11/2019 2106
m+p - Xylenes	50	49		1	99	70-130	07/11/2019 2106
o - Xylenes	50	51		1	101	70-130	07/11/2019 2106

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		94	70-130
Bromofluorobenzene		99	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21123-001
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Acenaphthylene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	07/05/2019 1135
Carbazole	ND		1	0.80	0.040	ug/L	07/05/2019 1135
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	07/05/2019 1135
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	07/05/2019 1135
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	07/05/2019 1135
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	07/05/2019 1135
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	07/05/2019 1135
2-Chlorophenol	ND		1	0.80	0.15	ug/L	07/05/2019 1135
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	07/05/2019 1135
Chrysene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Dibenzofuran	ND		1	0.80	0.16	ug/L	07/05/2019 1135
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	07/05/2019 1135
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	07/05/2019 1135
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	07/05/2019 1135
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
Diethylphthalate	ND		1	4.0	0.19	ug/L	07/05/2019 1135
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	07/05/2019 1135
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	07/05/2019 1135
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	07/05/2019 1135
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	07/05/2019 1135
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	07/05/2019 1135
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	07/05/2019 1135
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	07/05/2019 1135
bis(2-Ethylhexyl)phthalate	0.62	J	1	4.0	0.38	ug/L	07/05/2019 1135
Fluoranthene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Fluorene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	07/05/2019 1135
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	07/05/2019 1135
Hexachloroethane	ND		1	0.80	0.17	ug/L	07/05/2019 1135
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Isophorone	ND		1	0.80	0.22	ug/L	07/05/2019 1135

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ21123-001
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
2-Methylphenol	ND		1	0.80	0.21	ug/L	07/05/2019 1135
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	07/05/2019 1135
Naphthalene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
2-Nitroaniline	ND		1	1.6	0.66	ug/L	07/05/2019 1135
3-Nitroaniline	ND		1	1.6	0.15	ug/L	07/05/2019 1135
4-Nitroaniline	ND		1	1.6	1.3	ug/L	07/05/2019 1135
Nitrobenzene	ND		1	0.80	0.17	ug/L	07/05/2019 1135
2-Nitrophenol	ND		1	1.6	0.44	ug/L	07/05/2019 1135
4-Nitrophenol	ND		1	4.0	2.1	ug/L	07/05/2019 1135
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	07/05/2019 1135
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	07/05/2019 1135
Pentachlorophenol	ND		1	4.0	1.3	ug/L	07/05/2019 1135
Phenanthrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
Phenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
Pyrene	ND		1	0.16	0.040	ug/L	07/05/2019 1135
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	07/05/2019 1135
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	07/05/2019 1135
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	07/05/2019 1135
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	07/05/2019 1135
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	07/05/2019 1135

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		64	37-129
2-Fluorophenol		44	24-127
Nitrobenzene-d5		68	38-127
Phenol-d5		40	28-128
Terphenyl-d14		95	10-148
2,4,6-Tribromophenol		56	35-144

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21123-002
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.7		1	59	30-122	07/06/2019 2045
Acenaphthylene	8.0	5.1		1	63	30-130	07/06/2019 2045
Anthracene	8.0	5.6		1	70	30-123	07/06/2019 2045
Benzo(a)anthracene	8.0	5.9		1	74	40-125	07/06/2019 2045
Benzo(a)pyrene	8.0	5.9		1	74	40-128	07/06/2019 2045
Benzo(b)fluoranthene	8.0	6.8		1	85	30-130	07/06/2019 2045
Benzo(g,h,i)perylene	8.0	6.0		1	75	30-130	07/06/2019 2045
Benzo(k)fluoranthene	8.0	6.0		1	76	30-130	07/06/2019 2045
4-Bromophenyl phenyl ether	8.0	5.3		1	67	30-124	07/06/2019 2045
Butyl benzyl phthalate	8.0	6.3		1	79	54-135	07/06/2019 2045
Carbazole	8.0	5.8		1	72	45-101	07/06/2019 2045
bis (2-Chloro-1-methylethyl) ether	8.0	6.2		1	77	42-124	07/06/2019 2045
4-Chloro-3-methyl phenol	8.0	4.7		1	58	30-123	07/06/2019 2045
bis(2-Chloroethoxy)methane	8.0	4.8		1	60	44-127	07/06/2019 2045
bis(2-Chloroethyl)ether	8.0	5.6		1	70	46-120	07/06/2019 2045
2-Chloronaphthalene	8.0	4.8		1	60	46-100	07/06/2019 2045
2-Chlorophenol	8.0	4.2		1	52	50-117	07/06/2019 2045
4-Chlorophenyl phenyl ether	8.0	4.9		1	61	30-121	07/06/2019 2045
Chrysene	8.0	6.2		1	78	30-130	07/06/2019 2045
Dibenzo(a,h)anthracene	8.0	6.3		1	78	30-130	07/06/2019 2045
Dibenzofuran	8.0	4.8		1	61	30-118	07/06/2019 2045
1,2-Dichlorobenzene	8.0	4.3		1	53	32-111	07/06/2019 2045
1,3-Dichlorobenzene	8.0	4.2		1	52	28-110	07/06/2019 2045
1,4-Dichlorobenzene	8.0	4.3		1	53	29-112	07/06/2019 2045
3,3'-Dichlorobenzidine	8.0	4.1		1	52	10-126	07/06/2019 2045
2,4-Dichlorophenol	8.0	4.5		1	56	30-121	07/06/2019 2045
Diethylphthalate	8.0	5.7		1	72	40-125	07/06/2019 2045
Dimethyl phthalate	8.0	5.6		1	71	40-127	07/06/2019 2045
2,4-Dimethylphenol	8.0	5.9		1	74	20-125	07/06/2019 2045
Di-n-butyl phthalate	8.0	6.1		1	76	40-127	07/06/2019 2045
4,6-Dinitro-2-methylphenol	8.0	6.3		1	78	56-128	07/06/2019 2045
2,4-Dinitrophenol	16	8.9		1	56	11-126	07/06/2019 2045
2,4-Dinitrotoluene	8.0	5.7		1	71	59-127	07/06/2019 2045
2,6-Dinitrotoluene	8.0	5.4		1	67	59-126	07/06/2019 2045
Di-n-octylphthalate	8.0	4.2		1	53	50-136	07/06/2019 2045
bis(2-Ethylhexyl)phthalate	8.0	5.4		1	67	56-128	07/06/2019 2045
Fluoranthene	8.0	5.6		1	71	40-128	07/06/2019 2045
Fluorene	8.0	5.0		1	62	30-124	07/06/2019 2045
Hexachlorobenzene	8.0	5.6		1	70	30-125	07/06/2019 2045
Hexachlorobutadiene	8.0	4.1		1	51	24-110	07/06/2019 2045
Hexachlorocyclopentadiene	40	17		1	42	16-96	07/06/2019 2045
Hexachloroethane	8.0	4.0		1	51	31-110	07/06/2019 2045
Indeno(1,2,3-c,d)pyrene	8.0	5.8		1	72	30-130	07/06/2019 2045
Isophorone	8.0	5.3		1	66	57-123	07/06/2019 2045

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21123-002
Batch: 21123
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/28/2019 1501

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.6		1	58	40-132	07/06/2019 2045
2-Methylphenol	8.0	6.2		1	78	56-119	07/06/2019 2045
3+4-Methylphenol	8.0	5.8		1	73	53-119	07/06/2019 2045
Naphthalene	8.0	4.6		1	58	30-130	07/06/2019 2045
2-Nitroaniline	8.0	5.9		1	73	60-124	07/06/2019 2045
3-Nitroaniline	8.0	5.8		1	72	43-123	07/06/2019 2045
4-Nitroaniline	8.0	6.0		1	76	30-135	07/06/2019 2045
Nitrobenzene	8.0	5.0		1	63	51-122	07/06/2019 2045
2-Nitrophenol	8.0	5.4		1	68	51-118	07/06/2019 2045
4-Nitrophenol	16	10		1	65	53-130	07/06/2019 2045
N-Nitrosodi-n-propylamine	8.0	5.9		1	73	54-127	07/06/2019 2045
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.6		1	69	30-123	07/06/2019 2045
Pentachlorophenol	16	11		1	67	42-131	07/06/2019 2045
Phenanthrene	8.0	5.3		1	66	40-123	07/06/2019 2045
Phenol	8.0	3.8	N	1	47	49-117	07/06/2019 2045
Pyrene	8.0	6.2		1	77	40-126	07/06/2019 2045
1,2,4,5-Tetrachlorobenzene	8.0	4.4		1	55	30-130	07/06/2019 2045
2,3,4,6-Tetrachlorophenol	8.0	5.3		1	66	30-130	07/06/2019 2045
1,2,4-Trichlorobenzene	8.0	4.4		1	55	20-90	07/06/2019 2045
2,4,5-Trichlorophenol	8.0	4.8		1	60	30-123	07/06/2019 2045
2,4,6-Trichlorophenol	8.0	5.1		1	64	30-125	07/06/2019 2045

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		62	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		65	38-127
Phenol-d5		48	28-128
Terphenyl-d14		90	10-148
2,4,6-Tribromophenol		81	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ21484-001
Batch: 21484
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	07/05/2019 1524
C9 - C18 Aliphatics	ND		1	100	100	ug/L	07/05/2019 1524

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		78	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Montana EPH (aliphatics) - LCS

Sample ID: UQ21484-002
Batch: 21484
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	330		1	84	40-140	07/05/2019 1602
C9 - C18 Aliphatics	300	190		1	65	40-140	07/05/2019 1602

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		77	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ21484-003
Batch: 21484
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	350		1	89	5.7	40-140	25	07/05/2019 1632
C9 - C18 Aliphatics	300	210		1	70	7.6	40-140	25	07/05/2019 1632

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		81	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ21485-001
Batch: 21485
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	07/05/2019 1917

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		103	40-140
2-Fluorobiphenyl (fractionation 1)		104	40-140
o - Terphenyl (aromatic)		83	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ21485-002
Batch: 21485
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	640		1	75	40-140	07/05/2019 1947

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		104	40-140
2-Fluorobiphenyl (fractionation 1)		106	40-140
o - Terphenyl (aromatic)		84	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ21485-003
Batch: 21485
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/03/2019 912

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	620		1	73	3.2	40-140	25	07/05/2019 2017

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		100	40-140
2-Fluorobiphenyl (fractionation 1)		102	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21821-001
Batch: 21821
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	07/05/2019 1220

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21821-002
Batch: 21821
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	400		1	106	70-130	07/05/2019 1124

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21821-003
Batch: 21821
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	410		1	109	3.5	70-130	25	07/05/2019 1152

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21822-001
Batch: 21822
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	07/05/2019 1220
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	07/05/2019 1220
Ethylbenzene	ND		1	5.0	0.62	ug/L	07/05/2019 1220
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	07/05/2019 1220
Naphthalene	ND		1	5.0	0.70	ug/L	07/05/2019 1220
Toluene	ND		1	5.0	0.53	ug/L	07/05/2019 1220
m+p - Xylenes	ND		1	5.0	1.2	ug/L	07/05/2019 1220
o - Xylenes	ND		1	5.0	0.58	ug/L	07/05/2019 1220

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21822-002
Batch: 21822
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	25		1	99	70-130	07/05/2019 1124
C9 - C10 Aromatics	25	25		1	101	70-130	07/05/2019 1124
Ethylbenzene	25	25		1	100	70-130	07/05/2019 1124
Methyl tertiary butyl ether (MTBE)	25	25		1	98	70-130	07/05/2019 1124
Naphthalene	25	24		1	94	70-130	07/05/2019 1124
Toluene	25	25		1	99	70-130	07/05/2019 1124
m+p - Xylenes	50	51		1	102	70-130	07/05/2019 1124
o - Xylenes	25	25		1	100	70-130	07/05/2019 1124

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21822-003
Batch: 21822
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	28		1	111	11	70-130	25	07/05/2019 1152
C9 - C10 Aromatics	25	27		1	108	6.5	70-130	25	07/05/2019 1152
Ethylbenzene	25	28		1	110	9.9	70-130	25	07/05/2019 1152
Methyl tertiary butyl ether (MTBE)	25	28		1	113	14	70-130	25	07/05/2019 1152
Naphthalene	25	23		1	91	3.0	70-130	25	07/05/2019 1152
Toluene	25	28		1	114	14	70-130	25	07/05/2019 1152
m+p - Xylenes	50	55		1	111	8.5	70-130	25	07/05/2019 1152
o - Xylenes	25	27		1	108	7.3	70-130	25	07/05/2019 1152

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		85	70-130

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Montana VPH (aliphatics) - MB

Sample ID: UQ21823-001
Batch: 21823
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/05/2019 1220
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	07/05/2019 1220

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21823-002
Batch: 21823
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	112	70-130	07/05/2019 1124
C9 - C12 Aliphatics, Adjusted	75	75		1	100	70-130	07/05/2019 1124

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21823-003
Batch: 21823
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	120		1	116	3.5	70-130	25	07/05/2019 1152
C9 - C12 Aliphatics, Adjusted	75	82		1	109	9.3	70-130	25	07/05/2019 1152

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ21526-001
Batch: 21526
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 07/03/2019 1529

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	07/11/2019 0251
Arsenic	ND		1	2.0	1.3	ug/L	07/11/2019 0251
Barium	ND		1	5.0	1.3	ug/L	07/11/2019 0251
Beryllium	ND		1	0.40	0.15	ug/L	07/11/2019 0251
Cadmium	ND		1	0.50	0.13	ug/L	07/11/2019 0251
Chromium	ND		1	5.0	1.3	ug/L	07/11/2019 0251
Cobalt	ND		1	5.0	1.3	ug/L	07/11/2019 0251
Copper	ND		1	5.0	1.3	ug/L	07/11/2019 0251
Lead	ND		1	1.0	0.25	ug/L	07/11/2019 0251
Nickel	ND		1	5.0	1.3	ug/L	07/11/2019 0251
Selenium	ND		1	5.0	1.3	ug/L	07/11/2019 0251
Silver	ND		1	1.0	0.25	ug/L	07/11/2019 0251
Vanadium	ND		1	5.0	2.5	ug/L	07/11/2019 0251
Zinc	3.0	J	1	10	2.5	ug/L	07/11/2019 0251

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - LCS

Sample ID: UQ21526-002
Batch: 21526
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 07/03/2019 1529

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	100		1	102	80-120	07/11/2019 0257
Arsenic	100	100		1	104	80-120	07/11/2019 0257
Barium	100	100		1	101	80-120	07/11/2019 0257
Beryllium	100	100		1	104	80-120	07/11/2019 0257
Cadmium	100	99		1	99	80-120	07/11/2019 0257
Chromium	100	100		1	102	80-120	07/11/2019 0257
Cobalt	100	100		1	104	80-120	07/11/2019 0257
Copper	100	100		1	104	80-120	07/11/2019 0257
Lead	100	100		1	102	80-120	07/11/2019 0257
Nickel	100	100		1	103	80-120	07/11/2019 0257
Selenium	100	100		1	103	80-120	07/11/2019 0257
Silver	100	110		1	106	80-120	07/11/2019 0257
Vanadium	100	100		1	103	80-120	07/11/2019 0257
Zinc	100	100		1	105	80-120	07/11/2019 0257

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ21297-001
Batch: 21297
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 07/01/2019 1338

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	07/01/2019 2019

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ21297-002
Batch: 21297
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 07/01/2019 1338

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	93	80-120	07/01/2019 2022

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody
and
Miscellaneous Documents

SHEALY

Chain of Custody Record

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

Number 94133

Client: Ramboll US Corporation	Report to Contact: Daniel Price / Michael Wilson	Telephone No. / E-mail: dprice@ramboll.com / mwilson@ramboll.com	Quote No.
Address: 7500 College Blvd Ste	Sampler's Signature: x [signature]	Analysis (Attach list if more space is needed)	Page 1 of 1
City: Overland Park / State: KS / Zip Code: 66210	Printed Name: Brooks Bailey		UF28032
Project Name: CMR RIAIM East Rail			RMN2
Project No.: 1690012344-003 / P.O. No.			

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Grab / Composite	Aqueous	Solid	Air/Vapor	Unpres	H_2SO_4	HNO_3	HCl	NaOH	Other	VOC	SVOC	VPH	EPH	Metals	Remarks / Cooler I.D.
CMR-MW100-190626	6.27.19	14:12	G	✓			2		1	7			✓	✓	✓	✓	✓	
Trip Blank	6.27.19	—		✓						2			✓					

Turn Around Time Required (Prior lab approval required for expedited TAT.) ✓ Standard ☐ Rush (Specify)

Sample Disposal ☐ Return to Client ☐ Disposal by Lab

Possible Hazard Identification ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by: Brooks B[signature]	6.27.19	16:45	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: Fed Ex	6-28-19	1010	4. Laboratory received by: L Hite	6-28-19	1010

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack Receipt Temp. 2.8 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 08-01-2014

Shealy Environmental Services, Inc.
Document Number: ML20018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL US CORP. Cooler Inspected by/date: LKH / 06-28-2019 Lot #: UP28032

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 19-1020 Chlorine Strip ID: NA Tested by: LKH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

2.8 / 2.8 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H_2SO_4, HNO_3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) 002(2) were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: LKH Date: 06-28-2019

Comments:

MEMO

Date: **July 17, 2019**

To: **File**

From: **R Huening**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UE17007, 8 Soil Samples, 2 Water Samples

Data validation and usability assessment was conducted for data package UE17007 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB06-4.5-5.0-190516	UE17007-001
CMR-EB06-6.25-6.75-190516	UE17007-002
CMR-EB07-0.0-1.0-190516	UE17007-003
CMR-EB07-5.25-5.75-190516	UE17007-004
CMR-EB07-7.5-8.0-190516	UE17007-005
TB-01-20190516	UE17007-006
CMR-EB05-6-7-190517	UE17007-007
CMR-EB05-11-12-190517	UE17007-008
CMR-EB09-6-7-190517	UE17007-009
TB-02-190517	UE17007-010

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples (where included)
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds

- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

MS/MSD Recoveries
For the VOC and SVOC analysis suites MS/MSD results were reported. Recoveries for many SVOCs were out of criteria. However, these out of criteria results were likely due to the very high native sample concentrations in the original sample that overwhelmed the spiked amounts. Due to this, the out of criteria recoveries do not represent a systematic matrix issue. No validation action warranted.

For MS/MSD results in the metals analysis antimony and arsenic recoveries were out of criteria low, indicating a possible low bias. Due to this possible low bias all arsenic and antimony results have been validated as estimated (J, UJ).

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of hexachlorocyclopentadiene. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all hexachlorocyclopentadiene results have been validated as estimated (UJ).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UE17007

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 8 Soil, 2 Water

Reviewer Name R Huening

Completion Date July 9, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Chromium detected below the RL in method blank sample. All project sample detections were above the blank result and the RL, no action taken.
Matrix Spike/Matrix Spike Duplicate	Several recoveries out of criteria. Some analytes recovered high likely due to high parent sample concentrations. Antimony and arsenic recovered low. All antimony and arsenic results validated as estimated (J, UJ).
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other issues noted.
Overall Assessment of Data	All antimony and arsenic results validated as estimated (J, UJ).

SDG No. UE17007

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 8 Soil, 2 Water

Reviewer Name R Huening

Completion Date July 9, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	SVOC di-n-butyl phthalate detected in method blank below the RL. No project detections, no action taken.	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Several SVOC analysis surrogates out for samples with very high detections. No action taken.	Several surrogates out due to matrix issues. No action taken.
Matrix Spike/Matrix Spike Duplicate	Multiple SVOCs out of criteria in MS and MSD sample. Parent sample had very high detected results that cause detected MS/MSD results to be out of criteria or for non-detect results to recover high. No validation action warranted.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	Several SVOCs out of criteria with no detections. Hexachlorocyclopentadiene recovered low indicating low bias. All hexachlorocyclopentadiene results validated as estimated (UJ).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/A
Other Non-conformances	CCV high for VOC methyl acetate. Raised RLs for high concentration samples. No action taken.	No other non-conformances noted.
Overall Assessment of Data	All hexachlorocyclopentadiene results validated as estimated (UJ).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003 Task 221

Lot Number:**UE17007**

Date Completed:06/06/2019
Revision Date: 06/10/2019

06/10/2019 1:36 PM
Approved and released by:
Project Manager: Kelly M. Nance

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UE17007

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

This report supersedes and replaces any prior reports issued under this lot number. The details of the applicable revisions are detailed in a Report Revision Notice provided under separate cover.

Volatiles
The continuing calibration verification (CCV) associated with sample -009 had methyl acetate recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections for this compound in the associated samples; therefore, data quality is not impacted.

Sample -001 was analyzed via high level due to the sample matrix. The reporting limits have been raised accordingly.

Semiolatiles
The method blank associated with batch 17168 had di-n-butyl phthalate detected at a concentration that was below the LOQ. There were no detections for this compound in the samples associated with this method blank, negating the possibility of false positives or sample contamination. The laboratory control sample (LCS) associated with batch 17168 had bis(2-chloro-1-methylethyl)ether recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections for this compound in the samples associated with this batch; therefore, data quality is not impacted.

The LCS associated with batch 17168 had hexachlorocyclopentadiene recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -007 had multiple compounds recovered outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a

matrix effect.

Due to high detections for target compounds, samples -001, -002, -004, -005, -007, and -008 were diluted greater than 5X. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
Samples -002, -003, -004, -005, -007, -008, and -009 had multiple compounds detected in the VPH analysis above the LOQ. Naphthalene was detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same time as MTBE and naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Samples -002, -003, -004, -005, -007, -008, and -009 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The method blank associated with batch 17180 had chromium detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for chromium have been flagged with a “B” qualifier.

The MS/MSD associated with sample -009 had multiple metals recovered outside of the acceptance limits. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample Summary
Ramboll US Corporation
Lot Number: UE17007

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB06-4.5-5.0-190516	Solid	05/16/2019 1145	05/17/2019
002	CMR-EB06-6.25-6.75-190516	Solid	05/16/2019 1215	05/17/2019
003	CMR-EB07-0.0-1.0-190516	Solid	05/16/2019 1525	05/17/2019
004	CMR-EB07-5.25-5.75-190516	Solid	05/16/2019 1550	05/17/2019
005	CMR-EB07-7.5-8.0-190516	Solid	05/16/2019 1600	05/17/2019
006	TB-01-20190516	Aqueous	05/16/2019	05/17/2019
007	CMR-EB05-6-7-190517	Solid	05/17/2019 1015	05/18/2019
008	CMR-EB05-11-12-190517	Solid	05/17/2019 1015	05/18/2019
009	CMR-EB09-6-7-190517	Solid	05/17/2019 1515	05/18/2019
010	TB-02-20190517	Aqueous	05/17/2019	05/18/2019

(10 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UE17007

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB06-4.5-5.0-190516	Solid	Methylcyclohexane	8260B	250	J	ug/kg	19
001	CMR-EB06-4.5-5.0-190516	Solid	Acenaphthene	8270D	2700		ug/kg	21
001	CMR-EB06-4.5-5.0-190516	Solid	Anthracene	8270D	850		ug/kg	21
001	CMR-EB06-4.5-5.0-190516	Solid	Dibenzofuran	8270D	1500		ug/kg	21
001	CMR-EB06-4.5-5.0-190516	Solid	Fluorene	8270D	2800		ug/kg	21
001	CMR-EB06-4.5-5.0-190516	Solid	Phenanthrene	8270D	2200		ug/kg	22
001	CMR-EB06-4.5-5.0-190516	Solid	Pyrene	8270D	360		ug/kg	22
001	CMR-EB06-4.5-5.0-190516	Solid	C19 - C36 Aliphatics	Montana EPH	500		mg/kg	23
001	CMR-EB06-4.5-5.0-190516	Solid	C9 - C18 Aliphatics	Montana EPH	2200		mg/kg	23
001	CMR-EB06-4.5-5.0-190516	Solid	C11 - C22 Aromatics	Montana EPH	1600		mg/kg	24
001	CMR-EB06-4.5-5.0-190516	Solid	C9 - C12 Aliphatics,	Montana VPH	5.0		mg/kg	25
001	CMR-EB06-4.5-5.0-190516	Solid	Benzene	Montana VPH	0.057	J	mg/kg	26
001	CMR-EB06-4.5-5.0-190516	Solid	C9 - C10 Aromatics	Montana VPH	3.6		mg/kg	26
001	CMR-EB06-4.5-5.0-190516	Solid	Naphthalene	Montana VPH	0.26	J	mg/kg	26
001	CMR-EB06-4.5-5.0-190516	Solid	Arsenic	6020B	20		mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Barium	6020B	350		mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Beryllium	6020B	0.94		mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Cadmium	6020B	0.80		mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Chromium	6020B	14	B	mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Cobalt	6020B	6.7		mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Copper	6020B	23		mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Lead	6020B	8.0		mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Nickel	6020B	17		mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Silver	6020B	0.093	J	mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Vanadium	6020B	39		mg/kg	28
001	CMR-EB06-4.5-5.0-190516	Solid	Zinc	6020B	48		mg/kg	28
002	CMR-EB06-6.25-6.75-190516	Solid	Isopropylbenzene	8260B	120	J	ug/kg	29
002	CMR-EB06-6.25-6.75-190516	Solid	Methylcyclohexane	8260B	330		ug/kg	29
002	CMR-EB06-6.25-6.75-190516	Solid	Naphthalene	8260B	250	J	ug/kg	29
002	CMR-EB06-6.25-6.75-190516	Solid	Toluene	8260B	160	J	ug/kg	29
002	CMR-EB06-6.25-6.75-190516	Solid	Xylenes (total)	8260B	440	J	ug/kg	30
002	CMR-EB06-6.25-6.75-190516	Solid	m+p - Xylenes	8260B	370		ug/kg	30
002	CMR-EB06-6.25-6.75-190516	Solid	Anthracene	8270D	300		ug/kg	31
002	CMR-EB06-6.25-6.75-190516	Solid	Dibenzofuran	8270D	400	J	ug/kg	31
002	CMR-EB06-6.25-6.75-190516	Solid	Fluoranthene	8270D	81	J	ug/kg	31
002	CMR-EB06-6.25-6.75-190516	Solid	Fluorene	8270D	470		ug/kg	31
002	CMR-EB06-6.25-6.75-190516	Solid	Phenanthrene	8270D	570		ug/kg	32
002	CMR-EB06-6.25-6.75-190516	Solid	Pyrene	8270D	210		ug/kg	32
002	CMR-EB06-6.25-6.75-190516	Solid	C19 - C36 Aliphatics	Montana EPH	440		mg/kg	33
002	CMR-EB06-6.25-6.75-190516	Solid	C9 - C18 Aliphatics	Montana EPH	710		mg/kg	33
002	CMR-EB06-6.25-6.75-190516	Solid	C11 - C22 Aromatics	Montana EPH	710		mg/kg	34
002	CMR-EB06-6.25-6.75-190516	Solid	C5 - C8 Aliphatics,	Montana VPH	200		mg/kg	35
002	CMR-EB06-6.25-6.75-190516	Solid	C9 - C12 Aliphatics,	Montana VPH	190		mg/kg	35
002	CMR-EB06-6.25-6.75-190516	Solid	C9 - C10 Aromatics	Montana VPH	190		mg/kg	36
002	CMR-EB06-6.25-6.75-190516	Solid	Ethylbenzene	Montana VPH	10		mg/kg	36

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-EB06-6.25-6.75-190516	Solid	Methyl tertiary butyl ether	Montana VPH	0.24	J	mg/kg	36
002	CMR-EB06-6.25-6.75-190516	Solid	Naphthalene	Montana VPH	9.8		mg/kg	36
002	CMR-EB06-6.25-6.75-190516	Solid	o - Xylenes	Montana VPH	3.6		mg/kg	36
002	CMR-EB06-6.25-6.75-190516	Solid	TPH	Montana VPH	750		mg/kg	37
002	CMR-EB06-6.25-6.75-190516	Solid	Arsenic	6020B	2.6		mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Barium	6020B	85		mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Beryllium	6020B	1.6		mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Cadmium	6020B	0.45		mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Chromium	6020B	13	B	mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Cobalt	6020B	6.9		mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Copper	6020B	38		mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Lead	6020B	22		mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Mercury	7471B	0.79		mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Nickel	6020B	19		mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Silver	6020B	0.20	J	mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Vanadium	6020B	25		mg/kg	38
002	CMR-EB06-6.25-6.75-190516	Solid	Zinc	6020B	49		mg/kg	38
003	CMR-EB07-0.0-1.0-190516	Solid	m+p - Xylenes	8260B	2.0	J	ug/kg	40
003	CMR-EB07-0.0-1.0-190516	Solid	Anthracene	8270D	80		ug/kg	41
003	CMR-EB07-0.0-1.0-190516	Solid	Benzo(a)anthracene	8270D	46	J	ug/kg	41
003	CMR-EB07-0.0-1.0-190516	Solid	Benzo(b)fluoranthene	8270D	88		ug/kg	41
003	CMR-EB07-0.0-1.0-190516	Solid	Benzo(k)fluoranthene	8270D	30	J	ug/kg	41
003	CMR-EB07-0.0-1.0-190516	Solid	Chrysene	8270D	46	J	ug/kg	41
003	CMR-EB07-0.0-1.0-190516	Solid	Fluoranthene	8270D	86		ug/kg	41
003	CMR-EB07-0.0-1.0-190516	Solid	Fluorene	8270D	58	J	ug/kg	41
003	CMR-EB07-0.0-1.0-190516	Solid	2-Methylnaphthalene	8270D	690		ug/kg	42
003	CMR-EB07-0.0-1.0-190516	Solid	Naphthalene	8270D	230		ug/kg	42
003	CMR-EB07-0.0-1.0-190516	Solid	Phenanthrene	8270D	230		ug/kg	42
003	CMR-EB07-0.0-1.0-190516	Solid	Pyrene	8270D	130		ug/kg	42
003	CMR-EB07-0.0-1.0-190516	Solid	C19 - C36 Aliphatics	Montana EPH	110		mg/kg	43
003	CMR-EB07-0.0-1.0-190516	Solid	C9 - C18 Aliphatics	Montana EPH	150		mg/kg	43
003	CMR-EB07-0.0-1.0-190516	Solid	C11 - C22 Aromatics	Montana EPH	93		mg/kg	44
003	CMR-EB07-0.0-1.0-190516	Solid	C5 - C8 Aliphatics,	Montana VPH	8.3		mg/kg	45
003	CMR-EB07-0.0-1.0-190516	Solid	C9 - C12 Aliphatics,	Montana VPH	38		mg/kg	45
003	CMR-EB07-0.0-1.0-190516	Solid	Benzene	Montana VPH	0.043	J	mg/kg	46
003	CMR-EB07-0.0-1.0-190516	Solid	C9 - C10 Aromatics	Montana VPH	38		mg/kg	46
003	CMR-EB07-0.0-1.0-190516	Solid	Ethylbenzene	Montana VPH	0.84		mg/kg	46
003	CMR-EB07-0.0-1.0-190516	Solid	Naphthalene	Montana VPH	4.0		mg/kg	46
003	CMR-EB07-0.0-1.0-190516	Solid	Toluene	Montana VPH	0.11	J	mg/kg	46
003	CMR-EB07-0.0-1.0-190516	Solid	m+p - Xylenes	Montana VPH	1.6		mg/kg	46
003	CMR-EB07-0.0-1.0-190516	Solid	o - Xylenes	Montana VPH	1.0		mg/kg	46
003	CMR-EB07-0.0-1.0-190516	Solid	TPH	Montana VPH	100		mg/kg	47
003	CMR-EB07-0.0-1.0-190516	Solid	Antimony	6020B	0.71		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Arsenic	6020B	40		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Barium	6020B	410		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Beryllium	6020B	0.67		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Cadmium	6020B	1.6		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Chromium	6020B	14	B	mg/kg	48

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-EB07-0.0-1.0-190516	Solid	Cobalt	6020B	7.1		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Copper	6020B	240		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Lead	6020B	95		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Mercury	7471B	0.089		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Nickel	6020B	14		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Selenium	6020B	0.59	J	mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Silver	6020B	0.73		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Vanadium	6020B	36		mg/kg	48
003	CMR-EB07-0.0-1.0-190516	Solid	Zinc	6020B	270		mg/kg	48
004	CMR-EB07-5.25-5.75-190516	Solid	Acetone	8260B	32		ug/kg	49
004	CMR-EB07-5.25-5.75-190516	Solid	Isopropylbenzene	8260B	3.3	J	ug/kg	49
004	CMR-EB07-5.25-5.75-190516	Solid	Methylcyclohexane	8260B	9.4		ug/kg	49
004	CMR-EB07-5.25-5.75-190516	Solid	Methylene chloride	8260B	2.0	J	ug/kg	49
004	CMR-EB07-5.25-5.75-190516	Solid	Anthracene	8270D	310		ug/kg	51
004	CMR-EB07-5.25-5.75-190516	Solid	Chrysene	8270D	48	J	ug/kg	51
004	CMR-EB07-5.25-5.75-190516	Solid	Fluoranthene	8270D	59	J	ug/kg	51
004	CMR-EB07-5.25-5.75-190516	Solid	Fluorene	8270D	280		ug/kg	51
004	CMR-EB07-5.25-5.75-190516	Solid	2-Methylnaphthalene	8270D	280		ug/kg	52
004	CMR-EB07-5.25-5.75-190516	Solid	Naphthalene	8270D	150		ug/kg	52
004	CMR-EB07-5.25-5.75-190516	Solid	Phenanthrene	8270D	890		ug/kg	52
004	CMR-EB07-5.25-5.75-190516	Solid	Pyrene	8270D	170		ug/kg	52
004	CMR-EB07-5.25-5.75-190516	Solid	C19 - C36 Aliphatics	Montana EPH	110		mg/kg	53
004	CMR-EB07-5.25-5.75-190516	Solid	C9 - C18 Aliphatics	Montana EPH	280		mg/kg	53
004	CMR-EB07-5.25-5.75-190516	Solid	C11 - C22 Aromatics	Montana EPH	300		mg/kg	54
004	CMR-EB07-5.25-5.75-190516	Solid	C5 - C8 Aliphatics,	Montana VPH	6.3		mg/kg	55
004	CMR-EB07-5.25-5.75-190516	Solid	C9 - C12 Aliphatics,	Montana VPH	53		mg/kg	55
004	CMR-EB07-5.25-5.75-190516	Solid	C9 - C10 Aromatics	Montana VPH	43		mg/kg	56
004	CMR-EB07-5.25-5.75-190516	Solid	Ethylbenzene	Montana VPH	0.67		mg/kg	56
004	CMR-EB07-5.25-5.75-190516	Solid	Naphthalene	Montana VPH	2.1		mg/kg	56
004	CMR-EB07-5.25-5.75-190516	Solid	m+p - Xylenes	Montana VPH	0.25	J	mg/kg	56
004	CMR-EB07-5.25-5.75-190516	Solid	o - Xylenes	Montana VPH	1.1		mg/kg	56
004	CMR-EB07-5.25-5.75-190516	Solid	TPH	Montana VPH	64		mg/kg	57
004	CMR-EB07-5.25-5.75-190516	Solid	Antimony	6020B	0.23	J	mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Arsenic	6020B	22		mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Barium	6020B	430		mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Beryllium	6020B	0.66		mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Cadmium	6020B	0.80		mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Chromium	6020B	17	B	mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Cobalt	6020B	7.6		mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Copper	6020B	100		mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Lead	6020B	22		mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Mercury	7471B	0.037	J	mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Nickel	6020B	15		mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Selenium	6020B	0.51	J	mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Silver	6020B	0.26		mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Vanadium	6020B	37		mg/kg	58
004	CMR-EB07-5.25-5.75-190516	Solid	Zinc	6020B	110		mg/kg	58
005	CMR-EB07-7.5-8.0-190516	Solid	Cyclohexane	8260B	940		ug/kg	59

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
005	CMR-EB07-7.5-8.0-190516	Solid	Ethylbenzene	8260B	1200		ug/kg	59
005	CMR-EB07-7.5-8.0-190516	Solid	Isopropylbenzene	8260B	950		ug/kg	59
005	CMR-EB07-7.5-8.0-190516	Solid	Methylcyclohexane	8260B	5700		ug/kg	59
005	CMR-EB07-7.5-8.0-190516	Solid	Naphthalene	8260B	21000		ug/kg	59
005	CMR-EB07-7.5-8.0-190516	Solid	Toluene	8260B	120	J	ug/kg	59
005	CMR-EB07-7.5-8.0-190516	Solid	m+p - Xylenes	8260B	130	J	ug/kg	60
005	CMR-EB07-7.5-8.0-190516	Solid	Acenaphthene	8270D	1800		ug/kg	61
005	CMR-EB07-7.5-8.0-190516	Solid	Anthracene	8270D	620		ug/kg	61
005	CMR-EB07-7.5-8.0-190516	Solid	Dibenzofuran	8270D	1200		ug/kg	61
005	CMR-EB07-7.5-8.0-190516	Solid	Fluorene	8270D	1900		ug/kg	61
005	CMR-EB07-7.5-8.0-190516	Solid	2-Methylnaphthalene	8270D	110000		ug/kg	62
005	CMR-EB07-7.5-8.0-190516	Solid	Naphthalene	8270D	11000		ug/kg	62
005	CMR-EB07-7.5-8.0-190516	Solid	Phenanthrene	8270D	2300		ug/kg	62
005	CMR-EB07-7.5-8.0-190516	Solid	Pyrene	8270D	420		ug/kg	62
005	CMR-EB07-7.5-8.0-190516	Solid	C19 - C36 Aliphatics	Montana EPH	250		mg/kg	63
005	CMR-EB07-7.5-8.0-190516	Solid	C9 - C18 Aliphatics	Montana EPH	650		mg/kg	63
005	CMR-EB07-7.5-8.0-190516	Solid	C11 - C22 Aromatics	Montana EPH	990		mg/kg	64
005	CMR-EB07-7.5-8.0-190516	Solid	C5 - C8 Aliphatics,	Montana VPH	160		mg/kg	65
005	CMR-EB07-7.5-8.0-190516	Solid	C9 - C12 Aliphatics,	Montana VPH	270		mg/kg	65
005	CMR-EB07-7.5-8.0-190516	Solid	C9 - C10 Aromatics	Montana VPH	240		mg/kg	66
005	CMR-EB07-7.5-8.0-190516	Solid	Ethylbenzene	Montana VPH	6.6		mg/kg	66
005	CMR-EB07-7.5-8.0-190516	Solid	Naphthalene	Montana VPH	52		mg/kg	66
005	CMR-EB07-7.5-8.0-190516	Solid	o - Xylenes	Montana VPH	7.9		mg/kg	66
005	CMR-EB07-7.5-8.0-190516	Solid	TPH	Montana VPH	250		mg/kg	67
005	CMR-EB07-7.5-8.0-190516	Solid	Arsenic	6020B	0.42	J	mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Barium	6020B	120		mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Beryllium	6020B	1.7		mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Cadmium	6020B	0.32		mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Chromium	6020B	9.9	B	mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Cobalt	6020B	4.9		mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Copper	6020B	30		mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Lead	6020B	13		mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Mercury	7471B	0.18		mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Nickel	6020B	16		mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Silver	6020B	0.13	J	mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Vanadium	6020B	32		mg/kg	68
005	CMR-EB07-7.5-8.0-190516	Solid	Zinc	6020B	36		mg/kg	68
007	CMR-EB05-6-7-190517	Solid	Benzene	8260B	220	J	ug/kg	71
007	CMR-EB05-6-7-190517	Solid	Cyclohexane	8260B	200	J	ug/kg	71
007	CMR-EB05-6-7-190517	Solid	Ethylbenzene	8260B	1000		ug/kg	71
007	CMR-EB05-6-7-190517	Solid	Isopropylbenzene	8260B	510		ug/kg	71
007	CMR-EB05-6-7-190517	Solid	Methylcyclohexane	8260B	740		ug/kg	71
007	CMR-EB05-6-7-190517	Solid	Naphthalene	8260B	28000		ug/kg	71
007	CMR-EB05-6-7-190517	Solid	Toluene	8260B	150	J	ug/kg	71
007	CMR-EB05-6-7-190517	Solid	Xylenes (total)	8260B	570	J	ug/kg	72
007	CMR-EB05-6-7-190517	Solid	m+p - Xylenes	8260B	370		ug/kg	72
007	CMR-EB05-6-7-190517	Solid	o - Xylenes	8260B	200	J	ug/kg	72
007	CMR-EB05-6-7-190517	Solid	Acenaphthene	8270D	1000		ug/kg	73

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
007	CMR-EB05-6-7-190517	Solid	Anthracene	8270D	250		ug/kg	73
007	CMR-EB05-6-7-190517	Solid	Chrysene	8270D	22	J	ug/kg	73
007	CMR-EB05-6-7-190517	Solid	Dibenzofuran	8270D	740		ug/kg	73
007	CMR-EB05-6-7-190517	Solid	Fluoranthene	8270D	29	J	ug/kg	73
007	CMR-EB05-6-7-190517	Solid	Fluorene	8270D	1200		ug/kg	73
007	CMR-EB05-6-7-190517	Solid	2-Methylnaphthalene	8270D	52000		ug/kg	74
007	CMR-EB05-6-7-190517	Solid	Naphthalene	8270D	6200		ug/kg	74
007	CMR-EB05-6-7-190517	Solid	Phenanthrene	8270D	1200		ug/kg	74
007	CMR-EB05-6-7-190517	Solid	Pyrene	8270D	120		ug/kg	74
007	CMR-EB05-6-7-190517	Solid	C19 - C36 Aliphatics	Montana EPH	210		mg/kg	75
007	CMR-EB05-6-7-190517	Solid	C9 - C18 Aliphatics	Montana EPH	1100		mg/kg	75
007	CMR-EB05-6-7-190517	Solid	C11 - C22 Aromatics	Montana EPH	1300		mg/kg	76
007	CMR-EB05-6-7-190517	Solid	C5 - C8 Aliphatics,	Montana VPH	22		mg/kg	77
007	CMR-EB05-6-7-190517	Solid	C9 - C12 Aliphatics,	Montana VPH	210		mg/kg	77
007	CMR-EB05-6-7-190517	Solid	Benzene	Montana VPH	0.19	J	mg/kg	78
007	CMR-EB05-6-7-190517	Solid	C9 - C10 Aromatics	Montana VPH	160		mg/kg	78
007	CMR-EB05-6-7-190517	Solid	Ethylbenzene	Montana VPH	2.2		mg/kg	78
007	CMR-EB05-6-7-190517	Solid	Naphthalene	Montana VPH	44		mg/kg	78
007	CMR-EB05-6-7-190517	Solid	m+p - Xylenes	Montana VPH	0.62	J	mg/kg	78
007	CMR-EB05-6-7-190517	Solid	o - Xylenes	Montana VPH	0.66	J	mg/kg	78
007	CMR-EB05-6-7-190517	Solid	TPH	Montana VPH	410		mg/kg	79
007	CMR-EB05-6-7-190517	Solid	Arsenic	6020B	6.2		mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Barium	6020B	220		mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Beryllium	6020B	0.58		mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Cadmium	6020B	0.13		mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Chromium	6020B	14	B	mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Cobalt	6020B	4.9		mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Copper	6020B	14		mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Lead	6020B	7.7		mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Nickel	6020B	11		mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Silver	6020B	0.081	J	mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Vanadium	6020B	30		mg/kg	80
007	CMR-EB05-6-7-190517	Solid	Zinc	6020B	36		mg/kg	80
008	CMR-EB05-11-12-190517	Solid	Ethylbenzene	8260B	180	J	ug/kg	81
008	CMR-EB05-11-12-190517	Solid	Isopropylbenzene	8260B	380		ug/kg	81
008	CMR-EB05-11-12-190517	Solid	Naphthalene	8260B	5800		ug/kg	81
008	CMR-EB05-11-12-190517	Solid	Acenaphthene	8270D	900		ug/kg	83
008	CMR-EB05-11-12-190517	Solid	Anthracene	8270D	260		ug/kg	83
008	CMR-EB05-11-12-190517	Solid	Dibenzofuran	8270D	700		ug/kg	83
008	CMR-EB05-11-12-190517	Solid	Fluorene	8270D	1300		ug/kg	83
008	CMR-EB05-11-12-190517	Solid	2-Methylnaphthalene	8270D	68000		ug/kg	84
008	CMR-EB05-11-12-190517	Solid	Naphthalene	8270D	7100		ug/kg	84
008	CMR-EB05-11-12-190517	Solid	Phenanthrene	8270D	1200		ug/kg	84
008	CMR-EB05-11-12-190517	Solid	Pyrene	8270D	77		ug/kg	84
008	CMR-EB05-11-12-190517	Solid	C19 - C36 Aliphatics	Montana EPH	190		mg/kg	85
008	CMR-EB05-11-12-190517	Solid	C9 - C18 Aliphatics	Montana EPH	840		mg/kg	85
008	CMR-EB05-11-12-190517	Solid	C11 - C22 Aromatics	Montana EPH	600		mg/kg	86
008	CMR-EB05-11-12-190517	Solid	C5 - C8 Aliphatics,	Montana VPH	46		mg/kg	87

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
008	CMR-EB05-11-12-190517	Solid	C9 - C12 Aliphatics,	Montana VPH	150		mg/kg	87
008	CMR-EB05-11-12-190517	Solid	C9 - C10 Aromatics	Montana VPH	150		mg/kg	88
008	CMR-EB05-11-12-190517	Solid	Ethylbenzene	Montana VPH	4.4		mg/kg	88
008	CMR-EB05-11-12-190517	Solid	Naphthalene	Montana VPH	19		mg/kg	88
008	CMR-EB05-11-12-190517	Solid	Toluene	Montana VPH	0.48	J	mg/kg	88
008	CMR-EB05-11-12-190517	Solid	o - Xylenes	Montana VPH	1.6		mg/kg	88
008	CMR-EB05-11-12-190517	Solid	TPH	Montana VPH	460		mg/kg	89
008	CMR-EB05-11-12-190517	Solid	Antimony	6020B	0.23	J	mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Arsenic	6020B	2.0		mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Barium	6020B	70		mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Beryllium	6020B	1.1		mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Cadmium	6020B	0.17		mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Chromium	6020B	15	B	mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Cobalt	6020B	4.2		mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Copper	6020B	81		mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Lead	6020B	15		mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Mercury	7471B	0.042	J	mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Nickel	6020B	16		mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Silver	6020B	0.11	J	mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Vanadium	6020B	33		mg/kg	90
008	CMR-EB05-11-12-190517	Solid	Zinc	6020B	44		mg/kg	90
009	CMR-EB09-6-7-190517	Solid	Acetone	8260B	550	J	ug/kg	91
009	CMR-EB09-6-7-190517	Solid	Benzene	8260B	250	J	ug/kg	91
009	CMR-EB09-6-7-190517	Solid	Cyclohexane	8260B	5300		ug/kg	91
009	CMR-EB09-6-7-190517	Solid	Ethylbenzene	8260B	7000		ug/kg	91
009	CMR-EB09-6-7-190517	Solid	Isopropylbenzene	8260B	2000		ug/kg	91
009	CMR-EB09-6-7-190517	Solid	Methylcyclohexane	8260B	20000		ug/kg	91
009	CMR-EB09-6-7-190517	Solid	Naphthalene	8260B	3300		ug/kg	91
009	CMR-EB09-6-7-190517	Solid	Toluene	8260B	400	J	ug/kg	91
009	CMR-EB09-6-7-190517	Solid	Xylenes (total)	8260B	12000		ug/kg	92
009	CMR-EB09-6-7-190517	Solid	m+p - Xylenes	8260B	11000		ug/kg	92
009	CMR-EB09-6-7-190517	Solid	o - Xylenes	8260B	1300		ug/kg	92
009	CMR-EB09-6-7-190517	Solid	Fluorene	8270D	47		ug/kg	93
009	CMR-EB09-6-7-190517	Solid	2-Methylnaphthalene	8270D	320		ug/kg	94
009	CMR-EB09-6-7-190517	Solid	Naphthalene	8270D	870		ug/kg	94
009	CMR-EB09-6-7-190517	Solid	Phenanthrene	8270D	47		ug/kg	94
009	CMR-EB09-6-7-190517	Solid	C19 - C36 Aliphatics	Montana EPH	13		mg/kg	95
009	CMR-EB09-6-7-190517	Solid	C9 - C18 Aliphatics	Montana EPH	91		mg/kg	95
009	CMR-EB09-6-7-190517	Solid	C11 - C22 Aromatics	Montana EPH	47		mg/kg	96
009	CMR-EB09-6-7-190517	Solid	C5 - C8 Aliphatics,	Montana VPH	770		mg/kg	97
009	CMR-EB09-6-7-190517	Solid	C9 - C12 Aliphatics,	Montana VPH	590		mg/kg	97
009	CMR-EB09-6-7-190517	Solid	Benzene	Montana VPH	2.2		mg/kg	98
009	CMR-EB09-6-7-190517	Solid	C9 - C10 Aromatics	Montana VPH	340		mg/kg	98
009	CMR-EB09-6-7-190517	Solid	Ethylbenzene	Montana VPH	30		mg/kg	98
009	CMR-EB09-6-7-190517	Solid	Methyl tertiary butyl ether	Montana VPH	0.47	J	mg/kg	98
009	CMR-EB09-6-7-190517	Solid	Naphthalene	Montana VPH	8.8		mg/kg	98
009	CMR-EB09-6-7-190517	Solid	Toluene	Montana VPH	4.3		mg/kg	98
009	CMR-EB09-6-7-190517	Solid	m+p - Xylenes	Montana VPH	25		mg/kg	98

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
009	CMR-EB09-6-7-190517	Solid	o - Xylenes	Montana VPH	8.7		mg/kg	98
009	CMR-EB09-6-7-190517	Solid	TPH	Montana VPH	1800		mg/kg	99
009	CMR-EB09-6-7-190517	Solid	Arsenic	6020B	0.56	J	mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Barium	6020B	59		mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Beryllium	6020B	1.1		mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Cadmium	6020B	0.23		mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Chromium	6020B	13	B	mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Cobalt	6020B	3.9		mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Copper	6020B	20		mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Lead	6020B	10		mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Mercury	7471B	0.31		mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Nickel	6020B	20		mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Silver	6020B	0.085	J	mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Vanadium	6020B	22		mg/kg	100
009	CMR-EB09-6-7-190517	Solid	Zinc	6020B	44		mg/kg	100

(300 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-001
Description: CMR-EB06-4.5-5.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1145
% Solids: 83.5 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	05/24/2019 1621	JM1		17834	5.04

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1400	280	ug/kg	1
Benzene	71-43-2	8260B	ND		350	140	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		350	140	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		350	140	ug/kg	1
Bromoform	75-25-2	8260B	ND		350	140	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		350	140	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1400	280	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		350	140	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		350	140	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		350	140	ug/kg	1
Chloroethane	75-00-3	8260B	ND		350	140	ug/kg	1
Chloroform	67-66-3	8260B	ND		350	140	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		350	140	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		350	140	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		350	140	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		350	140	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		350	140	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		350	140	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		350	140	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		350	140	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		350	140	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		350	140	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		350	140	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		350	140	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		350	140	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		350	140	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		350	140	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		350	140	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		350	140	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		17000	1700	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		350	140	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		690	280	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		350	140	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		350	140	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		350	140	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		690	280	ug/kg	1
Methylcyclohexane	108-87-2	8260B	250	J	350	140	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		350	140	ug/kg	1
Naphthalene	91-20-3	8260B	ND		350	140	ug/kg	1
Styrene	100-42-5	8260B	ND		350	140	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		350	140	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		350	140	ug/kg	1
Toluene	108-88-3	8260B	ND		350	140	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		350	140	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-001
Description: CMR-EB06-4.5-5.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1145
% Solids: 83.5 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	05/24/2019 1621	JM1		17834	5.04

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		350	140	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		350	140	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		350	140	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		350	140	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		350	140	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		350	140	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		350	140	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		690	280	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		350	140	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		350	140	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		100	53-142
Bromofluorobenzene		109	47-138
Toluene-d8		105	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-001
Description: CMR-EB06-4.5-5.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1145
% Solids: 83.5 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	05/21/2019 1919	JCG	05/19/2019 1401	17168

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	2700		160	49	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		160	56	ug/kg	1
Anthracene	120-12-7	8270D	850		160	30	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		160	35	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		160	39	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		160	29	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		160	38	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		160	28	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		760	290	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		760	290	ug/kg	1
Carbazole	86-74-8	8270D	ND		760	290	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		760	290	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		760	290	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		760	290	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		760	290	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		760	290	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		760	290	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		760	290	ug/kg	1
Chrysene	218-01-9	8270D	ND		160	26	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		160	30	ug/kg	1
Dibenzofuran	132-64-9	8270D	1500		760	290	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		3900	1500	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		3900	1500	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		3900	1500	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		760	290	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		760	290	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		760	290	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		760	430	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		760	290	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		760	290	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		3900	1500	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		3900	1500	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1600	590	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1600	590	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		760	290	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		3900	1500	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		160	25	ug/kg	1
Fluorene	86-73-7	8270D	2800		160	33	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		760	290	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		760	290	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		3900	1500	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		760	290	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		160	59	ug/kg	1
Isophorone	78-59-1	8270D	ND		760	290	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-001
Description: CMR-EB06-4.5-5.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1145
% Solids: 83.5 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	05/21/2019 1919	JCG	05/19/2019 1401	17168

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		160	58	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		760	290	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1600	590	ug/kg	1
Naphthalene	91-20-3	8270D	ND		160	57	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1600	590	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1600	590	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1600	590	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		760	290	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1600	590	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		3900	1500	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		760	290	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		760	290	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		3900	1500	ug/kg	1
Phenanthrene	85-01-8	8270D	2200		160	42	ug/kg	1
Phenol	108-95-2	8270D	ND		760	290	ug/kg	1
Pyrene	129-00-0	8270D	360		160	29	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		1900	590	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		3900	590	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		3900	1500	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		760	290	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		760	290	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl	N	131	33-102
2-Fluorophenol		43	35-115
Nitrobenzene-d5	N	207	22-109
Phenol-d5	N	11	33-122
Terphenyl-d14		99	41-120
2,4,6-Tribromophenol		55	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-001
Description: CMR-EB06-4.5-5.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1145
% Solids: 83.5 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/03/2019 2148	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	500		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	2200		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-001
Description: CMR-EB06-4.5-5.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1145
% Solids: 83.5 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0633	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	1600		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		74	40-140
2-Fluorobiphenyl (fractionation 1)		123	40-140
o - Terphenyl (aromatic)		99	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-001
Description: CMR-EB06-4.5-5.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1145
% Solids: 83.5 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	05/30/2019 1846	JJG		18697

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.94	mg/kg	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	5.0		4.7	0.94	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		78	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-001
Description: CMR-EB06-4.5-5.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1145
% Solids: 83.5 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	05/30/2019 1846	JJG		18699

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.057	J	0.31	0.042	mg/kg	2
C9 - C10 Aromatics		Montana VPH	3.6		1.6	0.62	mg/kg	2
Ethylbenzene	100-41-4	Montana VPH	ND		0.31	0.039	mg/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.31	0.067	mg/kg	2
Naphthalene	91-20-3	Montana VPH	0.26	J	0.31	0.16	mg/kg	2
Toluene	108-88-3	Montana VPH	ND		0.31	0.050	mg/kg	2
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.31	0.070	mg/kg	2
o - Xylenes	95-47-6	Montana VPH	ND		0.31	0.035	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		108	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE17007-001
Description: CMR-EB06-4.5-5.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1145
% Solids: 83.5 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	2	05/28/2019 1809	JJG		18030

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		18	3.5	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		75	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB06-4.5-5.0-190516
Date Sampled: 05/16/2019 1145
Date Received: 05/17/2019

Laboratory ID: UE17007-001
Matrix: Solid
% Solids: 83.5 05/17/2019 2238

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/23/2019 1626	BNW	05/21/2019 0848	17180
1	7471B	7471B	1	05/21/2019 1415	TJW	05/20/2019 1624	17176

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.53	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	20		0.53	0.21	mg/kg	1
Barium	7440-39-3	6020B	350		1.4	0.33	mg/kg	1
Beryllium	7440-41-7	6020B	0.94		0.11	0.036	mg/kg	1
Cadmium	7440-43-9	6020B	0.80		0.14	0.026	mg/kg	1
Chromium	7440-47-3	6020B	14	B	1.4	0.58	mg/kg	1
Cobalt	7440-48-4	6020B	6.7		1.4	0.32	mg/kg	1
Copper	7440-50-8	6020B	23		1.4	0.34	mg/kg	1
Lead	7439-92-1	6020B	8.0		0.26	0.072	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.094	0.023	mg/kg	1
Nickel	7440-02-0	6020B	17		1.4	0.32	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.50	mg/kg	1
Silver	7440-22-4	6020B	0.093	J	0.26	0.063	mg/kg	1
Vanadium	7440-62-2	6020B	39		1.4	0.26	mg/kg	1
Zinc	7440-66-6	6020B	48		2.6	0.53	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-002
Description: CMR-EB06-6.25-6.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1215
% Solids: 85.0 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	05/21/2019 1920	JM1		17381	6.10

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1100	230	ug/kg	1
Benzene	71-43-2	8260B	ND		290	110	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		290	110	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		290	110	ug/kg	1
Bromoform	75-25-2	8260B	ND		290	110	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		290	110	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1100	230	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		290	110	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		290	110	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		290	110	ug/kg	1
Chloroethane	75-00-3	8260B	ND		290	110	ug/kg	1
Chloroform	67-66-3	8260B	ND		290	110	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		290	110	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		290	110	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		290	110	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		290	110	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		290	110	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		290	110	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		290	110	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		290	110	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		290	110	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		290	110	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		290	110	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		290	110	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		290	110	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		290	110	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		290	110	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		290	110	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		290	110	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		14000	1400	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		290	110	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		570	230	ug/kg	1
Isopropylbenzene	98-82-8	8260B	120	J	290	110	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		290	110	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		290	110	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		570	230	ug/kg	1
Methylcyclohexane	108-87-2	8260B	330		290	110	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		290	110	ug/kg	1
Naphthalene	91-20-3	8260B	250	J	290	110	ug/kg	1
Styrene	100-42-5	8260B	ND		290	110	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		290	110	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		290	110	ug/kg	1
Toluene	108-88-3	8260B	160	J	290	110	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		290	110	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-002
Description: CMR-EB06-6.25-6.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1215
% Solids: 85.0 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	05/21/2019 1920	JM1		17381	6.10

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		290	110	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		290	110	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		290	110	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		290	110	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		290	110	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		290	110	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		290	110	ug/kg	1
Xylenes (total)	1330-20-7	8260B	440	J	570	230	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	370		290	110	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		290	110	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		115	47-138
Toluene-d8		108	68-124

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-002
Description: CMR-EB06-6.25-6.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1215
% Solids: 85.0 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	05/21/2019 1944	JCG	05/19/2019 1401	17168

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		160	48	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		160	55	ug/kg	1
Anthracene	120-12-7	8270D	300		160	30	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		160	34	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		160	38	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		160	29	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		160	38	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		160	28	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		750	290	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		750	290	ug/kg	1
Carbazole	86-74-8	8270D	ND		750	290	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		750	290	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		750	290	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		750	290	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		750	290	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		750	290	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		750	290	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		750	290	ug/kg	1
Chrysene	218-01-9	8270D	ND		160	26	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		160	30	ug/kg	1
Dibenzofuran	132-64-9	8270D	400	J	750	290	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		3900	1500	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		3900	1500	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		3900	1500	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		750	290	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		750	290	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		750	290	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		750	430	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		750	290	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		750	290	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		3900	1500	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		3900	1500	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1600	580	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1600	580	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		750	290	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		3900	1500	ug/kg	1
Fluoranthene	206-44-0	8270D	81	J	160	24	ug/kg	1
Fluorene	86-73-7	8270D	470		160	33	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		750	290	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		750	290	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		3900	1500	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		750	290	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		160	58	ug/kg	1
Isophorone	78-59-1	8270D	ND		750	290	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-002
Description: CMR-EB06-6.25-6.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1215
% Solids: 85.0 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	05/21/2019 1944	JCG	05/19/2019 1401	17168

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		160	57	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		750	290	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1600	580	ug/kg	1
Naphthalene	91-20-3	8270D	ND		160	56	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1600	580	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1600	580	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1600	580	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		750	290	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1600	580	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		3900	1500	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		750	290	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		750	290	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		3900	1500	ug/kg	1
Phenanthrene	85-01-8	8270D	570		160	42	ug/kg	1
Phenol	108-95-2	8270D	ND		750	290	ug/kg	1
Pyrene	129-00-0	8270D	210		160	29	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		1900	580	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		3900	580	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		3900	1500	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		750	290	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		750	290	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		94	33-102
2-Fluorophenol		60	35-115
Nitrobenzene-d5	N	342	22-109
Phenol-d5	N	19	33-122
Terphenyl-d14		98	41-120
2,4,6-Tribromophenol		64	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-002
Description: CMR-EB06-6.25-6.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1215
% Solids: 85.0 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/03/2019 2217	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	440		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	710		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-002
Description: CMR-EB06-6.25-6.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1215
% Solids: 85.0 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0702	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	710		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		110	40-140
o - Terphenyl (aromatic)		98	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-002
Description: CMR-EB06-6.25-6.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1215
% Solids: 85.0 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	2	05/30/2019 1943	JJG		18697

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	200		8.9	1.8	mg/kg	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	190		8.9	1.8	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1110	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-002
Description: CMR-EB06-6.25-6.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1215
% Solids: 85.0 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/28/2019 1645	JJG		18028
2	VPH	Montana VPH	2	05/30/2019 1943	JJG		18699

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.30	0.040	mg/kg	1
C9 - C10 Aromatics		Montana VPH	190		1.5	0.59	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	10		0.30	0.037	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	0.24	J	0.30	0.064	mg/kg	1
Naphthalene	91-20-3	Montana VPH	9.8		0.59	0.31	mg/kg	2
Toluene	108-88-3	Montana VPH	ND		0.30	0.048	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.30	0.067	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	3.6		0.30	0.033	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Run 1 Acceptance Limits	Q	Run 2 % Recovery	Run 2 Acceptance Limits
2,5-Dibromotoluene (PID)	N	362	70-130	N	285	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE17007-002
Description: CMR-EB06-6.25-6.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1215
% Solids: 85.0 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/28/2019 1645	JJG		18030

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	750		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	3010	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-002
Description: CMR-EB06-6.25-6.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1215
% Solids: 85.0 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/23/2019 1632	BNW	05/21/2019 0848	17180
1	7471B	7471B	1	05/21/2019 1423	TJW	05/20/2019 1624	17176

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.55	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	2.6		0.55	0.22	mg/kg	1
Barium	7440-39-3	6020B	85		1.4	0.34	mg/kg	1
Beryllium	7440-41-7	6020B	1.6		0.11	0.038	mg/kg	1
Cadmium	7440-43-9	6020B	0.45		0.14	0.028	mg/kg	1
Chromium	7440-47-3	6020B	13	B	1.4	0.61	mg/kg	1
Cobalt	7440-48-4	6020B	6.9		1.4	0.33	mg/kg	1
Copper	7440-50-8	6020B	38		1.4	0.36	mg/kg	1
Lead	7439-92-1	6020B	22		0.28	0.075	mg/kg	1
Mercury	7439-97-6	7471B	0.79		0.091	0.022	mg/kg	1
Nickel	7440-02-0	6020B	19		1.4	0.33	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.52	mg/kg	1
Silver	7440-22-4	6020B	0.20	J	0.28	0.066	mg/kg	1
Vanadium	7440-62-2	6020B	25		1.4	0.28	mg/kg	1
Zinc	7440-66-6	6020B	49		2.8	0.55	mg/kg	1

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DL = Detection Limit
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-003
Description: CMR-EB07-0.0-1.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1525
% Solids: 89.6 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	05/24/2019 0044	KGT		17735	5.85

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		19	7.6	ug/kg	1
Benzene	71-43-2	8260B	ND		4.8	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.8	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.8	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.8	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.8	2.9	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.8	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.8	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.8	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.8	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.8	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.8	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.8	2.9	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.8	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.8	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.8	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.8	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.8	2.9	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.8	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.8	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.8	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.8	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.8	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.8	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		240	24	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.8	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.5	3.8	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.8	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.8	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.8	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.5	3.8	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.8	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.8	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.8	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.8	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.8	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.8	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.8	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.8	1.9	ug/kg	1

LOQ = Limit of Quantitation
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-003
Description: CMR-EB07-0.0-1.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1525
% Solids: 89.6 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	05/24/2019 0044	KGT		17735	5.85

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.8	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.8	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.8	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.8	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.8	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.8	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.8	2.9	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.5	3.8	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	2.0	J	4.8	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.8	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	53-142
Bromofluorobenzene		101	47-138
Toluene-d8		102	68-124

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-003
Description: CMR-EB07-0.0-1.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1525
% Solids: 89.6 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	05/21/2019 2009	JCG	05/19/2019 1401	17168

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		72	22	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		72	25	ug/kg	1
Anthracene	120-12-7	8270D	80		72	14	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	46	J	72	16	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		72	17	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	88		72	13	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		72	17	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	30	J	72	13	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		340	130	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		340	130	ug/kg	1
Carbazole	86-74-8	8270D	ND		340	130	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		340	130	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		340	130	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		340	130	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		340	130	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		340	130	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		340	130	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		340	130	ug/kg	1
Chrysene	218-01-9	8270D	46	J	72	12	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		72	14	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		340	130	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		1800	660	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		1800	660	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		1800	660	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		340	130	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		340	130	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		340	130	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		340	200	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		340	130	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		340	130	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		1800	660	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		1800	660	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		720	260	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		720	260	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		340	130	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		1800	660	ug/kg	1
Fluoranthene	206-44-0	8270D	86		72	11	ug/kg	1
Fluorene	86-73-7	8270D	58	J	72	15	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		340	130	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		340	130	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		1800	660	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		340	130	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		72	26	ug/kg	1
Isophorone	78-59-1	8270D	ND		340	130	ug/kg	1

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E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-003
Description: CMR-EB07-0.0-1.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1525
% Solids: 89.6 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	05/21/2019 2009	JCG	05/19/2019 1401	17168

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	690		72	26	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		340	130	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		720	260	ug/kg	1
Naphthalene	91-20-3	8270D	230		72	26	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		720	260	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		720	260	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		720	260	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		340	130	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		720	260	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		1800	660	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		340	130	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		340	130	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		1800	660	ug/kg	1
Phenanthrene	85-01-8	8270D	230		72	19	ug/kg	1
Phenol	108-95-2	8270D	ND		340	130	ug/kg	1
Pyrene	129-00-0	8270D	130		72	13	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		870	260	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		1800	260	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		1800	660	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		340	130	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		340	130	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		76	33-102
2-Fluorophenol		56	35-115
Nitrobenzene-d5		84	22-109
Phenol-d5		43	33-122
Terphenyl-d14		91	41-120
2,4,6-Tribromophenol		54	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-003
Description: CMR-EB07-0.0-1.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1525
% Solids: 89.6 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/03/2019 2246	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	110		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	150		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		82	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-003
Description: CMR-EB07-0.0-1.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1525
% Solids: 89.6 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0731	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	93		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		100	40-140
o - Terphenyl (aromatic)		111	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-003
Description: CMR-EB07-0.0-1.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1525
% Solids: 89.6 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/28/2019 1713	JJG		18029
2	VPH	Montana VPH	1	05/30/2019 1914	JJG		18697

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	8.3		3.9	0.77	mg/kg	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	38		3.9	0.77	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	155	70-130		118	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-003
Description: CMR-EB07-0.0-1.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1525
% Solids: 89.6 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	05/30/2019 1914	JJG		18699

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.043	J	0.26	0.035	mg/kg	2
C9 - C10 Aromatics		Montana VPH	38		1.3	0.52	mg/kg	2
Ethylbenzene	100-41-4	Montana VPH	0.84		0.26	0.032	mg/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.26	0.056	mg/kg	2
Naphthalene	91-20-3	Montana VPH	4.0		0.26	0.13	mg/kg	2
Toluene	108-88-3	Montana VPH	0.11	J	0.26	0.041	mg/kg	2
m+p - Xylenes	179601-23-1	Montana VPH	1.6		0.26	0.058	mg/kg	2
o - Xylenes	95-47-6	Montana VPH	1.0		0.26	0.029	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		127	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE17007-003
Description: CMR-EB07-0.0-1.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1525
% Solids: 89.6 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/28/2019 1713	JJG		18030

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	100		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	235	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB07-0.0-1.0-190516
Date Sampled: 05/16/2019 1525
Date Received: 05/17/2019

Laboratory ID: UE17007-003
Matrix: Solid
% Solids: 89.6 05/17/2019 2238

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/23/2019 1637	BNW	05/21/2019 0848	17180
1	7471B	7471B	1	05/21/2019 1425	TJW	05/20/2019 1624	17176

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.71		0.51	0.20	mg/kg	1
Arsenic	7440-38-2	6020B	40		0.51	0.20	mg/kg	1
Barium	7440-39-3	6020B	410		1.3	0.31	mg/kg	1
Beryllium	7440-41-7	6020B	0.67		0.10	0.034	mg/kg	1
Cadmium	7440-43-9	6020B	1.6		0.13	0.025	mg/kg	1
Chromium	7440-47-3	6020B	14	B	1.3	0.56	mg/kg	1
Cobalt	7440-48-4	6020B	7.1		1.3	0.30	mg/kg	1
Copper	7440-50-8	6020B	240		1.3	0.33	mg/kg	1
Lead	7439-92-1	6020B	95		0.25	0.069	mg/kg	1
Mercury	7439-97-6	7471B	0.089		0.085	0.020	mg/kg	1
Nickel	7440-02-0	6020B	14		1.3	0.30	mg/kg	1
Selenium	7782-49-2	6020B	0.59	J	1.3	0.48	mg/kg	1
Silver	7440-22-4	6020B	0.73		0.25	0.061	mg/kg	1
Vanadium	7440-62-2	6020B	36		1.3	0.25	mg/kg	1
Zinc	7440-66-6	6020B	270		2.5	0.51	mg/kg	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-004
Description: CMR-EB07-5.25-5.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1550
% Solids: 84.3 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	05/24/2019 0106	KGT		17735	6.38

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	32		19	7.4	ug/kg	1
Benzene	71-43-2	8260B	ND		4.7	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.7	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.7	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.7	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.7	2.8	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.7	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.7	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.7	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.7	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.7	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.7	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.7	2.8	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.7	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.7	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.7	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.7	2.8	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.7	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.7	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.7	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.7	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.7	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		230	23	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.7	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.3	3.7	ug/kg	1
Isopropylbenzene	98-82-8	8260B	3.3	J	4.7	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.7	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.7	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.3	3.7	ug/kg	1
Methylcyclohexane	108-87-2	8260B	9.4		4.7	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	2.0	J	4.7	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.7	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.7	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.7	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.7	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.7	1.9	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-004
Description: CMR-EB07-5.25-5.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1550
% Solids: 84.3 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	05/24/2019 0106	KGT		17735	6.38

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.7	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.7	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.7	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.7	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.7	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.7	2.8	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.3	3.7	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.7	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.7	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		92	47-138
Toluene-d8		112	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-004
Description: CMR-EB07-5.25-5.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1550
% Solids: 84.3 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	05/21/2019 2034	JCG	05/19/2019 1401	17168

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		79	24	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		79	28	ug/kg	1
Anthracene	120-12-7	8270D	310		79	15	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		79	17	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		79	19	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		79	15	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		79	19	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		79	14	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		380	150	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		380	150	ug/kg	1
Carbazole	86-74-8	8270D	ND		380	150	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		380	150	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		380	150	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		380	150	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		380	150	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		380	150	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		380	150	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		380	150	ug/kg	1
Chrysene	218-01-9	8270D	48	J	79	13	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		79	15	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		380	150	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		2000	730	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		2000	730	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		2000	730	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		380	150	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		380	150	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		380	150	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		380	220	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		380	150	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		380	150	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		2000	730	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		2000	730	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		790	290	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		790	290	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		380	150	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		2000	730	ug/kg	1
Fluoranthene	206-44-0	8270D	59	J	79	12	ug/kg	1
Fluorene	86-73-7	8270D	280		79	17	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		380	150	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		380	150	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		2000	730	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		380	150	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		79	29	ug/kg	1
Isophorone	78-59-1	8270D	ND		380	150	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-004
Description: CMR-EB07-5.25-5.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1550
% Solids: 84.3 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	25	05/21/2019 2034	JCG	05/19/2019 1401	17168

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	280		79	29	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		380	150	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		790	290	ug/kg	1
Naphthalene	91-20-3	8270D	150		79	28	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		790	290	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		790	290	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		790	290	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		380	150	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		790	290	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		2000	730	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		380	150	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		380	150	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		2000	730	ug/kg	1
Phenanthrene	85-01-8	8270D	890		79	21	ug/kg	1
Phenol	108-95-2	8270D	ND		380	150	ug/kg	1
Pyrene	129-00-0	8270D	170		79	15	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		970	290	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		2000	290	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		2000	730	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		380	150	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		380	150	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		86	33-102
2-Fluorophenol		60	35-115
Nitrobenzene-d5	N	124	22-109
Phenol-d5	N	8.2	33-122
Terphenyl-d14		98	41-120
2,4,6-Tribromophenol		46	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-004
Description: CMR-EB07-5.25-5.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1550
% Solids: 84.3 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/03/2019 2316	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	110		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	280		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		79	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Description: CMR-EB07-5.25-5.75-190516
Date Sampled: 05/16/2019 1550
Date Received: 05/17/2019

Laboratory ID: UE17007-004
Matrix: Solid
% Solids: 84.3 05/17/2019 2238

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0800	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	300		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		86	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		79	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-004
Description: CMR-EB07-5.25-5.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1550
% Solids: 84.3 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/28/2019 1741	JJG		18029

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	6.3		4.5	0.90	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	53		4.5	0.90	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	529	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-004
Description: CMR-EB07-5.25-5.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1550
% Solids: 84.3 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/28/2019 1741	JJG		18028

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.30	0.041	mg/kg	1
C9 - C10 Aromatics		Montana VPH	43		1.5	0.60	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	0.67		0.30	0.037	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.30	0.064	mg/kg	1
Naphthalene	91-20-3	Montana VPH	2.1		0.30	0.16	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.30	0.048	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	0.25	J	0.30	0.067	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	1.1		0.30	0.033	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	292	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE17007-004
Description: CMR-EB07-5.25-5.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1550
% Solids: 84.3 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/28/2019 1741	JJG		18030

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	64		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	368	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-004
Description: CMR-EB07-5.25-5.75-190516
Matrix: Solid
Date Sampled: 05/16/2019 1550
% Solids: 84.3 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/23/2019 1643	BNW	05/21/2019 0848	17180
1	7471B	7471B	1	05/21/2019 1433	TJW	05/20/2019 1624	17176

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.23	J	0.45	0.18	mg/kg	1
Arsenic	7440-38-2	6020B	22		0.45	0.18	mg/kg	1
Barium	7440-39-3	6020B	430		1.2	0.28	mg/kg	1
Beryllium	7440-41-7	6020B	0.66		0.089	0.030	mg/kg	1
Cadmium	7440-43-9	6020B	0.80		0.12	0.022	mg/kg	1
Chromium	7440-47-3	6020B	17	B	1.2	0.49	mg/kg	1
Cobalt	7440-48-4	6020B	7.6		1.2	0.27	mg/kg	1
Copper	7440-50-8	6020B	100		1.2	0.29	mg/kg	1
Lead	7439-92-1	6020B	22		0.22	0.061	mg/kg	1
Mercury	7439-97-6	7471B	0.037	J	0.092	0.022	mg/kg	1
Nickel	7440-02-0	6020B	15		1.2	0.27	mg/kg	1
Selenium	7782-49-2	6020B	0.51	J	1.2	0.42	mg/kg	1
Silver	7440-22-4	6020B	0.26		0.22	0.054	mg/kg	1
Vanadium	7440-62-2	6020B	37		1.2	0.22	mg/kg	1
Zinc	7440-66-6	6020B	110		2.2	0.45	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-005
Description: CMR-EB07-7.5-8.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1600
% Solids: 85.9 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	05/21/2019 2309	KGT		17420	5.86
2	5035 High	8260B	4	05/28/2019 1826	JM1		18047	5.86

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1200	230	ug/kg	1
Benzene	71-43-2	8260B	ND		290	120	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		290	120	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		290	120	ug/kg	1
Bromoform	75-25-2	8260B	ND		290	120	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		290	120	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1200	230	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		290	120	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		290	120	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		290	120	ug/kg	1
Chloroethane	75-00-3	8260B	ND		290	120	ug/kg	1
Chloroform	67-66-3	8260B	ND		290	120	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		290	120	ug/kg	1
Cyclohexane	110-82-7	8260B	940		290	120	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		290	120	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		290	120	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		290	120	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		290	120	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		290	120	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		290	120	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		290	120	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		290	120	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		290	120	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		290	120	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		290	120	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		290	120	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		290	120	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		290	120	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		290	120	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		14000	1400	ug/kg	1
Ethylbenzene	100-41-4	8260B	1200		290	120	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		580	230	ug/kg	1
Isopropylbenzene	98-82-8	8260B	950		290	120	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		290	120	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		290	120	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		580	230	ug/kg	1
Methylcyclohexane	108-87-2	8260B	5700		290	120	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		290	120	ug/kg	1
Naphthalene	91-20-3	8260B	21000		1200	460	ug/kg	2
Styrene	100-42-5	8260B	ND		290	120	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		290	120	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		290	120	ug/kg	1
Toluene	108-88-3	8260B	120	J	290	120	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-005
Description: CMR-EB07-7.5-8.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1600
% Solids: 85.9 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	05/21/2019 2309	KGT		17420	5.86
2	5035 High	8260B	4	05/28/2019 1826	JM1		18047	5.86

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		290	120	ug/kg	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		290	120	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		290	120	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		290	120	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		290	120	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		290	120	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		290	120	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		290	120	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		580	230	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	130	J	290	120	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		290	120	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		98	53-142		87	53-142
Bromofluorobenzene		114	47-138		116	47-138
Toluene-d8		112	68-124		104	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-005
Description: CMR-EB07-7.5-8.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1600
% Solids: 85.9 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	05/21/2019 2059	JCG	05/19/2019 1401	17168
2	3546	8270D	500	05/22/2019 1328	SCD	05/19/2019 1401	17168

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	1800		150	47	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		150	53	ug/kg	1
Anthracene	120-12-7	8270D	620		150	29	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		150	33	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		150	37	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		150	28	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		150	37	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		150	27	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		730	280	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		730	280	ug/kg	1
Carbazole	86-74-8	8270D	ND		730	280	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		730	280	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		730	280	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		730	280	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		730	280	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		730	280	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		730	280	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		730	280	ug/kg	1
Chrysene	218-01-9	8270D	ND		150	25	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		150	29	ug/kg	1
Dibenzofuran	132-64-9	8270D	1200		730	280	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		3800	1400	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		3800	1400	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		3800	1400	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		730	280	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		730	280	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		730	280	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		730	420	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		730	280	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		730	280	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		3800	1400	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		3800	1400	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1500	560	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1500	560	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		730	280	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		3800	1400	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		150	24	ug/kg	1
Fluorene	86-73-7	8270D	1900		150	32	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		730	280	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		730	280	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		3800	1400	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		730	280	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		150	56	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-005
Description: CMR-EB07-7.5-8.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1600
% Solids: 85.9 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	05/21/2019 2059	JCG	05/19/2019 1401	17168
2	3546	8270D	500	05/22/2019 1328	SCD	05/19/2019 1401	17168

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		730	280	ug/kg	1
2-Methylnaphthalene	91-57-6	8270D	110000		1500	560	ug/kg	2
2-Methylphenol	95-48-7	8270D	ND		730	280	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1500	560	ug/kg	1
Naphthalene	91-20-3	8270D	11000		150	55	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1500	560	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1500	560	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1500	560	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		730	280	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1500	560	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		3800	1400	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		730	280	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		730	280	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		3800	1400	ug/kg	1
Phenanthrene	85-01-8	8270D	2300		150	41	ug/kg	1
Phenol	108-95-2	8270D	ND		730	280	ug/kg	1
Pyrene	129-00-0	8270D	420		150	28	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		1900	560	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		3800	560	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		3800	1400	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		730	280	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		730	280	ug/kg	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl	N	114	33-102	N	155	33-102
2-Fluorophenol		56	35-115		70	35-115
Nitrobenzene-d5	N	266	22-109		38	22-109
Phenol-d5	N	16	33-122		110	33-122
Terphenyl-d14		100	41-120		103	41-120
2,4,6-Tribromophenol		76	30-117	N	0.00	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-005
Description: CMR-EB07-7.5-8.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1600
% Solids: 85.9 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/03/2019 2345	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	250		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	650		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		65	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-005
Description: CMR-EB07-7.5-8.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1600
% Solids: 85.9 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0829	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	990		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		111	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-005
Description: CMR-EB07-7.5-8.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1600
% Solids: 85.9 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 1837	JJG		18029

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	160		17	3.3	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	270		17	3.3	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	412	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-005
Description: CMR-EB07-7.5-8.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1600
% Solids: 85.9 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 1837	JJG		18028
2	VPH	Montana VPH	10	06/05/2019 1448	JJG		18745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		1.1	0.15	mg/kg	1
C9 - C10 Aromatics		Montana VPH	240		5.6	2.2	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	6.6		1.1	0.14	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		1.1	0.24	mg/kg	1
Naphthalene	91-20-3	Montana VPH	52		2.8	1.4	mg/kg	2
Toluene	108-88-3	Montana VPH	ND		1.1	0.18	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		1.1	0.25	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	7.9		1.1	0.12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Run 1 Acceptance Limits	Q	Run 2 % Recovery	Run 2 Acceptance Limits
2,5-Dibromotoluene (PID)	N	3610	70-130	N	3260	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE17007-005
Description: CMR-EB07-7.5-8.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1600
% Solids: 85.9 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 1837	JJG		18030

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	250		36	7.0	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1990	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-005
Description: CMR-EB07-7.5-8.0-190516
Matrix: Solid
Date Sampled: 05/16/2019 1600
% Solids: 85.9 05/17/2019 2238
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/23/2019 2159	JCF	05/21/2019 0848	17180
1	7471B	7471B	1	05/21/2019 1435	TJW	05/20/2019 1624	17176

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.56	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	0.42	J	0.56	0.22	mg/kg	1
Barium	7440-39-3	6020B	120		1.5	0.35	mg/kg	1
Beryllium	7440-41-7	6020B	1.7		0.11	0.038	mg/kg	1
Cadmium	7440-43-9	6020B	0.32		0.15	0.028	mg/kg	1
Chromium	7440-47-3	6020B	9.9	B	1.5	0.62	mg/kg	1
Cobalt	7440-48-4	6020B	4.9		1.5	0.34	mg/kg	1
Copper	7440-50-8	6020B	30		1.5	0.36	mg/kg	1
Lead	7439-92-1	6020B	13		0.28	0.076	mg/kg	1
Mercury	7439-97-6	7471B	0.18		0.093	0.022	mg/kg	1
Nickel	7440-02-0	6020B	16		1.5	0.34	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.5	0.53	mg/kg	1
Silver	7440-22-4	6020B	0.13	J	0.28	0.067	mg/kg	1
Vanadium	7440-62-2	6020B	32		1.5	0.28	mg/kg	1
Zinc	7440-66-6	6020B	36		2.8	0.56	mg/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-006
Description: TB-01-20190516
Matrix: Aqueous
Date Sampled: 05/16/2019
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/21/2019 1209	BWS		17324

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-006
Description: TB-01-20190516
Matrix: Aqueous
Date Sampled: 05/16/2019
Date Received: 05/17/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/21/2019 1209	BWS		17324

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		93	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		104	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-007
Description: CMR-EB05-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 80.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	05/21/2019 2332	KGT		17420	5.71
2	5035 High	8260B	4	05/29/2019 1752	JM1		18200	5.71

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1300	260	ug/kg	1
Benzene	71-43-2	8260B	220	J	330	130	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		330	130	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		330	130	ug/kg	1
Bromoform	75-25-2	8260B	ND		330	130	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		330	130	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1300	260	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		330	130	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		330	130	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		330	130	ug/kg	1
Chloroethane	75-00-3	8260B	ND		330	130	ug/kg	1
Chloroform	67-66-3	8260B	ND		330	130	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		330	130	ug/kg	1
Cyclohexane	110-82-7	8260B	200	J	330	130	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		330	130	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		330	130	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		330	130	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		330	130	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		330	130	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		330	130	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		330	130	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		330	130	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		330	130	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		330	130	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		330	130	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		330	130	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		330	130	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		330	130	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		330	130	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		17000	1700	ug/kg	1
Ethylbenzene	100-41-4	8260B	1000		330	130	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		660	260	ug/kg	1
Isopropylbenzene	98-82-8	8260B	510		330	130	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		330	130	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		330	130	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		660	260	ug/kg	1
Methylcyclohexane	108-87-2	8260B	740		330	130	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		330	130	ug/kg	1
Naphthalene	91-20-3	8260B	28000		1300	530	ug/kg	2
Styrene	100-42-5	8260B	ND		330	130	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		330	130	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		330	130	ug/kg	1
Toluene	108-88-3	8260B	150	J	330	130	ug/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-007
Description: CMR-EB05-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 80.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	05/21/2019 2332	KGT		17420	5.71
2	5035 High	8260B	4	05/29/2019 1752	JM1		18200	5.71

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		330	130	ug/kg	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		330	130	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		330	130	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		330	130	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		330	130	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		330	130	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		330	130	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		330	130	ug/kg	1
Xylenes (total)	1330-20-7	8260B	570	J	660	260	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	370		330	130	ug/kg	1
o - Xylenes	95-47-6	8260B	200	J	330	130	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		93	53-142		90	53-142
Bromofluorobenzene		108	47-138		118	47-138
Toluene-d8		95	68-124		92	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-007
Description: CMR-EB05-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 80.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	05/30/2019 1418	SCD	05/22/2019 1847	17544
2	3546	8270D	200	05/31/2019 2306	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	1000		33	10	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		33	12	ug/kg	1
Anthracene	120-12-7	8270D	250		33	6.3	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		33	7.3	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		33	8.1	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		33	6.1	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		33	8.0	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		33	5.9	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		160	61	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		160	61	ug/kg	1
Carbazole	86-74-8	8270D	ND		160	61	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		160	61	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		160	61	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		160	61	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		160	61	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		160	61	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		160	61	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		160	61	ug/kg	1
Chrysene	218-01-9	8270D	22	J	33	5.5	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		33	6.3	ug/kg	1
Dibenzofuran	132-64-9	8270D	740		160	61	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		820	310	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		820	310	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		820	310	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		160	61	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		160	61	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		160	61	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		160	91	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		160	61	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		160	61	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		820	310	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		820	310	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		330	120	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		330	120	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		160	61	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		820	310	ug/kg	1
Fluoranthene	206-44-0	8270D	29	J	33	5.2	ug/kg	1
Fluorene	86-73-7	8270D	1200		33	7.0	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		160	61	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		160	61	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		820	310	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		160	61	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		33	12	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-007
Description: CMR-EB05-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 80.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	05/30/2019 1418	SCD	05/22/2019 1847	17544
2	3546	8270D	200	05/31/2019 2306	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		160	61	ug/kg	1
2-Methylnaphthalene	91-57-6	8270D	52000		660	240	ug/kg	2
2-Methylphenol	95-48-7	8270D	ND		160	61	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		330	120	ug/kg	1
Naphthalene	91-20-3	8270D	6200		660	240	ug/kg	2
2-Nitroaniline	88-74-4	8270D	ND		330	120	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		330	120	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		330	120	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		160	61	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		330	120	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		820	310	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		160	61	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		160	61	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		820	310	ug/kg	1
Phenanthrene	85-01-8	8270D	1200		33	8.8	ug/kg	1
Phenol	108-95-2	8270D	ND		160	61	ug/kg	1
Pyrene	129-00-0	8270D	120		33	6.1	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		410	120	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		820	120	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		820	310	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		160	61	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		160	61	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Run 1 Acceptance Limits	Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		86	33-102	N	110	33-102
2-Fluorophenol		67	35-115		45	35-115
Nitrobenzene-d5		62	22-109		34	22-109
Phenol-d5		63	33-122		33	33-122
Terphenyl-d14		103	41-120	N	130	41-120
2,4,6-Tribromophenol	N	131	30-117	N	18	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-007
Description: CMR-EB05-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 80.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0014	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	210		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	1100		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		66	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-007
Description: CMR-EB05-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 80.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0858	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	1300		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		99	40-140
2-Fluorobiphenyl (fractionation 1)		128	40-140
o - Terphenyl (aromatic)		73	40-140

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-007
Description: CMR-EB05-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 80.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 1906	JJG		18029

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	22		19	3.8	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	210		19	3.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	5820	70-130

LOQ = Limit of Quantitation
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-007
Description: CMR-EB05-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 80.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 1906	JJG		18028

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.19	J	1.3	0.17	mg/kg	1
C9 - C10 Aromatics		Montana VPH	160		6.3	2.5	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	2.2		1.3	0.16	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		1.3	0.27	mg/kg	1
Naphthalene	91-20-3	Montana VPH	44		1.3	0.66	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		1.3	0.20	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	0.62	J	1.3	0.28	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.66	J	1.3	0.14	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	2990	70-130

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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE17007-007
Description: CMR-EB05-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 80.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 1906	JJG		18030

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	410		36	7.0	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	5900	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB05-6-7-190517
Date Sampled: 05/17/2019 1015
Date Received: 05/18/2019

Laboratory ID: UE17007-007
Matrix: Solid
% Solids: 80.8 05/18/2019 1518

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/23/2019 2205	JCF	05/21/2019 0848	17180
1	7471B	7471B	1	05/21/2019 1438	TJW	05/20/2019 1624	17176

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.49	0.20	mg/kg	1
Arsenic	7440-38-2	6020B	6.2		0.49	0.20	mg/kg	1
Barium	7440-39-3	6020B	220		1.3	0.30	mg/kg	1
Beryllium	7440-41-7	6020B	0.58		0.098	0.033	mg/kg	1
Cadmium	7440-43-9	6020B	0.13		0.13	0.025	mg/kg	1
Chromium	7440-47-3	6020B	14	B	1.3	0.54	mg/kg	1
Cobalt	7440-48-4	6020B	4.9		1.3	0.29	mg/kg	1
Copper	7440-50-8	6020B	14		1.3	0.32	mg/kg	1
Lead	7439-92-1	6020B	7.7		0.25	0.067	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.089	0.021	mg/kg	1
Nickel	7440-02-0	6020B	11		1.3	0.29	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.3	0.46	mg/kg	1
Silver	7440-22-4	6020B	0.081	J	0.25	0.059	mg/kg	1
Vanadium	7440-62-2	6020B	30		1.3	0.25	mg/kg	1
Zinc	7440-66-6	6020B	36		2.5	0.49	mg/kg	1

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Description: CMR-EB05-11-12-190517
Date Sampled: 05/17/2019 1015
Date Received: 05/18/2019

Laboratory ID: UE17007-008
Matrix: Solid
% Solids: 84.3 05/18/2019 1518

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	05/21/2019 2354	KGT		17420	5.99

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1200	240	ug/kg	1
Benzene	71-43-2	8260B	ND		290	120	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		290	120	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		290	120	ug/kg	1
Bromoform	75-25-2	8260B	ND		290	120	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		290	120	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1200	240	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		290	120	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		290	120	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		290	120	ug/kg	1
Chloroethane	75-00-3	8260B	ND		290	120	ug/kg	1
Chloroform	67-66-3	8260B	ND		290	120	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		290	120	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		290	120	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		290	120	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		290	120	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		290	120	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		290	120	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		290	120	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		290	120	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		290	120	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		290	120	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		290	120	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		290	120	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		290	120	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		290	120	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		290	120	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		290	120	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		290	120	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		15000	1500	ug/kg	1
Ethylbenzene	100-41-4	8260B	180	J	290	120	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		590	240	ug/kg	1
Isopropylbenzene	98-82-8	8260B	380		290	120	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		290	120	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		290	120	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		590	240	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		290	120	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		290	120	ug/kg	1
Naphthalene	91-20-3	8260B	5800		290	120	ug/kg	1
Styrene	100-42-5	8260B	ND		290	120	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		290	120	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		290	120	ug/kg	1
Toluene	108-88-3	8260B	ND		290	120	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		290	120	ug/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-008
Description: CMR-EB05-11-12-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 84.3 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	05/21/2019 2354	KGT		17420	5.99

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		290	120	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		290	120	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		290	120	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		290	120	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		290	120	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		290	120	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		290	120	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		590	240	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		290	120	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		290	120	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		102	53-142
Bromofluorobenzene		125	47-138
Toluene-d8		109	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-008
Description: CMR-EB05-11-12-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 84.3 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	20	05/30/2019 1507	SCD	05/22/2019 1847	17544
2	3546	8270D	200	05/30/2019 1710	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	900		60	19	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		60	21	ug/kg	1
Anthracene	120-12-7	8270D	260		60	11	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		60	13	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		60	15	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		60	11	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		60	15	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		60	11	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		290	110	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		290	110	ug/kg	1
Carbazole	86-74-8	8270D	ND		290	110	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		290	110	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		290	110	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		290	110	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		290	110	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		290	110	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		290	110	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		290	110	ug/kg	1
Chrysene	218-01-9	8270D	ND		60	10	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		60	11	ug/kg	1
Dibenzofuran	132-64-9	8270D	700		290	110	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		1500	560	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		1500	560	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		1500	560	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		290	110	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		290	110	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		290	110	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		290	170	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		290	110	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		290	110	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		1500	560	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		1500	560	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		600	220	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		600	220	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		290	110	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		1500	560	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		60	9.4	ug/kg	1
Fluorene	86-73-7	8270D	1300		60	13	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		290	110	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		290	110	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		1500	560	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		290	110	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		60	22	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-008
Description: CMR-EB05-11-12-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 84.3 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	20	05/30/2019 1507	SCD	05/22/2019 1847	17544
2	3546	8270D	200	05/30/2019 1710	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		290	110	ug/kg	1
2-Methylnaphthalene	91-57-6	8270D	68000		600	220	ug/kg	2
2-Methylphenol	95-48-7	8270D	ND		290	110	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		600	220	ug/kg	1
Naphthalene	91-20-3	8270D	7100		60	22	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		600	220	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		600	220	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		600	220	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		290	110	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		600	220	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		1500	560	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		290	110	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		290	110	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		1500	560	ug/kg	1
Phenanthrene	85-01-8	8270D	1200		60	16	ug/kg	1
Phenol	108-95-2	8270D	ND		290	110	ug/kg	1
Pyrene	129-00-0	8270D	77		60	11	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		740	220	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		1500	220	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		1500	560	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		290	110	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		290	110	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Run 1 Acceptance Limits	Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		84	33-102	N	111	33-102
2-Fluorophenol		56	35-115	N	19	35-115
Nitrobenzene-d5	N	134	22-109	N	147	22-109
Phenol-d5		48	33-122	N	32	33-122
Terphenyl-d14		101	41-120		117	41-120
2,4,6-Tribromophenol		103	30-117	N	0.00	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-008
Description: CMR-EB05-11-12-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 84.3 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0043	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	190		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	840		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		64	40-140

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
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J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Description: CMR-EB05-11-12-190517
Date Sampled: 05/17/2019 1015
Date Received: 05/18/2019

Laboratory ID: UE17007-008
Matrix: Solid
% Solids: 84.3 05/18/2019 1518

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0927	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	600		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		62	40-140
2-Fluorobiphenyl (fractionation 1)		110	40-140
o - Terphenyl (aromatic)		84	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-008
Description: CMR-EB05-11-12-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 84.3 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 1934	JJG		18029

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	46		18	3.6	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	150		18	3.6	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	882	70-130

LOQ = Limit of Quantitation
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DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-008
Description: CMR-EB05-11-12-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 84.3 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 1934	JJG		18028

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		1.2	0.16	mg/kg	1
C9 - C10 Aromatics		Montana VPH	150		6.0	2.4	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	4.4		1.2	0.15	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		1.2	0.26	mg/kg	1
Naphthalene	91-20-3	Montana VPH	19		1.2	0.62	mg/kg	1
Toluene	108-88-3	Montana VPH	0.48	J	1.2	0.19	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		1.2	0.27	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	1.6		1.2	0.13	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	992	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE17007-008
Description: CMR-EB05-11-12-190517
Matrix: Solid
Date Sampled: 05/17/2019 1015
% Solids: 84.3 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 1934	JJG		18030

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	460		36	7.0	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1540	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB05-11-12-190517
Date Sampled: 05/17/2019 1015
Date Received: 05/18/2019

Laboratory ID: UE17007-008
Matrix: Solid
% Solids: 84.3 05/18/2019 1518

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/23/2019 2211	JCF	05/21/2019 0848	17180
1	7471B	7471B	1	05/21/2019 1441	TJW	05/20/2019 1624	17176

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.23	J	0.51	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	2.0		0.51	0.21	mg/kg	1
Barium	7440-39-3	6020B	70		1.3	0.32	mg/kg	1
Beryllium	7440-41-7	6020B	1.1		0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	0.17		0.13	0.026	mg/kg	1
Chromium	7440-47-3	6020B	15	B	1.3	0.57	mg/kg	1
Cobalt	7440-48-4	6020B	4.2		1.3	0.31	mg/kg	1
Copper	7440-50-8	6020B	81		1.3	0.33	mg/kg	1
Lead	7439-92-1	6020B	15		0.26	0.070	mg/kg	1
Mercury	7439-97-6	7471B	0.042	J	0.091	0.022	mg/kg	1
Nickel	7440-02-0	6020B	16		1.3	0.31	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.3	0.49	mg/kg	1
Silver	7440-22-4	6020B	0.11	J	0.26	0.062	mg/kg	1
Vanadium	7440-62-2	6020B	33		1.3	0.26	mg/kg	1
Zinc	7440-66-6	6020B	44		2.6	0.51	mg/kg	1

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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-009
Description: CMR-EB09-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1515
% Solids: 85.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	2	05/29/2019 1815	JM1		18164	5.44

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	550	J	2500	490	ug/kg	2
Benzene	71-43-2	8260B	250	J	620	250	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		620	250	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		620	250	ug/kg	2
Bromoform	75-25-2	8260B	ND		620	250	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		620	250	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		2500	490	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		620	250	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		620	250	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		620	250	ug/kg	2
Chloroethane	75-00-3	8260B	ND		620	250	ug/kg	2
Chloroform	67-66-3	8260B	ND		620	250	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		620	250	ug/kg	2
Cyclohexane	110-82-7	8260B	5300		620	250	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		620	250	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		620	250	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		620	250	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		620	250	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		620	250	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		620	250	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		620	250	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		620	250	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		620	250	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		620	250	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		620	250	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		620	250	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		620	250	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		620	250	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		620	250	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		31000	3100	ug/kg	2
Ethylbenzene	100-41-4	8260B	7000		620	250	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		1200	490	ug/kg	2
Isopropylbenzene	98-82-8	8260B	2000		620	250	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		620	250	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		620	250	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		1200	490	ug/kg	2
Methylcyclohexane	108-87-2	8260B	20000		620	250	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		620	250	ug/kg	2
Naphthalene	91-20-3	8260B	3300		620	250	ug/kg	2
Styrene	100-42-5	8260B	ND		620	250	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		620	250	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		620	250	ug/kg	2
Toluene	108-88-3	8260B	400	J	620	250	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		620	250	ug/kg	2

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Description: CMR-EB09-6-7-190517
Date Sampled: 05/17/2019 1515
Date Received: 05/18/2019

Laboratory ID: UE17007-009
Matrix: Solid
% Solids: 85.8 05/18/2019 1518

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	2	05/29/2019 1815	JM1		18164	5.44

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		620	250	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		620	250	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		620	250	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		620	250	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		620	250	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		620	250	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		620	250	ug/kg	2
Xylenes (total)	1330-20-7	8260B	12000		1200	490	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	11000		620	250	ug/kg	2
o - Xylenes	95-47-6	8260B	1300		620	250	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		104	53-142
Bromofluorobenzene		113	47-138
Toluene-d8		124	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-009
Description: CMR-EB09-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1515
% Solids: 85.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	05/30/2019 1531	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		31	9.5	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		31	11	ug/kg	1
Anthracene	120-12-7	8270D	ND		31	5.8	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		31	6.7	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		31	7.5	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		31	5.7	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		31	7.4	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		31	5.5	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		150	57	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		150	57	ug/kg	1
Carbazole	86-74-8	8270D	ND		150	57	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		150	57	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		150	57	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		150	57	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		150	57	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		150	57	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		150	57	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		150	57	ug/kg	1
Chrysene	218-01-9	8270D	ND		31	5.1	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		31	5.8	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		150	57	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		770	290	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		770	290	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		770	290	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		150	57	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		150	57	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		150	57	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		150	85	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		150	57	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		150	57	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		770	290	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		770	290	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		310	110	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		310	110	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		150	57	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		770	290	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		31	4.8	ug/kg	1
Fluorene	86-73-7	8270D	47		31	6.5	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		150	57	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		150	57	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		770	290	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		150	57	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		31	11	ug/kg	1
Isophorone	78-59-1	8270D	ND		150	57	ug/kg	1

LOQ = Limit of Quantitation
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H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-009
Description: CMR-EB09-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1515
% Solids: 85.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	05/30/2019 1531	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	320		31	11	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		150	57	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		310	110	ug/kg	1
Naphthalene	91-20-3	8270D	870		31	11	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		310	110	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		310	110	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		310	110	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		150	57	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		310	110	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		770	290	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		150	57	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		150	57	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		770	290	ug/kg	1
Phenanthrene	85-01-8	8270D	47		31	8.2	ug/kg	1
Phenol	108-95-2	8270D	ND		150	57	ug/kg	1
Pyrene	129-00-0	8270D	ND		31	5.7	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		380	110	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		770	110	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		770	290	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		150	57	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		150	57	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		74	33-102
2-Fluorophenol		57	35-115
Nitrobenzene-d5		73	22-109
Phenol-d5		55	33-122
Terphenyl-d14		109	41-120
2,4,6-Tribromophenol		84	30-117

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-009
Description: CMR-EB09-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1515
% Solids: 85.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0112	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	13		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	91		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		90	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-009
Description: CMR-EB09-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1515
% Solids: 85.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0957	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	47		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		107	40-140
o - Terphenyl (aromatic)		100	40-140

LOQ = Limit of Quantitation
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DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-009
Description: CMR-EB09-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1515
% Solids: 85.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	10	05/30/2019 2011	JJG		18697

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	770		42	8.4	mg/kg	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	590		42	8.4	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	145	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE17007-009
Description: CMR-EB09-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1515
% Solids: 85.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 2002	JJG		18028
2	VPH	Montana VPH	10	05/30/2019 2011	JJG		18699

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	2.2		1.1	0.15	mg/kg	1
C9 - C10 Aromatics		Montana VPH	340		14	5.6	mg/kg	2
Ethylbenzene	100-41-4	Montana VPH	30		1.1	0.14	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	0.47	J	1.1	0.24	mg/kg	1
Naphthalene	91-20-3	Montana VPH	8.8		1.1	0.58	mg/kg	1
Toluene	108-88-3	Montana VPH	4.3		1.1	0.18	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	25		1.1	0.25	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	8.7		1.1	0.13	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Run 1 Acceptance Limits	Q	Run 2 % Recovery	Run 2 Acceptance Limits
2,5-Dibromotoluene (PID)	N	133	70-130	N	150	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE17007-009
Description: CMR-EB09-6-7-190517
Matrix: Solid
Date Sampled: 05/17/2019 1515
% Solids: 85.8 05/18/2019 1518
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	05/28/2019 2002	JJG		18030

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1800		36	7.0	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	162	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB09-6-7-190517
Date Sampled: 05/17/2019 1515
Date Received: 05/18/2019

Laboratory ID: UE17007-009
Matrix: Solid
% Solids: 85.8 05/18/2019 1518

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/23/2019 2217	JCF	05/21/2019 0848	17180
1	7471B	7471B	1	05/21/2019 1443	TJW	05/20/2019 1624	17176

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.57	0.23	mg/kg	1
Arsenic	7440-38-2	6020B	0.56	J	0.57	0.23	mg/kg	1
Barium	7440-39-3	6020B	59		1.5	0.35	mg/kg	1
Beryllium	7440-41-7	6020B	1.1		0.11	0.039	mg/kg	1
Cadmium	7440-43-9	6020B	0.23		0.15	0.029	mg/kg	1
Chromium	7440-47-3	6020B	13	B	1.5	0.63	mg/kg	1
Cobalt	7440-48-4	6020B	3.9		1.5	0.34	mg/kg	1
Copper	7440-50-8	6020B	20		1.5	0.37	mg/kg	1
Lead	7439-92-1	6020B	10		0.29	0.078	mg/kg	1
Mercury	7439-97-6	7471B	0.31		0.089	0.021	mg/kg	1
Nickel	7440-02-0	6020B	20		1.5	0.34	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.5	0.54	mg/kg	1
Silver	7440-22-4	6020B	0.085	J	0.29	0.069	mg/kg	1
Vanadium	7440-62-2	6020B	22		1.5	0.29	mg/kg	1
Zinc	7440-66-6	6020B	44		2.9	0.57	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-010
Description: TB-02-20190517
Matrix: Aqueous
Date Sampled: 05/17/2019
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/21/2019 1232	BWS		17324

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE17007-010
Description: TB-02-20190517
Matrix: Aqueous
Date Sampled: 05/17/2019
Date Received: 05/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/21/2019 1232	BWS		17324

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		98	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17324-001
Batch: 17324
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	05/21/2019 1107
Benzene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Bromochloromethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Bromodichloromethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Bromoform	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	05/21/2019 1107
2-Butanone (MEK)	ND		1	10	2.0	ug/L	05/21/2019 1107
Carbon disulfide	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Chlorobenzene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Chloroethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Chloroform	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Cyclohexane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Dibromochloromethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	05/21/2019 1107
1,4-Dioxane	ND		1	20	13	ug/L	05/21/2019 1107
Ethylbenzene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
2-Hexanone	ND		1	10	2.0	ug/L	05/21/2019 1107
Isopropylbenzene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Methyl acetate	ND		1	1.0	0.40	ug/L	05/21/2019 1107
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	05/21/2019 1107
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	05/21/2019 1107
Methylcyclohexane	ND		1	5.0	0.40	ug/L	05/21/2019 1107
Methylene chloride	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Naphthalene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Styrene	ND		1	0.50	0.41	ug/L	05/21/2019 1107
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Tetrachloroethene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Toluene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	05/21/2019 1107

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17324-001
Batch: 17324
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Trichloroethene	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Vinyl chloride	ND		1	0.50	0.40	ug/L	05/21/2019 1107
Xylenes (total)	ND		1	1.0	0.40	ug/L	05/21/2019 1107
m+p - Xylenes	ND		1	0.50	0.40	ug/L	05/21/2019 1107
o - Xylenes	ND		1	0.50	0.40	ug/L	05/21/2019 1107

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		104	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17324-002
Batch: 17324
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	70		1	70	60-140	05/21/2019 1004
Benzene	50	46		1	93	70-130	05/21/2019 1004
Bromochloromethane	50	46		1	93	70-130	05/21/2019 1004
Bromodichloromethane	50	47		1	93	70-130	05/21/2019 1004
Bromoform	50	48		1	97	70-130	05/21/2019 1004
Bromomethane (Methyl bromide)	50	51		1	103	70-130	05/21/2019 1004
2-Butanone (MEK)	100	80		1	80	70-130	05/21/2019 1004
Carbon disulfide	50	46		1	92	70-130	05/21/2019 1004
Carbon tetrachloride	50	46		1	93	70-130	05/21/2019 1004
Chlorobenzene	50	47		1	93	70-130	05/21/2019 1004
Chloroethane	50	49		1	98	70-130	05/21/2019 1004
Chloroform	50	44		1	88	70-130	05/21/2019 1004
Chloromethane (Methyl chloride)	50	50		1	100	60-140	05/21/2019 1004
Cyclohexane	50	53		1	106	70-130	05/21/2019 1004
1,2-Dibromo-3-chloropropane (DBCP)	50	45		1	90	70-130	05/21/2019 1004
Dibromochloromethane	50	48		1	96	70-130	05/21/2019 1004
1,2-Dibromoethane (EDB)	50	50		1	101	70-130	05/21/2019 1004
1,2-Dichlorobenzene	50	47		1	95	70-130	05/21/2019 1004
1,3-Dichlorobenzene	50	46		1	93	70-130	05/21/2019 1004
1,4-Dichlorobenzene	50	46		1	93	70-130	05/21/2019 1004
Dichlorodifluoromethane	50	46		1	92	60-140	05/21/2019 1004
1,1-Dichloroethane	50	45		1	90	70-130	05/21/2019 1004
1,2-Dichloroethane	50	47		1	94	70-130	05/21/2019 1004
1,1-Dichloroethene	50	46		1	93	70-130	05/21/2019 1004
cis-1,2-Dichloroethene	50	46		1	92	70-130	05/21/2019 1004
trans-1,2-Dichloroethene	50	46		1	92	70-130	05/21/2019 1004
1,2-Dichloropropane	50	46		1	92	70-130	05/21/2019 1004
cis-1,3-Dichloropropene	50	48		1	96	70-130	05/21/2019 1004
trans-1,3-Dichloropropene	50	48		1	97	70-130	05/21/2019 1004
1,4-Dioxane	500	390		1	78	60-140	05/21/2019 1004
Ethylbenzene	50	47		1	95	70-130	05/21/2019 1004
2-Hexanone	100	95		1	95	70-130	05/21/2019 1004
Isopropylbenzene	50	50		1	101	70-130	05/21/2019 1004
Methyl acetate	50	42		1	85	70-130	05/21/2019 1004
Methyl tertiary butyl ether (MTBE)	50	44		1	88	70-130	05/21/2019 1004
4-Methyl-2-pentanone	100	92		1	92	70-130	05/21/2019 1004
Methylcyclohexane	50	51		1	102	70-130	05/21/2019 1004
Methylene chloride	50	45		1	91	70-130	05/21/2019 1004
Naphthalene	50	49		1	99	70-130	05/21/2019 1004
Styrene	50	50		1	101	70-130	05/21/2019 1004
1,1,2,2-Tetrachloroethane	50	47		1	93	70-130	05/21/2019 1004
Tetrachloroethene	50	49		1	97	70-130	05/21/2019 1004
Toluene	50	47		1	93	70-130	05/21/2019 1004
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	46		1	93	70-130	05/21/2019 1004

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17324-002
Batch: 17324
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	47		1	95	70-130	05/21/2019 1004
1,2,4-Trichlorobenzene	50	47		1	95	70-130	05/21/2019 1004
1,1,1-Trichloroethane	50	44		1	88	70-130	05/21/2019 1004
1,1,2-Trichloroethane	50	48		1	96	70-130	05/21/2019 1004
Trichloroethene	50	49		1	98	70-130	05/21/2019 1004
Trichlorofluoromethane	50	47		1	93	70-130	05/21/2019 1004
Vinyl chloride	50	45		1	90	70-130	05/21/2019 1004
Xylenes (total)	100	97		1	97	70-130	05/21/2019 1004
m+p - Xylenes	50	49		1	97	70-130	05/21/2019 1004
o - Xylenes	50	49		1	97	70-130	05/21/2019 1004

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		105	70-130
Toluene-d8		104	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17381-001
Batch: 17381
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	05/21/2019 1413
Benzene	ND		1	250	100	ug/kg	05/21/2019 1413
Bromochloromethane	ND		1	250	100	ug/kg	05/21/2019 1413
Bromodichloromethane	ND		1	250	100	ug/kg	05/21/2019 1413
Bromoform	ND		1	250	100	ug/kg	05/21/2019 1413
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	05/21/2019 1413
2-Butanone (MEK)	ND		1	1000	200	ug/kg	05/21/2019 1413
Carbon disulfide	ND		1	250	100	ug/kg	05/21/2019 1413
Carbon tetrachloride	ND		1	250	100	ug/kg	05/21/2019 1413
Chlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
Chloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
Chloroform	ND		1	250	100	ug/kg	05/21/2019 1413
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	05/21/2019 1413
Cyclohexane	ND		1	250	100	ug/kg	05/21/2019 1413
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	05/21/2019 1413
Dibromochloromethane	ND		1	250	100	ug/kg	05/21/2019 1413
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	05/21/2019 1413
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
Dichlorodifluoromethane	ND		1	250	100	ug/kg	05/21/2019 1413
1,1-Dichloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
1,2-Dichloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
1,1-Dichloroethene	ND		1	250	100	ug/kg	05/21/2019 1413
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/21/2019 1413
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/21/2019 1413
1,2-Dichloropropane	ND		1	250	100	ug/kg	05/21/2019 1413
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/21/2019 1413
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/21/2019 1413
1,4-Dioxane	ND		1	13000	1300	ug/kg	05/21/2019 1413
Ethylbenzene	ND		1	250	100	ug/kg	05/21/2019 1413
2-Hexanone	ND		1	500	200	ug/kg	05/21/2019 1413
Isopropylbenzene	ND		1	250	100	ug/kg	05/21/2019 1413
Methyl acetate	ND		1	250	100	ug/kg	05/21/2019 1413
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	05/21/2019 1413
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	05/21/2019 1413
Methylcyclohexane	ND		1	250	100	ug/kg	05/21/2019 1413
Methylene chloride	ND		1	250	100	ug/kg	05/21/2019 1413
Naphthalene	ND		1	250	100	ug/kg	05/21/2019 1413
Styrene	ND		1	250	100	ug/kg	05/21/2019 1413
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
Tetrachloroethene	ND		1	250	100	ug/kg	05/21/2019 1413
Toluene	ND		1	250	100	ug/kg	05/21/2019 1413
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	05/21/2019 1413

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17381-001
Batch: 17381
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
Trichloroethene	ND		1	250	100	ug/kg	05/21/2019 1413
Trichlorofluoromethane	ND		1	250	100	ug/kg	05/21/2019 1413
Vinyl chloride	ND		1	250	100	ug/kg	05/21/2019 1413
Xylenes (total)	ND		1	500	200	ug/kg	05/21/2019 1413
m+p - Xylenes	ND		1	250	100	ug/kg	05/21/2019 1413
o - Xylenes	ND		1	250	100	ug/kg	05/21/2019 1413

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	53-142
Bromofluorobenzene		114	47-138
Toluene-d8		107	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17381-002
Batch: 17381
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	3900		1	77	60-140	05/21/2019 1042
Benzene	2500	2700		1	108	70-130	05/21/2019 1042
Bromochloromethane	2500	2500		1	100	70-130	05/21/2019 1042
Bromodichloromethane	2500	2500		1	101	70-130	05/21/2019 1042
Bromoform	2500	2300		1	91	70-130	05/21/2019 1042
Bromomethane (Methyl bromide)	2500	2000		1	81	70-130	05/21/2019 1042
2-Butanone (MEK)	5000	3900		1	78	60-140	05/21/2019 1042
Carbon disulfide	2500	2500		1	100	70-130	05/21/2019 1042
Carbon tetrachloride	2500	2800		1	112	70-130	05/21/2019 1042
Chlorobenzene	2500	2700		1	109	70-130	05/21/2019 1042
Chloroethane	2500	2700		1	106	70-130	05/21/2019 1042
Chloroform	2500	2500		1	100	70-130	05/21/2019 1042
Chloromethane (Methyl chloride)	2500	2300		1	93	60-140	05/21/2019 1042
Cyclohexane	2500	3100		1	126	70-130	05/21/2019 1042
1,2-Dibromo-3-chloropropane (DBCP)	2500	2100		1	84	70-130	05/21/2019 1042
Dibromochloromethane	2500	2600		1	103	70-130	05/21/2019 1042
1,2-Dibromoethane (EDB)	2500	2600		1	106	70-130	05/21/2019 1042
1,2-Dichlorobenzene	2500	2600		1	106	70-130	05/21/2019 1042
1,3-Dichlorobenzene	2500	2800		1	111	70-130	05/21/2019 1042
1,4-Dichlorobenzene	2500	2700		1	109	70-130	05/21/2019 1042
Dichlorodifluoromethane	2500	2200		1	87	60-140	05/21/2019 1042
1,1-Dichloroethane	2500	2500		1	102	70-130	05/21/2019 1042
1,2-Dichloroethane	2500	2600		1	104	70-130	05/21/2019 1042
1,1-Dichloroethene	2500	2700		1	107	70-130	05/21/2019 1042
cis-1,2-Dichloroethene	2500	2600		1	102	70-130	05/21/2019 1042
trans-1,2-Dichloroethene	2500	2700		1	108	70-130	05/21/2019 1042
1,2-Dichloropropane	2500	2600		1	103	70-130	05/21/2019 1042
cis-1,3-Dichloropropene	2500	2500		1	100	70-130	05/21/2019 1042
trans-1,3-Dichloropropene	2500	2600		1	103	70-130	05/21/2019 1042
1,4-Dioxane	25000	25000		1	98	60-140	05/21/2019 1042
Ethylbenzene	2500	2900		1	117	70-130	05/21/2019 1042
2-Hexanone	5000	4300		1	85	70-130	05/21/2019 1042
Isopropylbenzene	2500	2900		1	118	70-130	05/21/2019 1042
Methyl acetate	2500	2200		1	89	70-130	05/21/2019 1042
Methyl tertiary butyl ether (MTBE)	2500	2300		1	91	70-130	05/21/2019 1042
4-Methyl-2-pentanone	5000	4300		1	87	70-130	05/21/2019 1042
Methylcyclohexane	2500	3200		1	129	70-130	05/21/2019 1042
Methylene chloride	2500	2500		1	102	70-130	05/21/2019 1042
Naphthalene	2500	2200		1	86	70-130	05/21/2019 1042
Styrene	2500	2700		1	109	70-130	05/21/2019 1042
1,1,2,2-Tetrachloroethane	2500	2500		1	101	70-130	05/21/2019 1042
Tetrachloroethene	2500	3100		1	125	70-130	05/21/2019 1042
Toluene	2500	2900		1	117	70-130	05/21/2019 1042
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	2800		1	114	70-130	05/21/2019 1042

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17381-002
Batch: 17381
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2300		1	92	70-130	05/21/2019 1042
1,2,4-Trichlorobenzene	2500	2500		1	99	70-130	05/21/2019 1042
1,1,1-Trichloroethane	2500	2700		1	108	70-130	05/21/2019 1042
1,1,2-Trichloroethane	2500	2600		1	105	70-130	05/21/2019 1042
Trichloroethene	2500	3000		1	119	70-130	05/21/2019 1042
Trichlorofluoromethane	2500	3000		1	120	70-130	05/21/2019 1042
Vinyl chloride	2500	2700		1	106	70-130	05/21/2019 1042
Xylenes (total)	5000	5800		1	115	70-130	05/21/2019 1042
m+p - Xylenes	2500	2900		1	117	70-130	05/21/2019 1042
o - Xylenes	2500	2800		1	113	70-130	05/21/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		115	47-138
Toluene-d8		110	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17420-001
Batch: 17420
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	05/21/2019 1413
Benzene	ND		1	250	100	ug/kg	05/21/2019 1413
Bromochloromethane	ND		1	250	100	ug/kg	05/21/2019 1413
Bromodichloromethane	ND		1	250	100	ug/kg	05/21/2019 1413
Bromoform	ND		1	250	100	ug/kg	05/21/2019 1413
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	05/21/2019 1413
2-Butanone (MEK)	ND		1	1000	200	ug/kg	05/21/2019 1413
Carbon disulfide	ND		1	250	100	ug/kg	05/21/2019 1413
Carbon tetrachloride	ND		1	250	100	ug/kg	05/21/2019 1413
Chlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
Chloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
Chloroform	ND		1	250	100	ug/kg	05/21/2019 1413
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	05/21/2019 1413
Cyclohexane	ND		1	250	100	ug/kg	05/21/2019 1413
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	05/21/2019 1413
Dibromochloromethane	ND		1	250	100	ug/kg	05/21/2019 1413
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	05/21/2019 1413
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
Dichlorodifluoromethane	ND		1	250	100	ug/kg	05/21/2019 1413
1,1-Dichloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
1,2-Dichloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
1,1-Dichloroethene	ND		1	250	100	ug/kg	05/21/2019 1413
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/21/2019 1413
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/21/2019 1413
1,2-Dichloropropane	ND		1	250	100	ug/kg	05/21/2019 1413
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/21/2019 1413
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/21/2019 1413
1,4-Dioxane	ND		1	13000	1300	ug/kg	05/21/2019 1413
Ethylbenzene	ND		1	250	100	ug/kg	05/21/2019 1413
2-Hexanone	ND		1	500	200	ug/kg	05/21/2019 1413
Isopropylbenzene	ND		1	250	100	ug/kg	05/21/2019 1413
Methyl acetate	ND		1	250	100	ug/kg	05/21/2019 1413
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	05/21/2019 1413
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	05/21/2019 1413
Methylcyclohexane	ND		1	250	100	ug/kg	05/21/2019 1413
Methylene chloride	ND		1	250	100	ug/kg	05/21/2019 1413
Naphthalene	ND		1	250	100	ug/kg	05/21/2019 1413
Styrene	ND		1	250	100	ug/kg	05/21/2019 1413
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
Tetrachloroethene	ND		1	250	100	ug/kg	05/21/2019 1413
Toluene	ND		1	250	100	ug/kg	05/21/2019 1413
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	05/21/2019 1413

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17420-001
Batch: 17420
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	05/21/2019 1413
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	05/21/2019 1413
Trichloroethene	ND		1	250	100	ug/kg	05/21/2019 1413
Trichlorofluoromethane	ND		1	250	100	ug/kg	05/21/2019 1413
Vinyl chloride	ND		1	250	100	ug/kg	05/21/2019 1413
Xylenes (total)	ND		1	500	200	ug/kg	05/21/2019 1413
m+p - Xylenes	ND		1	250	100	ug/kg	05/21/2019 1413
o - Xylenes	ND		1	250	100	ug/kg	05/21/2019 1413

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	53-142
Bromofluorobenzene		114	47-138
Toluene-d8		107	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17420-002
Batch: 17420
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	3900		1	77	60-140	05/21/2019 1042
Benzene	2500	2700		1	108	70-130	05/21/2019 1042
Bromochloromethane	2500	2500		1	100	70-130	05/21/2019 1042
Bromodichloromethane	2500	2500		1	101	70-130	05/21/2019 1042
Bromoform	2500	2300		1	91	70-130	05/21/2019 1042
Bromomethane (Methyl bromide)	2500	2000		1	81	70-130	05/21/2019 1042
2-Butanone (MEK)	5000	3900		1	78	60-140	05/21/2019 1042
Carbon disulfide	2500	2500		1	100	70-130	05/21/2019 1042
Carbon tetrachloride	2500	2800		1	112	70-130	05/21/2019 1042
Chlorobenzene	2500	2700		1	109	70-130	05/21/2019 1042
Chloroethane	2500	2700		1	106	70-130	05/21/2019 1042
Chloroform	2500	2500		1	100	70-130	05/21/2019 1042
Chloromethane (Methyl chloride)	2500	2300		1	93	60-140	05/21/2019 1042
Cyclohexane	2500	3100		1	126	70-130	05/21/2019 1042
1,2-Dibromo-3-chloropropane (DBCP)	2500	2100		1	84	70-130	05/21/2019 1042
Dibromochloromethane	2500	2600		1	103	70-130	05/21/2019 1042
1,2-Dibromoethane (EDB)	2500	2600		1	106	70-130	05/21/2019 1042
1,2-Dichlorobenzene	2500	2600		1	106	70-130	05/21/2019 1042
1,3-Dichlorobenzene	2500	2800		1	111	70-130	05/21/2019 1042
1,4-Dichlorobenzene	2500	2700		1	109	70-130	05/21/2019 1042
Dichlorodifluoromethane	2500	2200		1	87	60-140	05/21/2019 1042
1,1-Dichloroethane	2500	2500		1	102	70-130	05/21/2019 1042
1,2-Dichloroethane	2500	2600		1	104	70-130	05/21/2019 1042
1,1-Dichloroethene	2500	2700		1	107	70-130	05/21/2019 1042
cis-1,2-Dichloroethene	2500	2600		1	102	70-130	05/21/2019 1042
trans-1,2-Dichloroethene	2500	2700		1	108	70-130	05/21/2019 1042
1,2-Dichloropropane	2500	2600		1	103	70-130	05/21/2019 1042
cis-1,3-Dichloropropene	2500	2500		1	100	70-130	05/21/2019 1042
trans-1,3-Dichloropropene	2500	2600		1	103	70-130	05/21/2019 1042
1,4-Dioxane	25000	25000		1	98	60-140	05/21/2019 1042
Ethylbenzene	2500	2900		1	117	70-130	05/21/2019 1042
2-Hexanone	5000	4300		1	85	70-130	05/21/2019 1042
Isopropylbenzene	2500	2900		1	118	70-130	05/21/2019 1042
Methyl acetate	2500	2200		1	89	70-130	05/21/2019 1042
Methyl tertiary butyl ether (MTBE)	2500	2300		1	91	70-130	05/21/2019 1042
4-Methyl-2-pentanone	5000	4300		1	87	70-130	05/21/2019 1042
Methylcyclohexane	2500	3200		1	129	70-130	05/21/2019 1042
Methylene chloride	2500	2500		1	102	70-130	05/21/2019 1042
Naphthalene	2500	2200		1	86	70-130	05/21/2019 1042
Styrene	2500	2700		1	109	70-130	05/21/2019 1042
1,1,2,2-Tetrachloroethane	2500	2500		1	101	70-130	05/21/2019 1042
Tetrachloroethene	2500	3100		1	125	70-130	05/21/2019 1042
Toluene	2500	2900		1	117	70-130	05/21/2019 1042
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	2800		1	114	70-130	05/21/2019 1042

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17420-002
Batch: 17420
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2300		1	92	70-130	05/21/2019 1042
1,2,4-Trichlorobenzene	2500	2500		1	99	70-130	05/21/2019 1042
1,1,1-Trichloroethane	2500	2700		1	108	70-130	05/21/2019 1042
1,1,2-Trichloroethane	2500	2600		1	105	70-130	05/21/2019 1042
Trichloroethene	2500	3000		1	119	70-130	05/21/2019 1042
Trichlorofluoromethane	2500	3000		1	120	70-130	05/21/2019 1042
Vinyl chloride	2500	2700		1	106	70-130	05/21/2019 1042
Xylenes (total)	5000	5800		1	115	70-130	05/21/2019 1042
m+p - Xylenes	2500	2900		1	117	70-130	05/21/2019 1042
o - Xylenes	2500	2800		1	113	70-130	05/21/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		115	47-138
Toluene-d8		110	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17735-001
Batch: 17735
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	05/23/2019 2211
Benzene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Bromochloromethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Bromoform	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	05/23/2019 2211
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	05/23/2019 2211
Carbon disulfide	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Chlorobenzene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Chloroethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Chloroform	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	05/23/2019 2211
Cyclohexane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	05/23/2019 2211
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,4-Dioxane	ND		1	250	25	ug/kg	05/23/2019 2211
Ethylbenzene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
2-Hexanone	ND		1	10	4.0	ug/kg	05/23/2019 2211
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Methyl acetate	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	05/23/2019 2211
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Methylene chloride	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Naphthalene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Styrene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Toluene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17735-001
Batch: 17735
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Trichloroethene	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
Vinyl chloride	ND		1	5.0	3.0	ug/kg	05/23/2019 2211
Xylenes (total)	ND		1	10	4.0	ug/kg	05/23/2019 2211
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	05/23/2019 2211
o - Xylenes	ND		1	5.0	2.0	ug/kg	05/23/2019 2211

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		107	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17735-002
Batch: 17735
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	110		1	112	60-140	05/23/2019 2127
Benzene	50	50		1	99	70-130	05/23/2019 2127
Bromochloromethane	50	51		1	101	70-130	05/23/2019 2127
Bromodichloromethane	50	50		1	100	70-130	05/23/2019 2127
Bromoform	50	47		1	95	70-130	05/23/2019 2127
Bromomethane (Methyl bromide)	50	46		1	92	70-130	05/23/2019 2127
2-Butanone (MEK)	100	110		1	109	60-140	05/23/2019 2127
Carbon disulfide	50	44		1	88	70-130	05/23/2019 2127
Carbon tetrachloride	50	48		1	95	70-130	05/23/2019 2127
Chlorobenzene	50	51		1	101	70-130	05/23/2019 2127
Chloroethane	50	47		1	93	70-130	05/23/2019 2127
Chloroform	50	48		1	96	70-130	05/23/2019 2127
Chloromethane (Methyl chloride)	50	43		1	86	60-140	05/23/2019 2127
Cyclohexane	50	52		1	103	70-130	05/23/2019 2127
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	94	70-130	05/23/2019 2127
Dibromochloromethane	50	51		1	103	70-130	05/23/2019 2127
1,2-Dibromoethane (EDB)	50	54		1	108	70-130	05/23/2019 2127
1,2-Dichlorobenzene	50	50		1	100	70-130	05/23/2019 2127
1,3-Dichlorobenzene	50	50		1	100	70-130	05/23/2019 2127
1,4-Dichlorobenzene	50	49		1	99	70-130	05/23/2019 2127
Dichlorodifluoromethane	50	41		1	83	60-140	05/23/2019 2127
1,1-Dichloroethane	50	47		1	95	70-130	05/23/2019 2127
1,2-Dichloroethane	50	52		1	103	70-130	05/23/2019 2127
1,1-Dichloroethene	50	45		1	91	70-130	05/23/2019 2127
cis-1,2-Dichloroethene	50	49		1	98	70-130	05/23/2019 2127
trans-1,2-Dichloroethene	50	49		1	98	70-130	05/23/2019 2127
1,2-Dichloropropane	50	50		1	101	70-130	05/23/2019 2127
cis-1,3-Dichloropropene	50	51		1	101	70-130	05/23/2019 2127
trans-1,3-Dichloropropene	50	51		1	101	70-130	05/23/2019 2127
1,4-Dioxane	500	440		1	89	60-140	05/23/2019 2127
Ethylbenzene	50	52		1	103	70-130	05/23/2019 2127
2-Hexanone	100	110		1	112	70-130	05/23/2019 2127
Isopropylbenzene	50	51		1	102	70-130	05/23/2019 2127
Methyl acetate	50	49		1	99	70-130	05/23/2019 2127
Methyl tertiary butyl ether (MTBE)	50	49		1	98	70-130	05/23/2019 2127
4-Methyl-2-pentanone	100	100		1	100	70-130	05/23/2019 2127
Methylcyclohexane	50	52		1	103	70-130	05/23/2019 2127
Methylene chloride	50	46		1	91	70-130	05/23/2019 2127
Naphthalene	50	50		1	100	70-130	05/23/2019 2127
Styrene	50	51		1	103	70-130	05/23/2019 2127
1,1,2,2-Tetrachloroethane	50	51		1	101	70-130	05/23/2019 2127
Tetrachloroethene	50	51		1	102	70-130	05/23/2019 2127
Toluene	50	52		1	104	70-130	05/23/2019 2127
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	48		1	96	70-130	05/23/2019 2127

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17735-002
Batch: 17735
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	49		1	97	70-130	05/23/2019 2127
1,2,4-Trichlorobenzene	50	49		1	98	70-130	05/23/2019 2127
1,1,1-Trichloroethane	50	47		1	95	70-130	05/23/2019 2127
1,1,2-Trichloroethane	50	53		1	106	70-130	05/23/2019 2127
Trichloroethene	50	53		1	105	70-130	05/23/2019 2127
Trichlorofluoromethane	50	45		1	90	70-130	05/23/2019 2127
Vinyl chloride	50	43		1	86	70-130	05/23/2019 2127
Xylenes (total)	100	100		1	104	70-130	05/23/2019 2127
m+p - Xylenes	50	52		1	104	70-130	05/23/2019 2127
o - Xylenes	50	52		1	104	70-130	05/23/2019 2127

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		89	53-142
Bromofluorobenzene		108	47-138
Toluene-d8		103	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ17735-003
Batch: 17735
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acetone	100	120		1	118	5.5	60-140	20	05/23/2019 2149
Benzene	50	49		1	98	1.8	70-130	20	05/23/2019 2149
Bromochloromethane	50	51		1	101	0.18	70-130	20	05/23/2019 2149
Bromodichloromethane	50	49		1	99	0.59	70-130	20	05/23/2019 2149
Bromoform	50	48		1	96	1.1	70-130	20	05/23/2019 2149
Bromomethane (Methyl bromide)	50	45		1	90	2.9	70-130	20	05/23/2019 2149
2-Butanone (MEK)	100	110		1	114	4.7	60-140	20	05/23/2019 2149
Carbon disulfide	50	43		1	85	3.1	70-130	20	05/23/2019 2149
Carbon tetrachloride	50	47		1	94	1.5	70-130	20	05/23/2019 2149
Chlorobenzene	50	49		1	98	3.0	70-130	20	05/23/2019 2149
Chloroethane	50	45		1	90	3.0	70-130	20	05/23/2019 2149
Chloroform	50	47		1	95	1.3	70-130	20	05/23/2019 2149
Chloromethane (Methyl chloride)	50	41		1	82	4.4	60-140	20	05/23/2019 2149
Cyclohexane	50	51		1	101	1.8	70-130	20	05/23/2019 2149
1,2-Dibromo-3-chloropropane (DBCP)	50	50		1	101	6.7	70-130	20	05/23/2019 2149
Dibromochloromethane	50	51		1	102	0.53	70-130	20	05/23/2019 2149
1,2-Dibromoethane (EDB)	50	55		1	110	2.2	70-130	20	05/23/2019 2149
1,2-Dichlorobenzene	50	50		1	99	1.4	70-130	20	05/23/2019 2149
1,3-Dichlorobenzene	50	48		1	97	3.2	70-130	20	05/23/2019 2149
1,4-Dichlorobenzene	50	48		1	96	2.5	70-130	20	05/23/2019 2149
Dichlorodifluoromethane	50	40		1	80	3.2	60-140	20	05/23/2019 2149
1,1-Dichloroethane	50	47		1	94	0.98	70-130	20	05/23/2019 2149
1,2-Dichloroethane	50	52		1	103	0.14	70-130	20	05/23/2019 2149
1,1-Dichloroethene	50	44		1	88	3.2	70-130	20	05/23/2019 2149
cis-1,2-Dichloroethene	50	49		1	97	1.3	70-130	20	05/23/2019 2149
trans-1,2-Dichloroethene	50	48		1	95	2.7	70-130	20	05/23/2019 2149
1,2-Dichloropropane	50	50		1	99	1.8	70-130	20	05/23/2019 2149
cis-1,3-Dichloropropene	50	50		1	99	1.8	70-130	20	05/23/2019 2149
trans-1,3-Dichloropropene	50	50		1	100	1.4	70-130	20	05/23/2019 2149
1,4-Dioxane	500	480		1	95	7.3	60-140	20	05/23/2019 2149
Ethylbenzene	50	50		1	100	2.9	70-130	20	05/23/2019 2149
2-Hexanone	100	120		1	118	4.7	70-130	20	05/23/2019 2149
Isopropylbenzene	50	50		1	100	2.2	70-130	20	05/23/2019 2149
Methyl acetate	50	51		1	102	3.6	70-130	20	05/23/2019 2149
Methyl tertiary butyl ether (MTBE)	50	49		1	99	0.16	70-130	20	05/23/2019 2149
4-Methyl-2-pentanone	100	100		1	105	4.2	70-130	20	05/23/2019 2149
Methylcyclohexane	50	51		1	102	1.6	70-130	20	05/23/2019 2149
Methylene chloride	50	44		1	89	2.4	70-130	20	05/23/2019 2149
Naphthalene	50	53		1	106	5.3	70-130	20	05/23/2019 2149
Styrene	50	50		1	101	1.9	70-130	20	05/23/2019 2149
1,1,2,2-Tetrachloroethane	50	51		1	102	0.49	70-130	20	05/23/2019 2149
Tetrachloroethene	50	49		1	98	4.1	70-130	20	05/23/2019 2149
Toluene	50	50		1	100	3.8	70-130	20	05/23/2019 2149
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	47		1	93	3.4	70-130	20	05/23/2019 2149

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J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ17735-003
Batch: 17735
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	101	3.4	70-130	20	05/23/2019 2149
1,2,4-Trichlorobenzene	50	49		1	98	0.41	70-130	20	05/23/2019 2149
1,1,1-Trichloroethane	50	47		1	94	1.5	70-130	20	05/23/2019 2149
1,1,2-Trichloroethane	50	53		1	106	0.27	70-130	20	05/23/2019 2149
Trichloroethene	50	52		1	105	0.57	70-130	20	05/23/2019 2149
Trichlorofluoromethane	50	44		1	88	2.0	70-130	20	05/23/2019 2149
Vinyl chloride	50	42		1	84	2.1	70-130	20	05/23/2019 2149
Xylenes (total)	100	100		1	101	2.7	70-130	20	05/23/2019 2149
m+p - Xylenes	50	50		1	101	3.3	70-130	20	05/23/2019 2149
o - Xylenes	50	51		1	102	2.1	70-130	20	05/23/2019 2149

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17834-001
Batch: 17834
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	05/24/2019 1208
Benzene	ND		1	250	100	ug/kg	05/24/2019 1208
Bromochloromethane	ND		1	250	100	ug/kg	05/24/2019 1208
Bromodichloromethane	ND		1	250	100	ug/kg	05/24/2019 1208
Bromoform	ND		1	250	100	ug/kg	05/24/2019 1208
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	05/24/2019 1208
2-Butanone (MEK)	ND		1	1000	200	ug/kg	05/24/2019 1208
Carbon disulfide	ND		1	250	100	ug/kg	05/24/2019 1208
Carbon tetrachloride	ND		1	250	100	ug/kg	05/24/2019 1208
Chlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
Chloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
Chloroform	ND		1	250	100	ug/kg	05/24/2019 1208
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	05/24/2019 1208
Cyclohexane	ND		1	250	100	ug/kg	05/24/2019 1208
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	05/24/2019 1208
Dibromochloromethane	ND		1	250	100	ug/kg	05/24/2019 1208
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	05/24/2019 1208
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
Dichlorodifluoromethane	ND		1	250	100	ug/kg	05/24/2019 1208
1,1-Dichloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
1,2-Dichloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
1,1-Dichloroethene	ND		1	250	100	ug/kg	05/24/2019 1208
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/24/2019 1208
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/24/2019 1208
1,2-Dichloropropane	ND		1	250	100	ug/kg	05/24/2019 1208
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/24/2019 1208
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/24/2019 1208
1,4-Dioxane	ND		1	13000	1300	ug/kg	05/24/2019 1208
Ethylbenzene	ND		1	250	100	ug/kg	05/24/2019 1208
2-Hexanone	ND		1	500	200	ug/kg	05/24/2019 1208
Isopropylbenzene	ND		1	250	100	ug/kg	05/24/2019 1208
Methyl acetate	ND		1	250	100	ug/kg	05/24/2019 1208
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	05/24/2019 1208
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	05/24/2019 1208
Methylcyclohexane	ND		1	250	100	ug/kg	05/24/2019 1208
Methylene chloride	ND		1	250	100	ug/kg	05/24/2019 1208
Naphthalene	ND		1	250	100	ug/kg	05/24/2019 1208
Styrene	ND		1	250	100	ug/kg	05/24/2019 1208
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
Tetrachloroethene	ND		1	250	100	ug/kg	05/24/2019 1208
Toluene	ND		1	250	100	ug/kg	05/24/2019 1208
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	05/24/2019 1208

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17834-001
Batch: 17834
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
Trichloroethene	ND		1	250	100	ug/kg	05/24/2019 1208
Trichlorofluoromethane	ND		1	250	100	ug/kg	05/24/2019 1208
Vinyl chloride	ND		1	250	100	ug/kg	05/24/2019 1208
Xylenes (total)	ND		1	500	200	ug/kg	05/24/2019 1208
m+p - Xylenes	ND		1	250	100	ug/kg	05/24/2019 1208
o - Xylenes	ND		1	250	100	ug/kg	05/24/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		96	53-142
Bromofluorobenzene		102	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17834-002
Batch: 17834
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	5300		1	106	60-140	05/24/2019 1146
Benzene	2500	2800		1	111	70-130	05/24/2019 1146
Bromochloromethane	2500	2700		1	109	70-130	05/24/2019 1146
Bromodichloromethane	2500	2700		1	107	70-130	05/24/2019 1146
Bromoform	2500	2400		1	97	70-130	05/24/2019 1146
Bromomethane (Methyl bromide)	2500	2000		1	81	70-130	05/24/2019 1146
2-Butanone (MEK)	5000	5700		1	113	60-140	05/24/2019 1146
Carbon disulfide	2500	2500		1	100	70-130	05/24/2019 1146
Carbon tetrachloride	2500	2800		1	113	70-130	05/24/2019 1146
Chlorobenzene	2500	2800		1	111	70-130	05/24/2019 1146
Chloroethane	2500	2400		1	97	70-130	05/24/2019 1146
Chloroform	2500	2600		1	106	70-130	05/24/2019 1146
Chloromethane (Methyl chloride)	2500	2100		1	84	60-140	05/24/2019 1146
Cyclohexane	2500	3200		1	126	70-130	05/24/2019 1146
1,2-Dibromo-3-chloropropane (DBCP)	2500	2300		1	91	70-130	05/24/2019 1146
Dibromochloromethane	2500	2700		1	107	70-130	05/24/2019 1146
1,2-Dibromoethane (EDB)	2500	2800		1	113	70-130	05/24/2019 1146
1,2-Dichlorobenzene	2500	2700		1	108	70-130	05/24/2019 1146
1,3-Dichlorobenzene	2500	2800		1	111	70-130	05/24/2019 1146
1,4-Dichlorobenzene	2500	2700		1	110	70-130	05/24/2019 1146
Dichlorodifluoromethane	2500	1700		1	66	60-140	05/24/2019 1146
1,1-Dichloroethane	2500	2700		1	107	70-130	05/24/2019 1146
1,2-Dichloroethane	2500	2800		1	111	70-130	05/24/2019 1146
1,1-Dichloroethene	2500	2700		1	106	70-130	05/24/2019 1146
cis-1,2-Dichloroethene	2500	2700		1	109	70-130	05/24/2019 1146
trans-1,2-Dichloroethene	2500	2800		1	112	70-130	05/24/2019 1146
1,2-Dichloropropane	2500	2700		1	110	70-130	05/24/2019 1146
cis-1,3-Dichloropropene	2500	2700		1	109	70-130	05/24/2019 1146
trans-1,3-Dichloropropene	2500	2700		1	107	70-130	05/24/2019 1146
1,4-Dioxane	25000	24000		1	97	60-140	05/24/2019 1146
Ethylbenzene	2500	2900		1	117	70-130	05/24/2019 1146
2-Hexanone	5000	5900		1	118	70-130	05/24/2019 1146
Isopropylbenzene	2500	2900		1	117	70-130	05/24/2019 1146
Methyl acetate	2500	2600		1	102	70-130	05/24/2019 1146
Methyl tertiary butyl ether (MTBE)	2500	2500		1	100	70-130	05/24/2019 1146
4-Methyl-2-pentanone	5000	5200		1	104	70-130	05/24/2019 1146
Methylcyclohexane	2500	3200		1	130	70-130	05/24/2019 1146
Methylene chloride	2500	2500		1	99	70-130	05/24/2019 1146
Naphthalene	2500	2500		1	100	70-130	05/24/2019 1146
Styrene	2500	2900		1	115	70-130	05/24/2019 1146
1,1,2,2-Tetrachloroethane	2500	2600		1	104	70-130	05/24/2019 1146
Tetrachloroethene	2500	3000		1	120	70-130	05/24/2019 1146
Toluene	2500	2900		1	115	70-130	05/24/2019 1146
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3000		1	119	70-130	05/24/2019 1146

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17834-002
Batch: 17834
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2600		1	104	70-130	05/24/2019 1146
1,2,4-Trichlorobenzene	2500	2600		1	106	70-130	05/24/2019 1146
1,1,1-Trichloroethane	2500	2700		1	109	70-130	05/24/2019 1146
1,1,2-Trichloroethane	2500	2800		1	111	70-130	05/24/2019 1146
Trichloroethene	2500	3000		1	120	70-130	05/24/2019 1146
Trichlorofluoromethane	2500	2700		1	106	70-130	05/24/2019 1146
Vinyl chloride	2500	2300		1	93	70-130	05/24/2019 1146
Xylenes (total)	5000	5900		1	117	70-130	05/24/2019 1146
m+p - Xylenes	2500	3000		1	118	70-130	05/24/2019 1146
o - Xylenes	2500	2900		1	116	70-130	05/24/2019 1146

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	53-142
Bromofluorobenzene		95	47-138
Toluene-d8		93	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18047-001
Batch: 18047
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Naphthalene	ND		1	250	100	ug/kg	05/21/2019 1413

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	53-142
Bromofluorobenzene		114	47-138
Toluene-d8		107	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18047-002
Batch: 18047
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Naphthalene	2500	2200		1	86	70-130	05/21/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		115	47-138
Toluene-d8		110	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18164-001
Batch: 18164
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	05/24/2019 1208
Benzene	ND		1	250	100	ug/kg	05/24/2019 1208
Bromochloromethane	ND		1	250	100	ug/kg	05/24/2019 1208
Bromodichloromethane	ND		1	250	100	ug/kg	05/24/2019 1208
Bromoform	ND		1	250	100	ug/kg	05/24/2019 1208
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	05/24/2019 1208
2-Butanone (MEK)	ND		1	1000	200	ug/kg	05/24/2019 1208
Carbon disulfide	ND		1	250	100	ug/kg	05/24/2019 1208
Carbon tetrachloride	ND		1	250	100	ug/kg	05/24/2019 1208
Chlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
Chloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
Chloroform	ND		1	250	100	ug/kg	05/24/2019 1208
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	05/24/2019 1208
Cyclohexane	ND		1	250	100	ug/kg	05/24/2019 1208
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	05/24/2019 1208
Dibromochloromethane	ND		1	250	100	ug/kg	05/24/2019 1208
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	05/24/2019 1208
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
Dichlorodifluoromethane	ND		1	250	100	ug/kg	05/24/2019 1208
1,1-Dichloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
1,2-Dichloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
1,1-Dichloroethene	ND		1	250	100	ug/kg	05/24/2019 1208
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/24/2019 1208
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/24/2019 1208
1,2-Dichloropropane	ND		1	250	100	ug/kg	05/24/2019 1208
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/24/2019 1208
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/24/2019 1208
1,4-Dioxane	ND		1	13000	1300	ug/kg	05/24/2019 1208
Ethylbenzene	ND		1	250	100	ug/kg	05/24/2019 1208
2-Hexanone	ND		1	500	200	ug/kg	05/24/2019 1208
Isopropylbenzene	ND		1	250	100	ug/kg	05/24/2019 1208
Methyl acetate	ND		1	250	100	ug/kg	05/24/2019 1208
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	05/24/2019 1208
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	05/24/2019 1208
Methylcyclohexane	ND		1	250	100	ug/kg	05/24/2019 1208
Methylene chloride	ND		1	250	100	ug/kg	05/24/2019 1208
Naphthalene	ND		1	250	100	ug/kg	05/24/2019 1208
Styrene	ND		1	250	100	ug/kg	05/24/2019 1208
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
Tetrachloroethene	ND		1	250	100	ug/kg	05/24/2019 1208
Toluene	ND		1	250	100	ug/kg	05/24/2019 1208
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	05/24/2019 1208

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18164-001
Batch: 18164
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	05/24/2019 1208
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	05/24/2019 1208
Trichloroethene	ND		1	250	100	ug/kg	05/24/2019 1208
Trichlorofluoromethane	ND		1	250	100	ug/kg	05/24/2019 1208
Vinyl chloride	ND		1	250	100	ug/kg	05/24/2019 1208
Xylenes (total)	ND		1	500	200	ug/kg	05/24/2019 1208
m+p - Xylenes	ND		1	250	100	ug/kg	05/24/2019 1208
o - Xylenes	ND		1	250	100	ug/kg	05/24/2019 1208

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		96	53-142
Bromofluorobenzene		102	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18164-002
Batch: 18164
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	5300		1	106	60-140	05/24/2019 1146
Benzene	2500	2800		1	111	70-130	05/24/2019 1146
Bromochloromethane	2500	2700		1	109	70-130	05/24/2019 1146
Bromodichloromethane	2500	2700		1	107	70-130	05/24/2019 1146
Bromoform	2500	2400		1	97	70-130	05/24/2019 1146
Bromomethane (Methyl bromide)	2500	2000		1	81	70-130	05/24/2019 1146
2-Butanone (MEK)	5000	5700		1	113	60-140	05/24/2019 1146
Carbon disulfide	2500	2500		1	100	70-130	05/24/2019 1146
Carbon tetrachloride	2500	2800		1	113	70-130	05/24/2019 1146
Chlorobenzene	2500	2800		1	111	70-130	05/24/2019 1146
Chloroethane	2500	2400		1	97	70-130	05/24/2019 1146
Chloroform	2500	2600		1	106	70-130	05/24/2019 1146
Chloromethane (Methyl chloride)	2500	2100		1	84	60-140	05/24/2019 1146
Cyclohexane	2500	3200		1	126	70-130	05/24/2019 1146
1,2-Dibromo-3-chloropropane (DBCP)	2500	2300		1	91	70-130	05/24/2019 1146
Dibromochloromethane	2500	2700		1	107	70-130	05/24/2019 1146
1,2-Dibromoethane (EDB)	2500	2800		1	113	70-130	05/24/2019 1146
1,2-Dichlorobenzene	2500	2700		1	108	70-130	05/24/2019 1146
1,3-Dichlorobenzene	2500	2800		1	111	70-130	05/24/2019 1146
1,4-Dichlorobenzene	2500	2700		1	110	70-130	05/24/2019 1146
Dichlorodifluoromethane	2500	1700		1	66	60-140	05/24/2019 1146
1,1-Dichloroethane	2500	2700		1	107	70-130	05/24/2019 1146
1,2-Dichloroethane	2500	2800		1	111	70-130	05/24/2019 1146
1,1-Dichloroethene	2500	2700		1	106	70-130	05/24/2019 1146
cis-1,2-Dichloroethene	2500	2700		1	109	70-130	05/24/2019 1146
trans-1,2-Dichloroethene	2500	2800		1	112	70-130	05/24/2019 1146
1,2-Dichloropropane	2500	2700		1	110	70-130	05/24/2019 1146
cis-1,3-Dichloropropene	2500	2700		1	109	70-130	05/24/2019 1146
trans-1,3-Dichloropropene	2500	2700		1	107	70-130	05/24/2019 1146
1,4-Dioxane	25000	24000		1	97	60-140	05/24/2019 1146
Ethylbenzene	2500	2900		1	117	70-130	05/24/2019 1146
2-Hexanone	5000	5900		1	118	70-130	05/24/2019 1146
Isopropylbenzene	2500	2900		1	117	70-130	05/24/2019 1146
Methyl acetate	2500	2600		1	102	70-130	05/24/2019 1146
Methyl tertiary butyl ether (MTBE)	2500	2500		1	100	70-130	05/24/2019 1146
4-Methyl-2-pentanone	5000	5200		1	104	70-130	05/24/2019 1146
Methylcyclohexane	2500	3200		1	130	70-130	05/24/2019 1146
Methylene chloride	2500	2500		1	99	70-130	05/24/2019 1146
Naphthalene	2500	2500		1	100	70-130	05/24/2019 1146
Styrene	2500	2900		1	115	70-130	05/24/2019 1146
1,1,2,2-Tetrachloroethane	2500	2600		1	104	70-130	05/24/2019 1146
Tetrachloroethene	2500	3000		1	120	70-130	05/24/2019 1146
Toluene	2500	2900		1	115	70-130	05/24/2019 1146
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3000		1	119	70-130	05/24/2019 1146

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18164-002
Batch: 18164
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2600		1	104	70-130	05/24/2019 1146
1,2,4-Trichlorobenzene	2500	2600		1	106	70-130	05/24/2019 1146
1,1,1-Trichloroethane	2500	2700		1	109	70-130	05/24/2019 1146
1,1,2-Trichloroethane	2500	2800		1	111	70-130	05/24/2019 1146
Trichloroethene	2500	3000		1	120	70-130	05/24/2019 1146
Trichlorofluoromethane	2500	2700		1	106	70-130	05/24/2019 1146
Vinyl chloride	2500	2300		1	93	70-130	05/24/2019 1146
Xylenes (total)	5000	5900		1	117	70-130	05/24/2019 1146
m+p - Xylenes	2500	3000		1	118	70-130	05/24/2019 1146
o - Xylenes	2500	2900		1	116	70-130	05/24/2019 1146

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	53-142
Bromofluorobenzene		95	47-138
Toluene-d8		93	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18200-001
Batch: 18200
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Naphthalene	ND		1	250	100	ug/kg	05/21/2019 1413

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	53-142
Bromofluorobenzene		114	47-138
Toluene-d8		107	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18200-002
Batch: 18200
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Naphthalene	2500	2200		1	86	70-130	05/21/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		115	47-138
Toluene-d8		110	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ17168-001
Batch: 17168
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/19/2019 1401

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	05/21/2019 1105
Acenaphthylene	ND		1	2.7	0.95	ug/kg	05/21/2019 1105
Anthracene	ND		1	2.7	0.51	ug/kg	05/21/2019 1105
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	05/21/2019 1105
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	05/21/2019 1105
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	05/21/2019 1105
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	05/21/2019 1105
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	05/21/2019 1105
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	05/21/2019 1105
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	05/21/2019 1105
Carbazole	ND		1	13	5.0	ug/kg	05/21/2019 1105
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	05/21/2019 1105
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	05/21/2019 1105
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	05/21/2019 1105
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	05/21/2019 1105
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	05/21/2019 1105
2-Chlorophenol	ND		1	13	5.0	ug/kg	05/21/2019 1105
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	05/21/2019 1105
Chrysene	ND		1	2.7	0.45	ug/kg	05/21/2019 1105
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	05/21/2019 1105
Dibenzofuran	ND		1	13	5.0	ug/kg	05/21/2019 1105
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	05/21/2019 1105
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	05/21/2019 1105
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	05/21/2019 1105
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	05/21/2019 1105
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	05/21/2019 1105
Diethylphthalate	ND		1	13	5.0	ug/kg	05/21/2019 1105
Dimethyl phthalate	ND		1	13	7.4	ug/kg	05/21/2019 1105
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	05/21/2019 1105
Di-n-butyl phthalate	9.6	J	1	13	5.0	ug/kg	05/21/2019 1105
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	05/21/2019 1105
2,4-Dinitrophenol	ND		1	67	25	ug/kg	05/21/2019 1105
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	05/21/2019 1105
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	05/21/2019 1105
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	05/21/2019 1105
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	05/21/2019 1105
Fluoranthene	ND		1	2.7	0.42	ug/kg	05/21/2019 1105
Fluorene	ND		1	2.7	0.57	ug/kg	05/21/2019 1105
Hexachlorobenzene	ND		1	13	5.0	ug/kg	05/21/2019 1105
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	05/21/2019 1105
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	05/21/2019 1105
Hexachloroethane	ND		1	13	5.0	ug/kg	05/21/2019 1105
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	05/21/2019 1105
Isophorone	ND		1	13	5.0	ug/kg	05/21/2019 1105

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

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+ = RPD is out of criteria

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ17168-001
Batch: 17168
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/19/2019 1401

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	05/21/2019 1105
2-Methylphenol	ND		1	13	5.0	ug/kg	05/21/2019 1105
3+4-Methylphenol	ND		1	27	10	ug/kg	05/21/2019 1105
Naphthalene	ND		1	2.7	0.97	ug/kg	05/21/2019 1105
2-Nitroaniline	ND		1	27	10	ug/kg	05/21/2019 1105
3-Nitroaniline	ND		1	27	10	ug/kg	05/21/2019 1105
4-Nitroaniline	ND		1	27	10	ug/kg	05/21/2019 1105
Nitrobenzene	ND		1	13	5.0	ug/kg	05/21/2019 1105
2-Nitrophenol	ND		1	27	10	ug/kg	05/21/2019 1105
4-Nitrophenol	ND		1	67	25	ug/kg	05/21/2019 1105
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	05/21/2019 1105
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	05/21/2019 1105
Pentachlorophenol	ND		1	67	25	ug/kg	05/21/2019 1105
Phenanthrene	ND		1	2.7	0.72	ug/kg	05/21/2019 1105
Phenol	ND		1	13	5.0	ug/kg	05/21/2019 1105
Pyrene	ND		1	2.7	0.50	ug/kg	05/21/2019 1105
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	05/21/2019 1105
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	05/21/2019 1105
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	05/21/2019 1105
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	05/21/2019 1105
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	05/21/2019 1105

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		57	33-102
2-Fluorophenol		64	35-115
Nitrobenzene-d5		97	22-109
Phenol-d5		62	33-122
Terphenyl-d14		76	41-120
2,4,6-Tribromophenol		66	30-117

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17168-002
Batch: 17168
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/19/2019 1401

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	80		1	60	12-111	05/21/2019 1129
Acenaphthylene	130	78		1	59	44-122	05/21/2019 1129
Anthracene	130	97		1	73	16-122	05/21/2019 1129
Benzo(a)anthracene	130	100		1	77	40-121	05/21/2019 1129
Benzo(a)pyrene	130	120		1	87	36-114	05/21/2019 1129
Benzo(b)fluoranthene	130	120		1	93	38-123	05/21/2019 1129
Benzo(g,h,i)perylene	130	120		1	89	43-120	05/21/2019 1129
Benzo(k)fluoranthene	130	120		1	92	40-126	05/21/2019 1129
4-Bromophenyl phenyl ether	130	89		1	67	30-130	05/21/2019 1129
Butyl benzyl phthalate	130	120		1	90	48-124	05/21/2019 1129
Carbazole	130	110		1	83	47-125	05/21/2019 1129
bis (2-Chloro-1-methylethyl) ether	130	160	N	1	119	41-113	05/21/2019 1129
4-Chloro-3-methyl phenol	130	98		1	73	48-120	05/21/2019 1129
bis(2-Chloroethoxy)methane	130	83		1	62	38-115	05/21/2019 1129
bis(2-Chloroethyl)ether	130	110		1	86	46-122	05/21/2019 1129
2-Chloronaphthalene	130	73		1	55	37-106	05/21/2019 1129
2-Chlorophenol	130	92		1	69	44-122	05/21/2019 1129
4-Chlorophenyl phenyl ether	130	79		1	60	32-107	05/21/2019 1129
Chrysene	130	100		1	79	41-124	05/21/2019 1129
Dibenzo(a,h)anthracene	130	120		1	89	38-125	05/21/2019 1129
Dibenzofuran	130	79		1	59	45-128	05/21/2019 1129
1,2-Dichlorobenzene	130	74		1	55	39-94	05/21/2019 1129
1,3-Dichlorobenzene	130	63		1	48	30-130	05/21/2019 1129
1,4-Dichlorobenzene	130	67		1	51	39-92	05/21/2019 1129
3,3'-Dichlorobenzidine	130	77		1	58	10-119	05/21/2019 1129
2,4-Dichlorophenol	130	75		1	56	30-96	05/21/2019 1129
Diethylphthalate	130	98		1	74	30-130	05/21/2019 1129
Dimethyl phthalate	130	88		1	66	24-127	05/21/2019 1129
2,4-Dimethylphenol	130	93		1	70	30-130	05/21/2019 1129
Di-n-butyl phthalate	130	120		1	93	35-108	05/21/2019 1129
4,6-Dinitro-2-methylphenol	130	140		1	108	53-150	05/21/2019 1129
2,4-Dinitrophenol	270	260		1	97	32-115	05/21/2019 1129
2,4-Dinitrotoluene	130	120		1	91	40-130	05/21/2019 1129
2,6-Dinitrotoluene	130	100		1	78	46-118	05/21/2019 1129
Di-n-octylphthalate	130	140		1	104	49-118	05/21/2019 1129
bis(2-Ethylhexyl)phthalate	130	130		1	99	33-123	05/21/2019 1129
Fluoranthene	130	100		1	77	26-133	05/21/2019 1129
Fluorene	130	83		1	62	19-108	05/21/2019 1129
Hexachlorobenzene	130	85		1	64	10-125	05/21/2019 1129
Hexachlorobutadiene	130	70		1	53	47-116	05/21/2019 1129
Hexachlorocyclopentadiene	670	270	N	1	40	48-127	05/21/2019 1129
Hexachloroethane	130	75		1	56	18-154	05/21/2019 1129
Indeno(1,2,3-c,d)pyrene	130	120		1	87	42-123	05/21/2019 1129
Isophorone	130	94		1	71	30-130	05/21/2019 1129

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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17168-002
Batch: 17168
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/19/2019 1401

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	75		1	56	10-107	05/21/2019 1129
2-Methylphenol	130	110		1	81	33-103	05/21/2019 1129
3+4-Methylphenol	130	110		1	82	18-121	05/21/2019 1129
Naphthalene	130	71		1	54	10-112	05/21/2019 1129
2-Nitroaniline	130	110		1	86	46-128	05/21/2019 1129
3-Nitroaniline	130	68		1	51	30-130	05/21/2019 1129
4-Nitroaniline	130	100		1	77	51-129	05/21/2019 1129
Nitrobenzene	130	96		1	72	49-142	05/21/2019 1129
2-Nitrophenol	130	92		1	69	33-114	05/21/2019 1129
4-Nitrophenol	270	170		1	64	27-138	05/21/2019 1129
N-Nitrosodi-n-propylamine	130	120		1	94	45-112	05/21/2019 1129
N-Nitrosodiphenylamine (Diphenylamine)	130	110		1	82	49-123	05/21/2019 1129
Pentachlorophenol	270	170		1	65	36-108	05/21/2019 1129
Phenanthrene	130	94		1	71	16-123	05/21/2019 1129
Phenol	130	110		1	81	39-108	05/21/2019 1129
Pyrene	130	100		1	78	34-121	05/21/2019 1129
1,2,4,5-Tetrachlorobenzene	130	68		1	51	30-130	05/21/2019 1129
2,3,4,6-Tetrachlorophenol	130	86		1	65	53-125	05/21/2019 1129
1,2,4-Trichlorobenzene	130	65		1	49	30-130	05/21/2019 1129
2,4,5-Trichlorophenol	130	79		1	60	32-105	05/21/2019 1129
2,4,6-Trichlorophenol	130	76		1	57	31-102	05/21/2019 1129

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		55	33-102
2-Fluorophenol		71	35-115
Nitrobenzene-d5		77	22-109
Phenol-d5		78	33-122
Terphenyl-d14		90	41-120
2,4,6-Tribromophenol		75	30-117

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ17544-001
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	05/30/2019 1216
Acenaphthylene	ND		1	2.7	0.95	ug/kg	05/30/2019 1216
Anthracene	ND		1	2.7	0.51	ug/kg	05/30/2019 1216
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	05/30/2019 1216
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	05/30/2019 1216
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	05/30/2019 1216
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	05/30/2019 1216
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	05/30/2019 1216
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
Carbazole	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	05/30/2019 1216
2-Chlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
Chrysene	ND		1	2.7	0.45	ug/kg	05/30/2019 1216
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	05/30/2019 1216
Dibenzofuran	ND		1	13	5.0	ug/kg	05/30/2019 1216
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	05/30/2019 1216
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
Diethylphthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
Dimethyl phthalate	ND		1	13	7.4	ug/kg	05/30/2019 1216
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	05/30/2019 1216
2,4-Dinitrophenol	ND		1	67	25	ug/kg	05/30/2019 1216
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	05/30/2019 1216
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	05/30/2019 1216
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	05/30/2019 1216
Fluoranthene	ND		1	2.7	0.42	ug/kg	05/30/2019 1216
Fluorene	ND		1	2.7	0.57	ug/kg	05/30/2019 1216
Hexachlorobenzene	ND		1	13	5.0	ug/kg	05/30/2019 1216
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	05/30/2019 1216
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	05/30/2019 1216
Hexachloroethane	ND		1	13	5.0	ug/kg	05/30/2019 1216
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	05/30/2019 1216
Isophorone	ND		1	13	5.0	ug/kg	05/30/2019 1216

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ17544-001
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	05/30/2019 1216
2-Methylphenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
3+4-Methylphenol	ND		1	27	10	ug/kg	05/30/2019 1216
Naphthalene	ND		1	2.7	0.97	ug/kg	05/30/2019 1216
2-Nitroaniline	ND		1	27	10	ug/kg	05/30/2019 1216
3-Nitroaniline	ND		1	27	10	ug/kg	05/30/2019 1216
4-Nitroaniline	ND		1	27	10	ug/kg	05/30/2019 1216
Nitrobenzene	ND		1	13	5.0	ug/kg	05/30/2019 1216
2-Nitrophenol	ND		1	27	10	ug/kg	05/30/2019 1216
4-Nitrophenol	ND		1	67	25	ug/kg	05/30/2019 1216
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	05/30/2019 1216
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	05/30/2019 1216
Pentachlorophenol	ND		1	67	25	ug/kg	05/30/2019 1216
Phenanthrene	ND		1	2.7	0.72	ug/kg	05/30/2019 1216
Phenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
Pyrene	ND		1	2.7	0.50	ug/kg	05/30/2019 1216
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	05/30/2019 1216
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	05/30/2019 1216
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		68	33-102
2-Fluorophenol		74	35-115
Nitrobenzene-d5		87	22-109
Phenol-d5		73	33-122
Terphenyl-d14		103	41-120
2,4,6-Tribromophenol		94	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17544-002
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	90		1	68	12-111	05/30/2019 1240
Acenaphthylene	130	91		1	69	44-122	05/30/2019 1240
Anthracene	130	100		1	76	16-122	05/30/2019 1240
Benzo(a)anthracene	130	110		1	85	40-121	05/30/2019 1240
Benzo(a)pyrene	130	120		1	88	36-114	05/30/2019 1240
Benzo(b)fluoranthene	130	120		1	90	38-123	05/30/2019 1240
Benzo(g,h,i)perylene	130	130		1	98	43-120	05/30/2019 1240
Benzo(k)fluoranthene	130	110		1	84	40-126	05/30/2019 1240
4-Bromophenyl phenyl ether	130	93		1	70	30-130	05/30/2019 1240
Butyl benzyl phthalate	130	140		1	102	48-124	05/30/2019 1240
Carbazole	130	110		1	84	47-125	05/30/2019 1240
bis (2-Chloro-1-methylethyl) ether	130	97		1	73	41-113	05/30/2019 1240
4-Chloro-3-methyl phenol	130	100		1	76	48-120	05/30/2019 1240
bis(2-Chloroethoxy)methane	130	88		1	66	38-115	05/30/2019 1240
bis(2-Chloroethyl)ether	130	89		1	67	46-122	05/30/2019 1240
2-Chloronaphthalene	130	87		1	65	37-106	05/30/2019 1240
2-Chlorophenol	130	87		1	65	44-122	05/30/2019 1240
4-Chlorophenyl phenyl ether	130	88		1	66	32-107	05/30/2019 1240
Chrysene	130	110		1	82	41-124	05/30/2019 1240
Dibenzo(a,h)anthracene	130	120		1	93	38-125	05/30/2019 1240
Dibenzofuran	130	89		1	67	45-128	05/30/2019 1240
1,2-Dichlorobenzene	130	76		1	57	39-94	05/30/2019 1240
1,3-Dichlorobenzene	130	75		1	57	30-130	05/30/2019 1240
1,4-Dichlorobenzene	130	75		1	57	39-92	05/30/2019 1240
3,3'-Dichlorobenzidine	130	53		1	40	10-119	05/30/2019 1240
2,4-Dichlorophenol	130	86		1	64	30-96	05/30/2019 1240
Diethylphthalate	130	100		1	77	30-130	05/30/2019 1240
Dimethyl phthalate	130	96		1	72	24-127	05/30/2019 1240
2,4-Dimethylphenol	130	110		1	85	30-130	05/30/2019 1240
Di-n-butyl phthalate	130	110		1	85	35-108	05/30/2019 1240
4,6-Dinitro-2-methylphenol	130	94		1	71	53-150	05/30/2019 1240
2,4-Dinitrophenol	270	140		1	54	32-115	05/30/2019 1240
2,4-Dinitrotoluene	130	100		1	76	40-130	05/30/2019 1240
2,6-Dinitrotoluene	130	97		1	73	46-118	05/30/2019 1240
Di-n-octylphthalate	130	130		1	98	49-118	05/30/2019 1240
bis(2-Ethylhexyl)phthalate	130	130		1	97	33-123	05/30/2019 1240
Fluoranthene	130	110		1	82	26-133	05/30/2019 1240
Fluorene	130	91		1	68	19-108	05/30/2019 1240
Hexachlorobenzene	130	93		1	70	10-125	05/30/2019 1240
Hexachlorobutadiene	130	75		1	57	47-116	05/30/2019 1240
Hexachlorocyclopentadiene	670	360		1	54	48-127	05/30/2019 1240
Hexachloroethane	130	77		1	58	18-154	05/30/2019 1240
Indeno(1,2,3-c,d)pyrene	130	120		1	92	42-123	05/30/2019 1240
Isophorone	130	97		1	73	30-130	05/30/2019 1240

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17544-002
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	84		1	63	10-107	05/30/2019 1240
2-Methylphenol	130	100		1	76	33-103	05/30/2019 1240
3+4-Methylphenol	130	100		1	77	18-121	05/30/2019 1240
Naphthalene	130	83		1	62	10-112	05/30/2019 1240
2-Nitroaniline	130	110		1	81	46-128	05/30/2019 1240
3-Nitroaniline	130	76		1	57	30-130	05/30/2019 1240
4-Nitroaniline	130	100		1	75	51-129	05/30/2019 1240
Nitrobenzene	130	95		1	71	49-142	05/30/2019 1240
2-Nitrophenol	130	85		1	64	33-114	05/30/2019 1240
4-Nitrophenol	270	260		1	97	27-138	05/30/2019 1240
N-Nitrosodi-n-propylamine	130	97		1	73	45-112	05/30/2019 1240
N-Nitrosodiphenylamine (Diphenylamine)	130	110		1	81	49-123	05/30/2019 1240
Pentachlorophenol	270	210		1	79	36-108	05/30/2019 1240
Phenanthrene	130	99		1	75	16-123	05/30/2019 1240
Phenol	130	100		1	77	39-108	05/30/2019 1240
Pyrene	130	120		1	87	34-121	05/30/2019 1240
1,2,4,5-Tetrachlorobenzene	130	83		1	63	30-130	05/30/2019 1240
2,3,4,6-Tetrachlorophenol	130	95		1	72	53-125	05/30/2019 1240
1,2,4-Trichlorobenzene	130	79		1	60	30-130	05/30/2019 1240
2,4,5-Trichlorophenol	130	98		1	74	32-105	05/30/2019 1240
2,4,6-Trichlorophenol	130	95		1	72	31-102	05/30/2019 1240

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		65	33-102
2-Fluorophenol		69	35-115
Nitrobenzene-d5		75	22-109
Phenol-d5		70	33-122
Terphenyl-d14		101	41-120
2,4,6-Tribromophenol		88	30-117

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UE17007-007MS
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	1000	160	1400	N	10	247	12-111	05/30/2019 1556
Acenaphthylene	ND	160	480	N	10	297	44-122	05/30/2019 1556
Anthracene	250	160	440		10	113	16-122	05/30/2019 1556
Benzo(a)anthracene	ND	160	150		10	92	40-121	05/30/2019 1556
Benzo(a)pyrene	ND	160	140		10	86	36-114	05/30/2019 1556
Benzo(b)fluoranthene	ND	160	140		10	83	38-123	05/30/2019 1556
Benzo(g,h,i)perylene	ND	160	110		10	65	43-120	05/30/2019 1556
Benzo(k)fluoranthene	ND	160	130		10	79	40-126	05/30/2019 1556
4-Bromophenyl phenyl ether	ND	160	160		10	101	30-130	05/30/2019 1556
Butyl benzyl phthalate	ND	160	150		10	92	30-130	05/30/2019 1556
Carbazole	ND	160	160		10	99	30-130	05/30/2019 1556
bis (2-Chloro-1-methylethyl) ether	ND	160	110		10	68	30-130	05/30/2019 1556
4-Chloro-3-methyl phenol	ND	160	170		10	105	30-130	05/30/2019 1556
bis(2-Chloroethoxy)methane	ND	160	76		10	47	30-130	05/30/2019 1556
bis(2-Chloroethyl)ether	ND	160	120		10	73	30-130	05/30/2019 1556
2-Chloronaphthalene	ND	160	3200	N	10	1980	30-130	05/30/2019 1556
2-Chlorophenol	ND	160	93		10	57	30-130	05/30/2019 1556
4-Chlorophenyl phenyl ether	ND	160	120		10	74	30-130	05/30/2019 1556
Chrysene	22	160	170		10	91	41-124	05/30/2019 1556
Dibenzo(a,h)anthracene	ND	160	110		10	66	38-125	05/30/2019 1556
Dibenzofuran	740	160	950		10	130	30-130	05/30/2019 1556
1,2-Dichlorobenzene	ND	160	93		10	57	39-94	05/30/2019 1556
1,3-Dichlorobenzene	ND	160	96		10	59	30-130	05/30/2019 1556
1,4-Dichlorobenzene	ND	160	95		10	58	39-92	05/30/2019 1556
3,3'-Dichlorobenzidine	ND	160	190		10	114	10-119	05/30/2019 1556
2,4-Dichlorophenol	ND	160	450	N	10	279	30-130	05/30/2019 1556
Diethylphthalate	ND	160	160		10	100	30-130	05/30/2019 1556
Dimethyl phthalate	ND	160	170		10	105	30-130	05/30/2019 1556
2,4-Dimethylphenol	ND	160	130		10	82	30-130	05/30/2019 1556
Di-n-butyl phthalate	ND	160	130		10	78	30-130	05/30/2019 1556
4,6-Dinitro-2-methylphenol	ND	160	390	N	10	238	30-130	05/30/2019 1556
2,4-Dinitrophenol	ND	320	760	N	10	233	30-130	05/30/2019 1556
2,4-Dinitrotoluene	ND	160	170		10	105	30-130	05/30/2019 1556
2,6-Dinitrotoluene	ND	160	61		10	37	30-130	05/30/2019 1556
Di-n-octylphthalate	ND	160	130		10	79	30-130	05/30/2019 1556
bis(2-Ethylhexyl)phthalate	ND	160	150		10	92	30-130	05/30/2019 1556
Fluoranthene	29	160	150		10	74	26-133	05/30/2019 1556
Fluorene	1200	160	1600	N	10	235	19-108	05/30/2019 1556
Hexachlorobenzene	ND	160	140		10	89	10-130	05/30/2019 1556
Hexachlorobutadiene	ND	160	97		10	60	30-130	05/30/2019 1556
Hexachlorocyclopentadiene	ND	810	ND	N	10	0.00	30-130	05/30/2019 1556
Hexachloroethane	ND	160	1900	N	10	1140	30-130	05/30/2019 1556
Indeno(1,2,3-c,d)pyrene	ND	160	110		10	66	42-123	05/30/2019 1556
Isophorone	ND	160	160		10	97	30-130	05/30/2019 1556

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LOD = Limit of Detection

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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UE17007-007MS
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	29000	160	31000	N	10	1260	10-107	05/30/2019 1556
2-Methylphenol	ND	160	130		10	82	30-130	05/30/2019 1556
3+4-Methylphenol	ND	160	91		10	56	30-130	05/30/2019 1556
Naphthalene	6300	160	7100	N	10	536	10-112	05/30/2019 1556
2-Nitroaniline	ND	160	380	N	10	231	30-130	05/30/2019 1556
3-Nitroaniline	ND	160	240	N	10	146	30-130	05/30/2019 1556
4-Nitroaniline	ND	160	770	N	10	477	30-130	05/30/2019 1556
Nitrobenzene	ND	160	120		10	76	30-130	05/30/2019 1556
2-Nitrophenol	ND	160	110		10	69	30-130	05/30/2019 1556
4-Nitrophenol	ND	320	1400	N	10	429	30-130	05/30/2019 1556
N-Nitrosodi-n-propylamine	ND	160	120		10	71	30-130	05/30/2019 1556
N-Nitrosodiphenylamine (Diphenylamine)	ND	160	3000	N	10	1850	30-130	05/30/2019 1556
Pentachlorophenol	ND	320	540	N	10	167	30-130	05/30/2019 1556
Phenanthrene	1200	160	1600	N	10	228	16-123	05/30/2019 1556
Phenol	ND	160	190		10	116	30-130	05/30/2019 1556
Pyrene	120	160	290		10	100	34-121	05/30/2019 1556
1,2,4,5-Tetrachlorobenzene	ND	160	100		10	64	30-130	05/30/2019 1556
2,3,4,6-Tetrachlorophenol	ND	160	170		10	108	53-125	05/30/2019 1556
1,2,4-Trichlorobenzene	ND	160	97		10	60	30-130	05/30/2019 1556
2,4,5-Trichlorophenol	ND	160	180		10	109	30-130	05/30/2019 1556
2,4,6-Trichlorophenol	ND	160	220	N	10	135	30-130	05/30/2019 1556

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		84	33-102
2-Fluorophenol		61	35-115
Nitrobenzene-d5		54	22-109
Phenol-d5		59	33-122
Terphenyl-d14		84	41-120
2,4,6-Tribromophenol		112	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UE17007-007MD
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acenaphthene	1000	160	1500	N	10	296	4.6	12-111	30	05/30/2019 1620
Acenaphthylene	ND	160	510	N	10	323	6.0	44-122	30	05/30/2019 1620
Anthracene	250	160	420		10	105	4.2	16-122	30	05/30/2019 1620
Benzo(a)anthracene	ND	160	160		10	101	6.1	40-121	30	05/30/2019 1620
Benzo(a)pyrene	ND	160	140		10	88	0.49	36-114	30	05/30/2019 1620
Benzo(b)fluoranthene	ND	160	130		10	84	2.4	38-123	30	05/30/2019 1620
Benzo(g,h,i)perylene	ND	160	100		10	64	4.0	43-120	30	05/30/2019 1620
Benzo(k)fluoranthene	ND	160	130		10	84	4.6	40-126	30	05/30/2019 1620
4-Bromophenyl phenyl ether	ND	160	210	N	10	132	23	30-130	40	05/30/2019 1620
Butyl benzyl phthalate	ND	160	150		10	95	0.81	30-130	40	05/30/2019 1620
Carbazole	ND	160	160		10	103	1.1	30-130	40	05/30/2019 1620
bis (2-Chloro-1-methylethyl) ether	ND	160	120		10	78	12	30-130	40	05/30/2019 1620
4-Chloro-3-methyl phenol	ND	160	92	+	10	58	60	30-130	40	05/30/2019 1620
bis(2-Chloroethoxy)methane	ND	160	83		10	53	9.1	30-130	40	05/30/2019 1620
bis(2-Chloroethyl)ether	ND	160	130		10	85	12	30-130	40	05/30/2019 1620
2-Chloronaphthalene	ND	160	3600	N	10	2300	12	30-130	40	05/30/2019 1620
2-Chlorophenol	ND	160	110		10	70	17	30-130	40	05/30/2019 1620
4-Chlorophenyl phenyl ether	ND	160	120		10	79	4.0	30-130	40	05/30/2019 1620
Chrysene	22	160	160		10	87	6.7	41-124	30	05/30/2019 1620
Dibenzo(a,h)anthracene	ND	160	100		10	66	2.8	38-125	30	05/30/2019 1620
Dibenzofuran	740	160	1000	N	10	171	6.0	30-130	40	05/30/2019 1620
1,2-Dichlorobenzene	ND	160	100		10	66	12	39-94	40	05/30/2019 1620
1,3-Dichlorobenzene	ND	160	110		10	69	13	30-130	40	05/30/2019 1620
1,4-Dichlorobenzene	ND	160	100		10	66	9.8	39-92	40	05/30/2019 1620
3,3'-Dichlorobenzidine	ND	160	190	N	10	122	3.6	10-119	40	05/30/2019 1620
2,4-Dichlorophenol	ND	160	500	N	10	316	9.8	30-130	40	05/30/2019 1620
Diethylphthalate	ND	160	160		10	104	1.2	30-130	40	05/30/2019 1620
Dimethyl phthalate	ND	160	170		10	107	0.14	30-130	40	05/30/2019 1620
2,4-Dimethylphenol	ND	160	130		10	84	0.12	30-130	40	05/30/2019 1620
Di-n-butyl phthalate	ND	160	120		10	79	1.2	30-130	40	05/30/2019 1620
4,6-Dinitro-2-methylphenol	ND	160	380	N	10	243	0.32	30-130	40	05/30/2019 1620
2,4-Dinitrophenol	ND	320	800	N	10	253	5.6	30-130	40	05/30/2019 1620
2,4-Dinitrotoluene	ND	160	180		10	115	6.5	30-130	40	05/30/2019 1620
2,6-Dinitrotoluene	ND	160	99	+	10	63	48	30-130	40	05/30/2019 1620
Di-n-octylphthalate	ND	160	140		10	86	5.8	30-130	40	05/30/2019 1620
bis(2-Ethylhexyl)phthalate	ND	160	150		10	95	0.36	30-130	40	05/30/2019 1620
Fluoranthene	29	160	140		10	71	6.0	26-133	30	05/30/2019 1620
Fluorene	1200	160	1600	N	10	275	3.3	19-108	30	05/30/2019 1620
Hexachlorobenzene	ND	160	150		10	93	1.9	10-130	40	05/30/2019 1620
Hexachlorobutadiene	ND	160	110		10	70	13	30-130	40	05/30/2019 1620
Hexachlorocyclopentadiene	ND	790	ND	N	10	0.00	0.00	30-130	40	05/30/2019 1620
Hexachloroethane	ND	160	2200	N	10	1380	17	30-130	40	05/30/2019 1620
Indeno(1,2,3-c,d)pyrene	ND	160	110		10	67	1.1	42-123	30	05/30/2019 1620
Isophorone	ND	160	180		10	115	14	30-130	40	05/30/2019 1620

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UE17007-007MD
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
2-Methylnaphthalene	29000	160	32000	N	10	1850	2.8	10-107	30	05/30/2019 1620
2-Methylphenol	ND	160	130		10	82	3.3	30-130	40	05/30/2019 1620
3+4-Methylphenol	ND	160	120		10	75	26	30-130	40	05/30/2019 1620
Naphthalene	6300	160	8100	N	10	1180	13	10-112	30	05/30/2019 1620
2-Nitroaniline	ND	160	800	N,+	10	503	72	30-130	40	05/30/2019 1620
3-Nitroaniline	ND	160	390	N,+	10	246	49	30-130	40	05/30/2019 1620
4-Nitroaniline	ND	160	390	N,+	10	248	65	30-130	40	05/30/2019 1620
Nitrobenzene	ND	160	130		10	83	5.9	30-130	40	05/30/2019 1620
2-Nitrophenol	ND	160	140		10	89	22	30-130	40	05/30/2019 1620
4-Nitrophenol	ND	320	1200	N	10	369	18	30-130	40	05/30/2019 1620
N-Nitrosodi-n-propylamine	ND	160	130		10	83	14	30-130	40	05/30/2019 1620
N-Nitrosodiphenylamine (Diphenylamine)	ND	160	2900	N	10	1830	3.5	30-130	40	05/30/2019 1620
Pentachlorophenol	ND	320	500	N	10	158	7.8	30-130	40	05/30/2019 1620
Phenanthrene	1200	160	1600	N	10	230	0.40	16-123	30	05/30/2019 1620
Phenol	ND	160	190		10	121	1.3	30-130	40	05/30/2019 1620
Pyrene	120	160	270		10	91	7.0	34-121	30	05/30/2019 1620
1,2,4,5-Tetrachlorobenzene	ND	160	120		10	74	12	30-130	40	05/30/2019 1620
2,3,4,6-Tetrachlorophenol	ND	160	180		10	111	0.54	53-125	40	05/30/2019 1620
1,2,4-Trichlorobenzene	ND	160	110		10	68	10	30-130	40	05/30/2019 1620
2,4,5-Trichlorophenol	ND	160	160		10	101	11	30-130	40	05/30/2019 1620
2,4,6-Trichlorophenol	ND	160	250	N	10	158	13	30-130	40	05/30/2019 1620

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		86	33-102
2-Fluorophenol		73	35-115
Nitrobenzene-d5	N	169	22-109
Phenol-d5		73	33-122
Terphenyl-d14		89	41-120
2,4,6-Tribromophenol	N	125	30-117

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ18272-001
Batch: 18272
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1502

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/03/2019 2020
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/03/2019 2020

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		95	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Montana EPH (aliphatics) - LCS

Sample ID: UQ18272-002
Batch: 18272
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1502

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	44		1	110	40-140	06/03/2019 2049
C9 - C18 Aliphatics	30	24		1	81	40-140	06/03/2019 2049

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		102	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ18272-003
Batch: 18272
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1502

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	40		1	99	9.9	40-140	25	06/03/2019 2118
C9 - C18 Aliphatics	30	22		1	74	8.7	40-140	25	06/03/2019 2118

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		93	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ18274-001
Batch: 18274
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/04/2019 0506

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		80	40-140
2-Fluorobiphenyl (fractionation 1)		82	40-140
o - Terphenyl (aromatic)		82	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana EPH (aromatics) - LCS

Sample ID: UQ18274-002
Batch: 18274
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	83		1	98	40-140	06/04/2019 0535

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		95	40-140
o - Terphenyl (aromatic)		99	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ18274-003
Batch: 18274
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	79		1	93	5.2	40-140	25	06/04/2019 0604

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		95	40-140
o - Terphenyl (aromatic)		94	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ18028-001
Batch: 18028
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	05/28/2019 1453
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	05/28/2019 1453
Ethylbenzene	ND		1	0.25	0.031	mg/kg	05/28/2019 1453
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	05/28/2019 1453
Naphthalene	ND		1	0.25	0.13	mg/kg	05/28/2019 1453
Toluene	ND		1	0.25	0.040	mg/kg	05/28/2019 1453
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	05/28/2019 1453
o - Xylenes	ND		1	0.25	0.028	mg/kg	05/28/2019 1453

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ18028-002
Batch: 18028
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	05/28/2019 1357
C9 - C10 Aromatics	1.3	1.3		1	104	70-130	05/28/2019 1357
Ethylbenzene	1.3	1.2		1	96	70-130	05/28/2019 1357
Methyl tertiary butyl ether (MTBE)	1.3	0.97		1	78	70-130	05/28/2019 1357
Naphthalene	1.3	1.1		1	88	70-130	05/28/2019 1357
Toluene	1.3	1.2		1	96	70-130	05/28/2019 1357
m+p - Xylenes	2.5	2.5		1	100	70-130	05/28/2019 1357
o - Xylenes	1.3	1.2		1	96	70-130	05/28/2019 1357

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ18028-003
Batch: 18028
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	8.0	70-130	25	05/28/2019 1425
C9 - C10 Aromatics	1.3	1.4		1	112	7.4	70-130	25	05/28/2019 1425
Ethylbenzene	1.3	1.3		1	104	8.0	70-130	25	05/28/2019 1425
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	21	70-130	25	05/28/2019 1425
Naphthalene	1.3	1.2		1	96	8.7	70-130	25	05/28/2019 1425
Toluene	1.3	1.3		1	104	8.0	70-130	25	05/28/2019 1425
m+p - Xylenes	2.5	2.6		1	104	3.9	70-130	25	05/28/2019 1425
o - Xylenes	1.3	1.3		1	104	8.0	70-130	25	05/28/2019 1425

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ18029-001
Batch: 18029
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	05/28/2019 1453
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	05/28/2019 1453

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ18029-002
Batch: 18029
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	4.8		1	95	70-130	05/28/2019 1357
C9 - C12 Aliphatics, Adjusted	3.8	3.9		1	104	70-130	05/28/2019 1357

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ18029-003
Batch: 18029
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.1		1	101	6.3	70-130	25	05/28/2019 1425
C9 - C12 Aliphatics, Adjusted	3.8	4.0		1	106	2.0	70-130	25	05/28/2019 1425

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ18030-001
Batch: 18030
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	05/28/2019 1453

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - LCS

Sample ID: UQ18030-002
Batch: 18030
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	19		1	100	70-130	05/28/2019 1357

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ18030-003
Batch: 18030
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	105	4.2	70-130	25	05/28/2019 1425

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ18697-001
Batch: 18697
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	05/28/2019 1453
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	05/28/2019 1453

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ18697-002
Batch: 18697
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	4.8		1	95	70-130	05/28/2019 1357
C9 - C12 Aliphatics, Adjusted	3.8	3.9		1	104	70-130	05/28/2019 1357

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ18697-003
Batch: 18697
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.1		1	101	6.3	70-130	25	05/28/2019 1425
C9 - C12 Aliphatics, Adjusted	3.8	4.0		1	106	2.0	70-130	25	05/28/2019 1425

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ18699-001
Batch: 18699
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	05/28/2019 1453
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	05/28/2019 1453
Ethylbenzene	ND		1	0.25	0.031	mg/kg	05/28/2019 1453
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	05/28/2019 1453
Naphthalene	ND		1	0.25	0.13	mg/kg	05/28/2019 1453
Toluene	ND		1	0.25	0.040	mg/kg	05/28/2019 1453
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	05/28/2019 1453
o - Xylenes	ND		1	0.25	0.028	mg/kg	05/28/2019 1453

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ18699-002
Batch: 18699
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	05/28/2019 1357
C9 - C10 Aromatics	1.3	1.3		1	104	70-130	05/28/2019 1357
Ethylbenzene	1.3	1.2		1	96	70-130	05/28/2019 1357
Methyl tertiary butyl ether (MTBE)	1.3	0.97		1	78	70-130	05/28/2019 1357
Naphthalene	1.3	1.1		1	88	70-130	05/28/2019 1357
Toluene	1.3	1.2		1	96	70-130	05/28/2019 1357
m+p - Xylenes	2.5	2.5		1	100	70-130	05/28/2019 1357
o - Xylenes	1.3	1.2		1	96	70-130	05/28/2019 1357

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ18699-003
Batch: 18699
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	8.0	70-130	25	05/28/2019 1425
C9 - C10 Aromatics	1.3	1.4		1	112	7.4	70-130	25	05/28/2019 1425
Ethylbenzene	1.3	1.3		1	104	8.0	70-130	25	05/28/2019 1425
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	21	70-130	25	05/28/2019 1425
Naphthalene	1.3	1.2		1	96	8.7	70-130	25	05/28/2019 1425
Toluene	1.3	1.3		1	104	8.0	70-130	25	05/28/2019 1425
m+p - Xylenes	2.5	2.6		1	104	3.9	70-130	25	05/28/2019 1425
o - Xylenes	1.3	1.3		1	104	8.0	70-130	25	05/28/2019 1425

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ18745-001
Batch: 18745
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Naphthalene	ND		1	0.25	0.13	mg/kg	05/28/2019 1453

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ18745-002
Batch: 18745
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Naphthalene	1.3	1.1		1	88	70-130	05/28/2019 1357

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ18745-003
Batch: 18745
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Naphthalene	1.3	1.2		1	96	8.7	70-130	25	05/28/2019 1425

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ17180-001
Batch: 17180
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 05/21/2019 848

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	05/22/2019 1115
Arsenic	ND		1	0.50	0.20	mg/kg	05/22/2019 1115
Barium	ND		1	1.3	0.31	mg/kg	05/22/2019 1115
Beryllium	ND		1	0.10	0.034	mg/kg	05/22/2019 1115
Cadmium	ND		1	0.13	0.025	mg/kg	05/22/2019 1115
Chromium	1.0	J	1	1.3	0.55	mg/kg	05/22/2019 1422
Cobalt	ND		1	1.3	0.30	mg/kg	05/22/2019 1115
Copper	ND		1	1.3	0.33	mg/kg	05/22/2019 1115
Lead	ND		1	0.25	0.068	mg/kg	05/22/2019 1115
Nickel	ND		1	1.3	0.30	mg/kg	05/22/2019 1115
Selenium	ND		1	1.3	0.47	mg/kg	05/22/2019 1115
Silver	ND		1	0.25	0.060	mg/kg	05/22/2019 1115
Vanadium	ND		1	1.3	0.25	mg/kg	05/22/2019 1115
Zinc	ND		1	2.5	0.50	mg/kg	05/22/2019 1115

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ17180-002
Batch: 17180
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 05/21/2019 848

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	46		1	93	80-120	05/22/2019 1052
Arsenic	50	43		1	86	80-120	05/22/2019 1052
Barium	50	48		1	96	80-120	05/22/2019 1052
Beryllium	50	52		1	104	80-120	05/22/2019 1052
Cadmium	50	47		1	94	80-120	05/22/2019 1052
Chromium	50	41		1	81	80-120	05/22/2019 1428
Cobalt	50	47		1	95	80-120	05/22/2019 1052
Copper	50	51		1	102	80-120	05/22/2019 1052
Lead	50	48		1	95	80-120	05/22/2019 1052
Nickel	50	47		1	93	80-120	05/22/2019 1052
Selenium	50	46		1	92	80-120	05/22/2019 1052
Silver	50	50		1	99	80-120	05/22/2019 1052
Vanadium	50	49		1	99	80-120	05/22/2019 1052
Zinc	50	48		1	96	80-120	05/22/2019 1052

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UE17007-009MS
Batch: 17180
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 05/21/2019 848

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	ND	49	16	N	1	33	75-125	05/23/2019 2223
Arsenic	0.56	49	36	N	1	73	75-125	05/23/2019 2223
Barium	59	49	140	N	1	166	75-125	05/23/2019 2223
Beryllium	1.1	49	43		1	86	75-125	05/23/2019 2223
Cadmium	0.23	49	41		1	84	75-125	05/23/2019 2223
Chromium	13	49	71		1	120	75-125	05/23/2019 2223
Cobalt	3.9	49	46		1	87	75-125	05/23/2019 2223
Copper	20	49	63		1	87	75-125	05/23/2019 2223
Lead	10	49	58		1	97	75-125	05/23/2019 2223
Nickel	20	49	65		1	93	75-125	05/23/2019 2223
Selenium	ND	49	41		1	83	75-125	05/23/2019 2223
Silver	0.085	49	46		1	93	75-125	05/23/2019 2223
Vanadium	22	49	120	N	1	197	75-125	05/23/2019 2223
Zinc	44	49	150	N	1	219	75-125	05/23/2019 2223

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UE17007-009MD
Batch: 17180
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 05/21/2019 848

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Antimony	ND	46	16	N	1	34	1.2	75-125	20	05/23/2019 2229
Arsenic	0.56	46	35	N	1	74	3.7	75-125	20	05/23/2019 2229
Barium	59	46	140	N	1	184	2.9	75-125	20	05/23/2019 2229
Beryllium	1.1	46	41		1	86	5.0	75-125	20	05/23/2019 2229
Cadmium	0.23	46	39		1	84	5.9	75-125	20	05/23/2019 2229
Chromium	13	46	73	N	1	130	1.9	75-125	20	05/23/2019 2229
Cobalt	3.9	46	45		1	88	3.9	75-125	20	05/23/2019 2229
Copper	20	46	60		1	86	4.4	75-125	20	05/23/2019 2229
Lead	10	46	55		1	98	3.9	75-125	20	05/23/2019 2229
Nickel	20	46	63		1	94	2.9	75-125	20	05/23/2019 2229
Selenium	ND	46	38		1	81	7.9	75-125	20	05/23/2019 2229
Silver	0.085	46	43		1	92	6.7	75-125	20	05/23/2019 2229
Vanadium	22	46	120	N	1	218	3.8	75-125	20	05/23/2019 2229
Zinc	44	46	150	N	1	228	1.2	75-125	20	05/23/2019 2229

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ17176-001
Batch: 17176
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 05/20/2019 1624

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	05/21/2019 1354

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ17176-002
Batch: 17176
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 05/20/2019 1624

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.79		1	94	80-120	05/21/2019 1401

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UE17007-001MS
Batch: 17176
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 05/20/2019 1624

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	ND	0.94	0.97		1	103	80-120	05/21/2019 1418

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UE17007-001MD
Batch: 17176
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 05/20/2019 1624

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Mercury	ND	0.99	1.1		1	106	8.8	80-120	20	05/21/2019 1420

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody
and
Miscellaneous Documents

Shealy Environmental Services, Inc.
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SHEALY ENVIRONMENTAL SERVICES, INC.

Chain of Custody Record

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106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

Number 91642

Client: Ramboll US Corporation	Report to Contact: Michael Wilson	Telephone No. / E-mail: 316-644-2303 / mwilson@ramboll.com	Quote No.
Address: 7500 College Boulevard Suite 925	Sampler's Signature: X	Analysis (Attach list if more space is needed)	Page 1 of 1
City: Overland Park	State: KS	Zip Code: 66210	Printed Name: Josh Myers
Project Name: CMR RIAIM East Rail			
Project No.: 1690012344-003 Task 221	P.O. No.		

UE17007

KM N2

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	# Grab / # Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No. of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	Na2S2O3	MeOH	VOC	VPH	EPH	Metals	SVOC/EPH	SVOC	Remarks / Cooler I.D.
CMR-EB06-4.5-5.0-190516	5/16/19	1145	G		X		2					1	2	X	X		X	X		
CMR-EB06-6.25-6.75-190516		1215	G		X		2					1	2	X	X		X	X		
CMR-EB07-0.0-1.0-190516		1525	G		X		2					1	2	X	X		X	X		
CMR-EB07-5.25-5.75-190516		1550	G		X		2					1	2	X	X		X	X		
CMR-EB07-7.5-8.0-190516		1600	G		X		2					1	2	X	X		X	X		
TB-01	N/A	N/A	-		X					2				X						Trip Blank

Turn Around Time Required (Prior lab approval required for expedited TAT.)
☑ Standard ☐ Rush (Specify)

Sample Disposal
☐ Return to Client ☑ Disposal by Lab

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☑ Unknown

QC Requirements (Specify)

1. Relinquished by: Josh Myers	Date: 5/16/19	Time: 1700	1. Received by:	Date:	Time:
2. Relinquished by:	Date:	Time:	2. Received by:	Date:	Time:
3. Relinquished by:	Date:	Time:	3. Received by:	Date:	Time:
4. Relinquished by: Fed Ex	Date: 5-17-19	Time: 0910	4. Laboratory received by: L Hite	Date: 5-17-19	Time: 0910

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack Receipt Temp. 2.9 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 06-01-2014

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 05-17-2019 Lot #: LE17007

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

2.9 /2.9 °C NA /NA °C NA /NA °C NA /NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # _____

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA _____ were received with bubbles >6 mm in diameter.

Samples(s) NA _____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: LKH Date: 05-17-2019

Comments:

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

Chain of Custody Record

Number 91643

Client: Ramboll US Corporation	Report to Contact: Michael Wilson
Address: 1500 College Boulevard Suite [illegible]925	Sampler's Signature: Josh Myers
City: Overland Park	State: KS
Zip Code: 66210	Printed Name: Josh Myers
Project Name: 418th CMR RIAIM East Rail	Telephone No. / E-mail: (316)644-2303 / mwilson@ramboll.com
Project No.: 1690012344-003 Task 221	P.O. No.
Quote No.	
Analysis (Attach list if more space is needed)	Page 1 of 1

UE17007

KMN2

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Grab/Composite	Aqueous	Soil	Wipe/Sponge	Matrix: Other	No of Containers by Preservative Type: Unpres	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Methanol	VOC	VPH	EPH	Metals	SVOC/EPH	SVOC	Remarks / Cooler I.D.
CMR-EB05-6-7-190517	5/17/19	1015	G		X			2					1	2	X	X		X	X		
CMR-EB05-11-12-190517		1015	G		X			2					1	2	X	X		X	X		
CMR-EB04-6-7-190517		1515	G		X			2					1	2	X	X		X	X		
TB-02	N/A	N/A		X							2				X						Trip Blank

Turn Around Time Required (Prior lab approval required for expedited TAT.)
☒ Standard ☐ Rush (Specify)

Sample Disposal
☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☒ Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by: Josh Myers	5/17/19	1730	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: FedEx	5/18/19	0927	4. Laboratory received by	5/18/19	0927

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice: (Circle) Yes No Ice Pack

Receipt Temp. 2.6 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 09-01-2014

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: Ramboll Cooler Inspected by/date: JSH / 05/18/19 Lot #: UE17007

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

2.6 / 2.6 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA _____ were received with bubbles >6 mm in diameter.

Samples(s) NA _____ were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JSH Date: 05/18/19

Comments:

MEMO

Date: **July 17, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UE21018, 4 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UE21018 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB14-0.5-1.5-190520	UE21018-001
CMR-EB14-2.0-2.4-190520	UE21018-002
CMR-EB11-2.0-2.5-190520	UE21018-003
CMR-EB11-2.5-3.0-190520	UE21018-004
TB-03-20190520	UE21018-005

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UE21018

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 10, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Chromium detected in a method blank below the RL. All project sample detections were above the blank result and the RL, no action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UE21018

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 10, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	No issues	No issues
Deuterated Monitoring Compound or Surrogate Spikes	SVOC surrogates out due to dilutions. No action taken.	Surrogates out on one sample likely due to high analyte concentrations. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with sample results. No action taken.	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	No issues	No issues
Internal Standards	No issues	One sample had ISes out of criteria due to likely matrix effects. No action taken.
Tentatively Identified Compounds	No TICs identified by the lab.	N/A
Other Non-conformances	VOC methyl acetate CCV out of criteria high. No detections, no action taken.	No other non-conformances noted during analysis or review.
Overall Assessment of Data	No validation action warranted.	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003 Task 221

Lot Number:**UE21018**

Date Completed:06/06/2019
Revision Date: 06/10/2019

06/10/2019 1:37 PM
Approved and released by:
Project Manager: Kelly M. Nance

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UE21018

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

This report supersedes and replaces any prior reports issued under this lot number. The details of the applicable revisions are detailed in a Report Revision Notice provided under separate cover.

Volatiles
The continuing calibration verification (CCV) associated with samples -003 and -004 had methyl acetate recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections for this compound in the associated samples; therefore, data quality is not impacted.

Sample -002 had surrogates recovered outside of the acceptance limits due to confirmed matrix interference. Sample -004 had surrogates recovered outside of the acceptance limits due to sample dilution.

Semivolatiles
Sample -004 diluted 10X due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Sample -001 was diluted 10X due to the sample matrix. The reporting limits have been raised accordingly.

Montana VPH
Sample -004 had multiple compounds detected in the VPH analysis above the LOQ. Naphthalene was detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same time as MTBE and naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Sample -002 had internal standards recovered below the acceptance limits due to confirmed matrix

interference.

Sample -002 had surrogates recovered outside of the acceptance limits due to confirmed matrix interference.

Sample -004 was diluted due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Metals
The method blank associated with batch 175263 had chromium detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for chromium have been flagged with a “B” qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UE21018

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB14-0.5-1.5-190520	Solid	05/20/2019 1110	05/21/2019
002	CMR-EB14-2.0-2.4-190520	Solid	05/20/2019 1300	05/21/2019
003	CMR-EB11-2.0-2.5-190520	Solid	05/20/2019 1520	05/21/2019
004	CMR-EB11-2.5-3.0-190520	Solid	05/20/2019 1525	05/21/2019
005	TB-03-20190520	Aqueous	05/20/2019	05/21/2019

(5 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UE21018

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB14-0.5-1.5-190520	Solid	Acetone	8260B	28		ug/kg	10
001	CMR-EB14-0.5-1.5-190520	Solid	Benzo(a)pyrene	8270D	13	J	ug/kg	12
001	CMR-EB14-0.5-1.5-190520	Solid	Benzo(g,h,i)perylene	8270D	13	J	ug/kg	12
001	CMR-EB14-0.5-1.5-190520	Solid	Fluoranthene	8270D	8.6	J	ug/kg	12
001	CMR-EB14-0.5-1.5-190520	Solid	2-Methylnaphthalene	8270D	13	J	ug/kg	13
001	CMR-EB14-0.5-1.5-190520	Solid	Phenanthrene	8270D	12	J	ug/kg	13
001	CMR-EB14-0.5-1.5-190520	Solid	Pyrene	8270D	22	J	ug/kg	13
001	CMR-EB14-0.5-1.5-190520	Solid	C19 - C36 Aliphatics	Montana EPH	53		mg/kg	14
001	CMR-EB14-0.5-1.5-190520	Solid	C11 - C22 Aromatics	Montana EPH	54		mg/kg	15
001	CMR-EB14-0.5-1.5-190520	Solid	Arsenic	6020B	9.1		mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Barium	6020B	230		mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Beryllium	6020B	0.67		mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Cadmium	6020B	0.65		mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Chromium	6020B	15	B	mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Cobalt	6020B	5.3		mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Copper	6020B	19		mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Lead	6020B	13		mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Mercury	7471B	0.024	J	mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Nickel	6020B	12		mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Selenium	6020B	0.43	J	mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Silver	6020B	0.10	J	mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Vanadium	6020B	34		mg/kg	19
001	CMR-EB14-0.5-1.5-190520	Solid	Zinc	6020B	120		mg/kg	19
002	CMR-EB14-2.0-2.4-190520	Solid	Acetone	8260B	10	J	ug/kg	20
002	CMR-EB14-2.0-2.4-190520	Solid	Anthracene	8270D	8.2	J	ug/kg	22
002	CMR-EB14-2.0-2.4-190520	Solid	Benzo(a)anthracene	8270D	32		ug/kg	22
002	CMR-EB14-2.0-2.4-190520	Solid	Benzo(a)pyrene	8270D	16		ug/kg	22
002	CMR-EB14-2.0-2.4-190520	Solid	Benzo(b)fluoranthene	8270D	47		ug/kg	22
002	CMR-EB14-2.0-2.4-190520	Solid	Benzo(g,h,i)perylene	8270D	21		ug/kg	22
002	CMR-EB14-2.0-2.4-190520	Solid	Benzo(k)fluoranthene	8270D	10	J	ug/kg	22
002	CMR-EB14-2.0-2.4-190520	Solid	Chrysene	8270D	23		ug/kg	22
002	CMR-EB14-2.0-2.4-190520	Solid	Fluoranthene	8270D	24		ug/kg	22
002	CMR-EB14-2.0-2.4-190520	Solid	Indeno(1,2,3-c,d)pyrene	8270D	16		ug/kg	22
002	CMR-EB14-2.0-2.4-190520	Solid	2-Methylnaphthalene	8270D	29		ug/kg	23
002	CMR-EB14-2.0-2.4-190520	Solid	Naphthalene	8270D	34		ug/kg	23
002	CMR-EB14-2.0-2.4-190520	Solid	Phenanthrene	8270D	54		ug/kg	23
002	CMR-EB14-2.0-2.4-190520	Solid	Pyrene	8270D	35		ug/kg	23
002	CMR-EB14-2.0-2.4-190520	Solid	TEH	Montana EPH	16		mg/kg	24
002	CMR-EB14-2.0-2.4-190520	Solid	Antimony	6020B	1.1		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Arsenic	6020B	100		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Barium	6020B	120		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Beryllium	6020B	0.96		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Cadmium	6020B	3.4		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Chromium	6020B	13	B	mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Cobalt	6020B	11		mg/kg	28

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-EB14-2.0-2.4-190520	Solid	Copper	6020B	710		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Lead	6020B	55		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Mercury	7471B	0.13		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Nickel	6020B	17		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Selenium	6020B	0.97	J	mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Silver	6020B	1.2		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Vanadium	6020B	35		mg/kg	28
002	CMR-EB14-2.0-2.4-190520	Solid	Zinc	6020B	920		mg/kg	28
003	CMR-EB11-2.0-2.5-190520	Solid	Acetone	8260B	53		ug/kg	29
003	CMR-EB11-2.0-2.5-190520	Solid	Carbon disulfide	8260B	5.2	J	ug/kg	29
003	CMR-EB11-2.0-2.5-190520	Solid	Anthracene	8270D	41		ug/kg	31
003	CMR-EB11-2.0-2.5-190520	Solid	Benzo(a)anthracene	8270D	97		ug/kg	31
003	CMR-EB11-2.0-2.5-190520	Solid	Benzo(a)pyrene	8270D	61		ug/kg	31
003	CMR-EB11-2.0-2.5-190520	Solid	Benzo(b)fluoranthene	8270D	150		ug/kg	31
003	CMR-EB11-2.0-2.5-190520	Solid	Benzo(g,h,i)perylene	8270D	65		ug/kg	31
003	CMR-EB11-2.0-2.5-190520	Solid	Chrysene	8270D	76		ug/kg	31
003	CMR-EB11-2.0-2.5-190520	Solid	Fluoranthene	8270D	73		ug/kg	31
003	CMR-EB11-2.0-2.5-190520	Solid	Fluorene	8270D	9.1	J	ug/kg	31
003	CMR-EB11-2.0-2.5-190520	Solid	Indeno(1,2,3-c,d)pyrene	8270D	53		ug/kg	31
003	CMR-EB11-2.0-2.5-190520	Solid	2-Methylnaphthalene	8270D	55		ug/kg	32
003	CMR-EB11-2.0-2.5-190520	Solid	Naphthalene	8270D	47		ug/kg	32
003	CMR-EB11-2.0-2.5-190520	Solid	Phenanthrene	8270D	150		ug/kg	32
003	CMR-EB11-2.0-2.5-190520	Solid	Pyrene	8270D	130		ug/kg	32
003	CMR-EB11-2.0-2.5-190520	Solid	TEH	Montana EPH	18		mg/kg	33
003	CMR-EB11-2.0-2.5-190520	Solid	Antimony	6020B	2.6		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Arsenic	6020B	260		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Barium	6020B	130		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Beryllium	6020B	0.78		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Cadmium	6020B	1.5		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Chromium	6020B	7.2	B	mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Cobalt	6020B	24		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Copper	6020B	1600		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Lead	6020B	100		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Mercury	7471B	0.11		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Nickel	6020B	29		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Selenium	6020B	1.2	J	mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Silver	6020B	2.6		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Vanadium	6020B	24		mg/kg	37
003	CMR-EB11-2.0-2.5-190520	Solid	Zinc	6020B	580		mg/kg	37
004	CMR-EB11-2.5-3.0-190520	Solid	Cyclohexane	8260B	8200		ug/kg	38
004	CMR-EB11-2.5-3.0-190520	Solid	Ethylbenzene	8260B	14000		ug/kg	38
004	CMR-EB11-2.5-3.0-190520	Solid	Isopropylbenzene	8260B	4000	J	ug/kg	38
004	CMR-EB11-2.5-3.0-190520	Solid	Methylcyclohexane	8260B	47000		ug/kg	38
004	CMR-EB11-2.5-3.0-190520	Solid	Naphthalene	8260B	11000		ug/kg	38
004	CMR-EB11-2.5-3.0-190520	Solid	Xylenes (total)	8260B	72000		ug/kg	39
004	CMR-EB11-2.5-3.0-190520	Solid	m+p - Xylenes	8260B	57000		ug/kg	39
004	CMR-EB11-2.5-3.0-190520	Solid	o - Xylenes	8260B	15000		ug/kg	39
004	CMR-EB11-2.5-3.0-190520	Solid	Anthracene	8270D	260		ug/kg	40

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
004	CMR-EB11-2.5-3.0-190520	Solid	Benzo(a)pyrene	8270D	17	J	ug/kg	40
004	CMR-EB11-2.5-3.0-190520	Solid	Benzo(g,h,i)perylene	8270D	21	J	ug/kg	40
004	CMR-EB11-2.5-3.0-190520	Solid	Dibenzofuran	8270D	360		ug/kg	40
004	CMR-EB11-2.5-3.0-190520	Solid	Fluoranthene	8270D	64		ug/kg	40
004	CMR-EB11-2.5-3.0-190520	Solid	Fluorene	8270D	660		ug/kg	40
004	CMR-EB11-2.5-3.0-190520	Solid	2-Methylnaphthalene	8270D	22000		ug/kg	41
004	CMR-EB11-2.5-3.0-190520	Solid	Naphthalene	8270D	13000		ug/kg	41
004	CMR-EB11-2.5-3.0-190520	Solid	Phenanthrene	8270D	710		ug/kg	41
004	CMR-EB11-2.5-3.0-190520	Solid	Pyrene	8270D	100		ug/kg	41
004	CMR-EB11-2.5-3.0-190520	Solid	C19 - C36 Aliphatics	Montana EPH	180		mg/kg	42
004	CMR-EB11-2.5-3.0-190520	Solid	C9 - C18 Aliphatics	Montana EPH	1700		mg/kg	42
004	CMR-EB11-2.5-3.0-190520	Solid	C11 - C22 Aromatics	Montana EPH	710		mg/kg	43
004	CMR-EB11-2.5-3.0-190520	Solid	C5 - C8 Aliphatics,	Montana VPH	2000		mg/kg	44
004	CMR-EB11-2.5-3.0-190520	Solid	C9 - C12 Aliphatics,	Montana VPH	2200		mg/kg	44
004	CMR-EB11-2.5-3.0-190520	Solid	Benzene	Montana VPH	3.6	J	mg/kg	45
004	CMR-EB11-2.5-3.0-190520	Solid	C9 - C10 Aromatics	Montana VPH	1300		mg/kg	45
004	CMR-EB11-2.5-3.0-190520	Solid	Ethylbenzene	Montana VPH	60		mg/kg	45
004	CMR-EB11-2.5-3.0-190520	Solid	Naphthalene	Montana VPH	35		mg/kg	45
004	CMR-EB11-2.5-3.0-190520	Solid	Toluene	Montana VPH	9.4		mg/kg	45
004	CMR-EB11-2.5-3.0-190520	Solid	m+p - Xylenes	Montana VPH	98		mg/kg	45
004	CMR-EB11-2.5-3.0-190520	Solid	o - Xylenes	Montana VPH	48		mg/kg	45
004	CMR-EB11-2.5-3.0-190520	Solid	TPH	Montana VPH	5500		mg/kg	46
004	CMR-EB11-2.5-3.0-190520	Solid	Antimony	6020B	0.20	J	mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Arsenic	6020B	18		mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Barium	6020B	240		mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Beryllium	6020B	0.77		mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Cadmium	6020B	0.39		mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Chromium	6020B	17	B	mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Cobalt	6020B	5.6		mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Copper	6020B	42		mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Lead	6020B	14		mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Nickel	6020B	13		mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Selenium	6020B	0.59	J	mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Silver	6020B	0.087	J	mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Vanadium	6020B	44		mg/kg	47
004	CMR-EB11-2.5-3.0-190520	Solid	Zinc	6020B	170		mg/kg	47

(129 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-001
Description: CMR-EB14-0.5-1.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1110
% Solids: 90.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	05/30/2019 1545	JM1		18280	4.67

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	28		24	9.5	ug/kg	1
Benzene	71-43-2	8260B	ND		5.9	2.4	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		5.9	2.4	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		5.9	2.4	ug/kg	1
Bromoform	75-25-2	8260B	ND		5.9	2.4	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.9	3.6	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		24	4.7	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		5.9	2.4	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		5.9	2.4	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		5.9	2.4	ug/kg	1
Chloroethane	75-00-3	8260B	ND		5.9	2.4	ug/kg	1
Chloroform	67-66-3	8260B	ND		5.9	2.4	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.9	3.6	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		5.9	2.4	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.9	2.4	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		5.9	2.4	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.9	2.4	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.9	2.4	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.9	2.4	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.9	2.4	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		5.9	3.6	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		5.9	2.4	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		5.9	2.4	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		5.9	2.4	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.9	2.4	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.9	2.4	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		5.9	2.4	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.9	2.4	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.9	2.4	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		300	30	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		5.9	2.4	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		12	4.7	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		5.9	2.4	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		5.9	2.4	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.9	2.4	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		12	4.7	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		5.9	2.4	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		5.9	2.4	ug/kg	1
Naphthalene	91-20-3	8260B	ND		5.9	2.4	ug/kg	1
Styrene	100-42-5	8260B	ND		5.9	2.4	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.9	2.4	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		5.9	2.4	ug/kg	1
Toluene	108-88-3	8260B	ND		5.9	2.4	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.9	2.4	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-001
Description: CMR-EB14-0.5-1.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1110
% Solids: 90.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	05/30/2019 1545	JM1		18280	4.67

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.9	2.4	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.9	2.4	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.9	2.4	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.9	2.4	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		5.9	2.4	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		5.9	2.4	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		5.9	3.6	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		12	4.7	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		5.9	2.4	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		5.9	2.4	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		89	53-142
Bromofluorobenzene		92	47-138
Toluene-d8		108	68-124

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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-001
Description: CMR-EB14-0.5-1.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1110
% Solids: 90.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	06/01/2019 0107	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		29	8.8	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		29	10	ug/kg	1
Anthracene	120-12-7	8270D	ND		29	5.4	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		29	6.3	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	13	J	29	7.0	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		29	5.3	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	13	J	29	6.9	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		29	5.1	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		140	53	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		140	53	ug/kg	1
Carbazole	86-74-8	8270D	ND		140	53	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		140	53	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		140	53	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		140	53	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		140	53	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		140	53	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		140	53	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		140	53	ug/kg	1
Chrysene	218-01-9	8270D	ND		29	4.8	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		29	5.4	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		140	53	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		710	270	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		710	270	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		710	270	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		140	53	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		140	53	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		140	53	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		140	79	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		140	53	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		140	53	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		710	270	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		710	270	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		290	110	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		290	110	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		140	53	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		710	270	ug/kg	1
Fluoranthene	206-44-0	8270D	8.6	J	29	4.5	ug/kg	1
Fluorene	86-73-7	8270D	ND		29	6.1	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		140	53	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		140	53	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		710	270	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		140	53	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		29	11	ug/kg	1
Isophorone	78-59-1	8270D	ND		140	53	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-001
Description: CMR-EB14-0.5-1.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1110
% Solids: 90.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	06/01/2019 0107	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	13	J	29	11	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		140	53	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		290	110	ug/kg	1
Naphthalene	91-20-3	8270D	ND		29	10	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		290	110	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		290	110	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		290	110	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		140	53	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		290	110	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		710	270	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		140	53	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		140	53	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		710	270	ug/kg	1
Phenanthrene	85-01-8	8270D	12	J	29	7.7	ug/kg	1
Phenol	108-95-2	8270D	ND		140	53	ug/kg	1
Pyrene	129-00-0	8270D	22	J	29	5.3	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		350	110	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		710	110	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		710	270	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		140	53	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		140	53	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		69	33-102
2-Fluorophenol		67	35-115
Nitrobenzene-d5		77	22-109
Phenol-d5		66	33-122
Terphenyl-d14		80	41-120
2,4,6-Tribromophenol		74	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE21018-001
Description: CMR-EB14-0.5-1.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1110
% Solids: 90.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0142	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	53		10	10	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		86	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Description: CMR-EB14-0.5-1.5-190520
Date Sampled: 05/20/2019 1110
Date Received: 05/21/2019

Laboratory ID: UE21018-001
Matrix: Solid
% Solids: 90.3 05/21/2019 2353

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 1026	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	54		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		86	40-140
2-Fluorobiphenyl (fractionation 1)		90	40-140
o - Terphenyl (aromatic)		95	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE21018-001
Description: CMR-EB14-0.5-1.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1110
% Solids: 90.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1608	JJG		18529

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.95	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.95	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		102	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Description: CMR-EB14-0.5-1.5-190520
Date Sampled: 05/20/2019 1110
Date Received: 05/21/2019

Laboratory ID: UE21018-001
Matrix: Solid
% Solids: 90.3 05/21/2019 2353

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1608	JJG		18528

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.32	0.043	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.6	0.63	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.32	0.039	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.32	0.068	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.32	0.16	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.32	0.051	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.32	0.071	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.32	0.035	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE21018-001
Description: CMR-EB14-0.5-1.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1110
% Solids: 90.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1608	JJG		18527

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB14-0.5-1.5-190520
Date Sampled: 05/20/2019 1110
Date Received: 05/21/2019

Laboratory ID: UE21018-001
Matrix: Solid
% Solids: 90.3 05/21/2019 2353

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/24/2019 0507	JCF	05/23/2019 0810	17534
1	7471B	7471B	1	05/23/2019 1727	JMH	05/23/2019 1335	17526
2	3050B	6020B	1	05/24/2019 1144	JCF	05/23/2019 0810	17534

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.44	0.18	mg/kg	1
Arsenic	7440-38-2	6020B	9.1		0.44	0.18	mg/kg	1
Barium	7440-39-3	6020B	230		1.1	0.27	mg/kg	1
Beryllium	7440-41-7	6020B	0.67		0.088	0.030	mg/kg	1
Cadmium	7440-43-9	6020B	0.65		0.11	0.022	mg/kg	1
Chromium	7440-47-3	6020B	15	B	1.1	0.49	mg/kg	2
Cobalt	7440-48-4	6020B	5.3		1.1	0.26	mg/kg	1
Copper	7440-50-8	6020B	19		1.1	0.29	mg/kg	1
Lead	7439-92-1	6020B	13		0.22	0.060	mg/kg	1
Mercury	7439-97-6	7471B	0.024	J	0.083	0.020	mg/kg	1
Nickel	7440-02-0	6020B	12		1.1	0.26	mg/kg	1
Selenium	7782-49-2	6020B	0.43	J	1.1	0.42	mg/kg	1
Silver	7440-22-4	6020B	0.10	J	0.22	0.053	mg/kg	1
Vanadium	7440-62-2	6020B	34		1.1	0.22	mg/kg	1
Zinc	7440-66-6	6020B	120		2.2	0.44	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
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DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-002
Description: CMR-EB14-2.0-2.4-190520
Matrix: Solid
Date Sampled: 05/20/2019 1300
% Solids: 85.0 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	05/30/2019 1607	JM1		18280	5.28

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	10	J	22	8.9	ug/kg	1
Benzene	71-43-2	8260B	ND		5.6	2.2	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		5.6	2.2	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		5.6	2.2	ug/kg	1
Bromoform	75-25-2	8260B	ND		5.6	2.2	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.6	3.3	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		22	4.5	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		5.6	2.2	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		5.6	2.2	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		5.6	2.2	ug/kg	1
Chloroethane	75-00-3	8260B	ND		5.6	2.2	ug/kg	1
Chloroform	67-66-3	8260B	ND		5.6	2.2	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.6	3.3	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		5.6	2.2	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.6	2.2	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		5.6	2.2	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.6	2.2	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.6	2.2	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.6	2.2	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.6	2.2	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		5.6	3.3	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		5.6	2.2	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		5.6	2.2	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		5.6	2.2	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.6	2.2	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.6	2.2	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		5.6	2.2	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.6	2.2	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.6	2.2	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		280	28	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		5.6	2.2	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		11	4.5	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		5.6	2.2	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		5.6	2.2	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.6	2.2	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		11	4.5	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		5.6	2.2	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		5.6	2.2	ug/kg	1
Naphthalene	91-20-3	8260B	ND		5.6	2.2	ug/kg	1
Styrene	100-42-5	8260B	ND		5.6	2.2	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.6	2.2	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		5.6	2.2	ug/kg	1
Toluene	108-88-3	8260B	ND		5.6	2.2	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.6	2.2	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-002
Description: CMR-EB14-2.0-2.4-190520
Matrix: Solid
Date Sampled: 05/20/2019 1300
% Solids: 85.0 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	05/30/2019 1607	JM1		18280	5.28

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.6	2.2	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.6	2.2	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.6	2.2	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.6	2.2	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		5.6	2.2	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		5.6	2.2	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		5.6	3.3	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		11	4.5	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		5.6	2.2	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		5.6	2.2	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		78	47-138
Toluene-d8		122	68-124

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-002
Description: CMR-EB14-2.0-2.4-190520
Matrix: Solid
Date Sampled: 05/20/2019 1300
% Solids: 85.0 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/01/2019 0131	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		15	4.7	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		15	5.3	ug/kg	1
Anthracene	120-12-7	8270D	8.2	J	15	2.9	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	32		15	3.3	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	16		15	3.7	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	47		15	2.8	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	21		15	3.7	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	10	J	15	2.7	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		73	28	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		73	28	ug/kg	1
Carbazole	86-74-8	8270D	ND		73	28	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		73	28	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		73	28	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		73	28	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		73	28	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		73	28	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		73	28	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		73	28	ug/kg	1
Chrysene	218-01-9	8270D	23		15	2.5	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		15	2.9	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		73	28	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		380	140	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		380	140	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		380	140	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		73	28	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		73	28	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		73	28	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		73	42	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		73	28	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		73	28	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		380	140	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		380	140	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		150	56	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		150	56	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		73	28	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		380	140	ug/kg	1
Fluoranthene	206-44-0	8270D	24		15	2.4	ug/kg	1
Fluorene	86-73-7	8270D	ND		15	3.2	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		73	28	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		73	28	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		380	140	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		73	28	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	16		15	5.6	ug/kg	1
Isophorone	78-59-1	8270D	ND		73	28	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-002
Description: CMR-EB14-2.0-2.4-190520
Matrix: Solid
Date Sampled: 05/20/2019 1300
% Solids: 85.0 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/01/2019 0131	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	29		15	5.6	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		73	28	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		150	56	ug/kg	1
Naphthalene	91-20-3	8270D	34		15	5.5	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		150	56	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		150	56	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		150	56	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		73	28	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		150	56	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		380	140	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		73	28	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		73	28	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		380	140	ug/kg	1
Phenanthrene	85-01-8	8270D	54		15	4.0	ug/kg	1
Phenol	108-95-2	8270D	ND		73	28	ug/kg	1
Pyrene	129-00-0	8270D	35		15	2.8	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		190	56	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		380	56	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		380	140	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		73	28	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		73	28	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		70	33-102
2-Fluorophenol		76	35-115
Nitrobenzene-d5		81	22-109
Phenol-d5		80	33-122
Terphenyl-d14		91	41-120
2,4,6-Tribromophenol		82	30-117

LOQ = Limit of Quantitation
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DL = Detection Limit
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (screening)

Client: Ramboll US Corporation
Description: CMR-EB14-2.0-2.4-190520
Date Sampled: 05/20/2019 1300
Date Received: 05/21/2019

Laboratory ID: UE21018-002
Matrix: Solid
% Solids: 85.0 05/21/2019 2353

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	05/29/2019 1933	CHG	05/28/2019 1202	17905

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TEH		Montana EPH	16		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		109	40-140
o - Terphenyl (aromatic)		101	40-140
2-Fluorobiphenyl (fractionation 1)		104	40-140
2-Bromonaphthalene (fractionation 2)		100	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE21018-002
Description: CMR-EB14-2.0-2.4-190520
Matrix: Solid
Date Sampled: 05/20/2019 1300
% Solids: 85.0 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1637	JJG		18529

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		5.9	1.2	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		5.9	1.2	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	68	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Description: CMR-EB14-2.0-2.4-190520
Date Sampled: 05/20/2019 1300
Date Received: 05/21/2019

Laboratory ID: UE21018-002
Matrix: Solid
% Solids: 85.0 05/21/2019 2353

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1637	JJG		18528

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.39	0.053	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		2.0	0.78	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.39	0.048	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.39	0.084	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.39	0.20	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.39	0.063	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.39	0.088	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.39	0.044	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		71	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE21018-002
Description: CMR-EB14-2.0-2.4-190520
Matrix: Solid
Date Sampled: 05/20/2019 1300
% Solids: 85.0 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1637	JJG		18527

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	68	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-002
Description: CMR-EB14-2.0-2.4-190520
Matrix: Solid
Date Sampled: 05/20/2019 1300
% Solids: 85.0 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/24/2019 0513	JCF	05/23/2019 0810	17534
1	7471B	7471B	1	05/23/2019 1729	JMH	05/23/2019 1335	17526
2	3050B	6020B	1	05/24/2019 1202	JCF	05/23/2019 0810	17534
3	3050B	6020B	4	05/24/2019 1208	JCF	05/23/2019 0810	17534

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.1		0.56	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	100		0.56	0.22	mg/kg	1
Barium	7440-39-3	6020B	120		1.5	0.35	mg/kg	1
Beryllium	7440-41-7	6020B	0.96		0.11	0.038	mg/kg	1
Cadmium	7440-43-9	6020B	3.4		0.15	0.028	mg/kg	1
Chromium	7440-47-3	6020B	13	B	1.5	0.62	mg/kg	2
Cobalt	7440-48-4	6020B	11		1.5	0.34	mg/kg	1
Copper	7440-50-8	6020B	710		5.8	1.5	mg/kg	3
Lead	7439-92-1	6020B	55		0.28	0.076	mg/kg	1
Mercury	7439-97-6	7471B	0.13		0.088	0.021	mg/kg	1
Nickel	7440-02-0	6020B	17		1.5	0.34	mg/kg	1
Selenium	7782-49-2	6020B	0.97	J	1.5	0.53	mg/kg	1
Silver	7440-22-4	6020B	1.2		0.28	0.067	mg/kg	1
Vanadium	7440-62-2	6020B	35		1.5	0.28	mg/kg	1
Zinc	7440-66-6	6020B	920		11	2.2	mg/kg	3

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-003
Description: CMR-EB11-2.0-2.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1520
% Solids: 79.2 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	05/31/2019 1418	JM1		18374	3.14

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	53		40	16	ug/kg	2
Benzene	71-43-2	8260B	ND		10	4.0	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		10	4.0	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		10	4.0	ug/kg	2
Bromoform	75-25-2	8260B	ND		10	4.0	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		10	6.0	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		40	8.0	ug/kg	2
Carbon disulfide	75-15-0	8260B	5.2	J	10	4.0	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		10	4.0	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		10	4.0	ug/kg	2
Chloroethane	75-00-3	8260B	ND		10	4.0	ug/kg	2
Chloroform	67-66-3	8260B	ND		10	4.0	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		10	6.0	ug/kg	2
Cyclohexane	110-82-7	8260B	ND		10	4.0	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		10	4.0	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		10	4.0	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		10	4.0	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		10	4.0	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		10	4.0	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		10	4.0	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		10	6.0	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		10	4.0	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		10	4.0	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		10	4.0	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		10	4.0	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		10	4.0	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		10	4.0	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		10	4.0	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		10	4.0	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		500	50	ug/kg	2
Ethylbenzene	100-41-4	8260B	ND		10	4.0	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		20	8.0	ug/kg	2
Isopropylbenzene	98-82-8	8260B	ND		10	4.0	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		10	4.0	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		10	4.0	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		20	8.0	ug/kg	2
Methylcyclohexane	108-87-2	8260B	ND		10	4.0	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		10	4.0	ug/kg	2
Naphthalene	91-20-3	8260B	ND		10	4.0	ug/kg	2
Styrene	100-42-5	8260B	ND		10	4.0	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		10	4.0	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		10	4.0	ug/kg	2
Toluene	108-88-3	8260B	ND		10	4.0	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		10	4.0	ug/kg	2

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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-003
Description: CMR-EB11-2.0-2.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1520
% Solids: 79.2 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	05/31/2019 1418	JM1		18374	3.14

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		10	4.0	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		10	4.0	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		10	4.0	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		10	4.0	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		10	4.0	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		10	4.0	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		10	6.0	ug/kg	2
Xylenes (total)	1330-20-7	8260B	ND		20	8.0	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	ND		10	4.0	ug/kg	2
o - Xylenes	95-47-6	8260B	ND		10	4.0	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		101	53-142
Bromofluorobenzene		79	47-138
Toluene-d8		124	68-124

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-003
Description: CMR-EB11-2.0-2.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1520
% Solids: 79.2 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	05/30/2019 1824	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		17	5.2	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		17	5.9	ug/kg	1
Anthracene	120-12-7	8270D	41		17	3.2	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	97		17	3.7	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	61		17	4.1	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	150		17	3.1	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	65		17	4.1	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		17	3.0	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		81	31	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		81	31	ug/kg	1
Carbazole	86-74-8	8270D	ND		81	31	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		81	31	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		81	31	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		81	31	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		81	31	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		81	31	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		81	31	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		81	31	ug/kg	1
Chrysene	218-01-9	8270D	76		17	2.8	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		17	3.2	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		81	31	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		420	160	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		420	160	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		420	160	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		81	31	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		81	31	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		81	31	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		81	46	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		81	31	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		81	31	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		420	160	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		420	160	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		170	62	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		170	62	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		81	31	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		420	160	ug/kg	1
Fluoranthene	206-44-0	8270D	73		17	2.6	ug/kg	1
Fluorene	86-73-7	8270D	9.1	J	17	3.6	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		81	31	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		81	31	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		420	160	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		81	31	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	53		17	6.2	ug/kg	1
Isophorone	78-59-1	8270D	ND		81	31	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-003
Description: CMR-EB11-2.0-2.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1520
% Solids: 79.2 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	05/30/2019 1824	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	55		17	6.2	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		81	31	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		170	62	ug/kg	1
Naphthalene	91-20-3	8270D	47		17	6.0	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		170	62	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		170	62	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		170	62	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		81	31	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		170	62	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		420	160	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		81	31	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		81	31	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		420	160	ug/kg	1
Phenanthrene	85-01-8	8270D	150		17	4.5	ug/kg	1
Phenol	108-95-2	8270D	ND		81	31	ug/kg	1
Pyrene	129-00-0	8270D	130		17	3.1	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		210	62	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		420	62	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		420	160	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		81	31	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		81	31	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		82	33-102
2-Fluorophenol		82	35-115
Nitrobenzene-d5		101	22-109
Phenol-d5		83	33-122
Terphenyl-d14		92	41-120
2,4,6-Tribromophenol		92	30-117

LOQ = Limit of Quantitation
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Montana EPH (screening)

Client: Ramboll US Corporation
Description: CMR-EB11-2.0-2.5-190520
Date Sampled: 05/20/2019 1520
Date Received: 05/21/2019

Laboratory ID: UE21018-003
Matrix: Solid
% Solids: 79.2 05/21/2019 2353

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	05/29/2019 2003	CHG	05/28/2019 1202	17905

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TEH		Montana EPH	18		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		111	40-140
o - Terphenyl (aromatic)		104	40-140
2-Fluorobiphenyl (fractionation 1)		107	40-140
2-Bromonaphthalene (fractionation 2)		102	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE21018-003
Description: CMR-EB11-2.0-2.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1520
% Solids: 79.2 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1705	JJG		18529

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		6.8	1.4	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		6.8	1.4	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		75	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Description: CMR-EB11-2.0-2.5-190520
Date Sampled: 05/20/2019 1520
Date Received: 05/21/2019

Laboratory ID: UE21018-003
Matrix: Solid
% Solids: 79.2 05/21/2019 2353

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1705	JJG		18528

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.46	0.062	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		2.3	0.91	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.46	0.057	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.46	0.098	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.46	0.24	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.46	0.073	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.46	0.10	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.46	0.051	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		74	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE21018-003
Description: CMR-EB11-2.0-2.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1520
% Solids: 79.2 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1705	JJG		18527

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		76	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-003
Description: CMR-EB11-2.0-2.5-190520
Matrix: Solid
Date Sampled: 05/20/2019 1520
% Solids: 79.2 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/24/2019 0519	JCF	05/23/2019 0810	17534
1	7471B	7471B	1	05/23/2019 1731	JMH	05/23/2019 1335	17526
2	3050B	6020B	1	05/24/2019 1214	JCF	05/23/2019 0810	17534
3	3050B	6020B	10	05/24/2019 1220	JCF	05/23/2019 0810	17534

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	2.6		0.58	0.23	mg/kg	1
Arsenic	7440-38-2	6020B	260		0.58	0.23	mg/kg	1
Barium	7440-39-3	6020B	130		1.5	0.36	mg/kg	1
Beryllium	7440-41-7	6020B	0.78		0.12	0.040	mg/kg	1
Cadmium	7440-43-9	6020B	1.5		0.15	0.029	mg/kg	1
Chromium	7440-47-3	6020B	7.2	B	1.5	0.65	mg/kg	2
Cobalt	7440-48-4	6020B	24		1.5	0.35	mg/kg	1
Copper	7440-50-8	6020B	1600		15	3.8	mg/kg	3
Lead	7439-92-1	6020B	100		0.29	0.079	mg/kg	1
Mercury	7439-97-6	7471B	0.11		0.095	0.023	mg/kg	1
Nickel	7440-02-0	6020B	29		1.5	0.35	mg/kg	1
Selenium	7782-49-2	6020B	1.2	J	1.5	0.55	mg/kg	1
Silver	7440-22-4	6020B	2.6		0.29	0.070	mg/kg	1
Vanadium	7440-62-2	6020B	24		1.5	0.29	mg/kg	1
Zinc	7440-66-6	6020B	580		2.9	0.58	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-004
Description: CMR-EB11-2.5-3.0-190520
Matrix: Solid
Date Sampled: 05/20/2019 1525
% Solids: 82.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	20	05/29/2019 1858	JM1		18163	5.42

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		27000	5300	ug/kg	1
Benzene	71-43-2	8260B	ND		6700	2700	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		6700	2700	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		6700	2700	ug/kg	1
Bromoform	75-25-2	8260B	ND		6700	2700	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		6700	2700	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		27000	5300	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		6700	2700	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		6700	2700	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		6700	2700	ug/kg	1
Chloroethane	75-00-3	8260B	ND		6700	2700	ug/kg	1
Chloroform	67-66-3	8260B	ND		6700	2700	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		6700	2700	ug/kg	1
Cyclohexane	110-82-7	8260B	8200		6700	2700	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		6700	2700	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		6700	2700	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		6700	2700	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		6700	2700	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		6700	2700	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		6700	2700	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		6700	2700	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		6700	2700	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		6700	2700	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		6700	2700	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		6700	2700	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		6700	2700	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		6700	2700	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		6700	2700	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		6700	2700	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		330000	33000	ug/kg	1
Ethylbenzene	100-41-4	8260B	14000		6700	2700	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		13000	5300	ug/kg	1
Isopropylbenzene	98-82-8	8260B	4000	J	6700	2700	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		6700	2700	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		6700	2700	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		13000	5300	ug/kg	1
Methylcyclohexane	108-87-2	8260B	47000		6700	2700	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		6700	2700	ug/kg	1
Naphthalene	91-20-3	8260B	11000		6700	2700	ug/kg	1
Styrene	100-42-5	8260B	ND		6700	2700	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		6700	2700	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		6700	2700	ug/kg	1
Toluene	108-88-3	8260B	ND		6700	2700	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		6700	2700	ug/kg	1

LOQ = Limit of Quantitation
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Description: CMR-EB11-2.5-3.0-190520
Date Sampled: 05/20/2019 1525
Date Received: 05/21/2019

Laboratory ID: UE21018-004
Matrix: Solid
% Solids: 82.3 05/21/2019 2353

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	20	05/29/2019 1858	JM1		18163	5.42

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		6700	2700	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		6700	2700	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		6700	2700	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		6700	2700	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		6700	2700	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		6700	2700	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		6700	2700	ug/kg	1
Xylenes (total)	1330-20-7	8260B	72000		13000	5300	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	57000		6700	2700	ug/kg	1
o - Xylenes	95-47-6	8260B	15000		6700	2700	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		106	53-142
Bromofluorobenzene	N	146	47-138
Toluene-d8	N	134	68-124

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL

Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-004
Description: CMR-EB11-2.5-3.0-190520
Matrix: Solid
Date Sampled: 05/20/2019 1525
% Solids: 82.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	05/30/2019 1848	SCD	05/22/2019 1847	17544
2	3546	8270D	100	05/31/2019 2330	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		33	10	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		33	12	ug/kg	1
Anthracene	120-12-7	8270D	260		33	6.2	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		33	7.2	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	17	J	33	8.0	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		33	6.1	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	21	J	33	7.9	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		33	5.8	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		160	61	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		160	61	ug/kg	1
Carbazole	86-74-8	8270D	ND		160	61	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		160	61	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		160	61	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		160	61	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		160	61	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		160	61	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		160	61	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		160	61	ug/kg	1
Chrysene	218-01-9	8270D	ND		33	5.5	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		33	6.2	ug/kg	1
Dibenzofuran	132-64-9	8270D	360		160	61	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		810	300	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		810	300	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		810	300	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		160	61	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		160	61	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		160	61	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		160	90	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		160	61	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		160	61	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		810	300	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		810	300	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		330	120	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		330	120	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		160	61	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		810	300	ug/kg	1
Fluoranthene	206-44-0	8270D	64		33	5.1	ug/kg	1
Fluorene	86-73-7	8270D	660		33	6.9	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		160	61	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		160	61	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		810	300	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		160	61	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		33	12	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-004
Description: CMR-EB11-2.5-3.0-190520
Matrix: Solid
Date Sampled: 05/20/2019 1525
% Solids: 82.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	05/30/2019 1848	SCD	05/22/2019 1847	17544
2	3546	8270D	100	05/31/2019 2330	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		160	61	ug/kg	1
2-Methylnaphthalene	91-57-6	8270D	22000		330	120	ug/kg	2
2-Methylphenol	95-48-7	8270D	ND		160	61	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		330	120	ug/kg	1
Naphthalene	91-20-3	8270D	13000		330	120	ug/kg	2
2-Nitroaniline	88-74-4	8270D	ND		330	120	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		330	120	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		330	120	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		160	61	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		330	120	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		810	300	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		160	61	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		160	61	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		810	300	ug/kg	1
Phenanthrene	85-01-8	8270D	710		33	8.8	ug/kg	1
Phenol	108-95-2	8270D	ND		160	61	ug/kg	1
Pyrene	129-00-0	8270D	100		33	6.1	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		400	120	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		810	120	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		810	300	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		160	61	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		160	61	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Run 1 Acceptance Limits	Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl	N	137	33-102	N	121	33-102
2-Fluorophenol	N	17	35-115		37	35-115
Nitrobenzene-d5	N	1960	22-109	N	600	22-109
Phenol-d5	N	188	33-122		39	33-122
Terphenyl-d14		84	41-120	N	132	41-120
2,4,6-Tribromophenol	N	134	30-117		109	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE21018-004
Description: CMR-EB11-2.5-3.0-190520
Matrix: Solid
Date Sampled: 05/20/2019 1525
% Solids: 82.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0211	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	180		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	1700		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		69	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE21018-004
Description: CMR-EB11-2.5-3.0-190520
Matrix: Solid
Date Sampled: 05/20/2019 1525
% Solids: 82.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 1055	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	710		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		80	40-140
2-Fluorobiphenyl (fractionation 1)		140	40-140
o - Terphenyl (aromatic)		129	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE21018-004
Description: CMR-EB11-2.5-3.0-190520
Matrix: Solid
Date Sampled: 05/20/2019 1525
% Solids: 82.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/03/2019 1733	JJG		18529

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	2000		100	20	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	2200		100	20	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	60	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE21018-004
Description: CMR-EB11-2.5-3.0-190520
Matrix: Solid
Date Sampled: 05/20/2019 1525
% Solids: 82.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/03/2019 1733	JJG		18528

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	3.6	J	6.7	0.91	mg/kg	1
C9 - C10 Aromatics		Montana VPH	1300		34	13	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	60		6.7	0.83	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		6.7	1.5	mg/kg	1
Naphthalene	91-20-3	Montana VPH	35		6.7	3.5	mg/kg	1
Toluene	108-88-3	Montana VPH	9.4		6.7	1.1	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	98		6.7	1.5	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	48		6.7	0.75	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	61	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE21018-004
Description: CMR-EB11-2.5-3.0-190520
Matrix: Solid
Date Sampled: 05/20/2019 1525
% Solids: 82.3 05/21/2019 2353
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/03/2019 1733	JJG		18527

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	5500		180	35	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB11-2.5-3.0-190520
Date Sampled: 05/20/2019 1525
Date Received: 05/21/2019

Laboratory ID: UE21018-004
Matrix: Solid
% Solids: 82.3 05/21/2019 2353

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/24/2019 0525	JCF	05/23/2019 0810	17534
1	7471B	7471B	1	05/23/2019 1734	JMH	05/23/2019 1335	17526
2	3050B	6020B	1	05/24/2019 1225	JCF	05/23/2019 0810	17534

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.20	J	0.51	0.20	mg/kg	1
Arsenic	7440-38-2	6020B	18		0.51	0.20	mg/kg	1
Barium	7440-39-3	6020B	240		1.3	0.32	mg/kg	1
Beryllium	7440-41-7	6020B	0.77		0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	0.39		0.13	0.026	mg/kg	1
Chromium	7440-47-3	6020B	17	B	1.3	0.56	mg/kg	2
Cobalt	7440-48-4	6020B	5.6		1.3	0.31	mg/kg	1
Copper	7440-50-8	6020B	42		1.3	0.33	mg/kg	1
Lead	7439-92-1	6020B	14		0.26	0.069	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.095	0.023	mg/kg	1
Nickel	7440-02-0	6020B	13		1.3	0.31	mg/kg	1
Selenium	7782-49-2	6020B	0.59	J	1.3	0.48	mg/kg	1
Silver	7440-22-4	6020B	0.087	J	0.26	0.061	mg/kg	1
Vanadium	7440-62-2	6020B	44		1.3	0.26	mg/kg	1
Zinc	7440-66-6	6020B	170		2.6	0.51	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-005
Description: TB-03-20190520
Matrix: Aqueous
Date Sampled: 05/20/2019
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/23/2019 2318	KGT		17730

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE21018-005
Description: TB-03-20190520
Matrix: Aqueous
Date Sampled: 05/20/2019
Date Received: 05/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/23/2019 2318	KGT		17730

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		99	70-130
Toluene-d8		104	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17730-001
Batch: 17730
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	05/23/2019 2231
Benzene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Bromochloromethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Bromodichloromethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Bromoform	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	05/23/2019 2231
2-Butanone (MEK)	ND		1	10	2.0	ug/L	05/23/2019 2231
Carbon disulfide	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Chlorobenzene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Chloroethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Chloroform	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Cyclohexane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Dibromochloromethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	05/23/2019 2231
1,4-Dioxane	ND		1	20	13	ug/L	05/23/2019 2231
Ethylbenzene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
2-Hexanone	ND		1	10	2.0	ug/L	05/23/2019 2231
Isopropylbenzene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Methyl acetate	ND		1	1.0	0.40	ug/L	05/23/2019 2231
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	05/23/2019 2231
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	05/23/2019 2231
Methylcyclohexane	ND		1	5.0	0.40	ug/L	05/23/2019 2231
Methylene chloride	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Naphthalene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Styrene	ND		1	0.50	0.41	ug/L	05/23/2019 2231
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Tetrachloroethene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Toluene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	05/23/2019 2231

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17730-001
Batch: 17730
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Trichloroethene	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Vinyl chloride	ND		1	0.50	0.40	ug/L	05/23/2019 2231
Xylenes (total)	ND		1	1.0	0.40	ug/L	05/23/2019 2231
m+p - Xylenes	ND		1	0.50	0.40	ug/L	05/23/2019 2231
o - Xylenes	ND		1	0.50	0.40	ug/L	05/23/2019 2231

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17730-002
Batch: 17730
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	89		1	89	60-140	05/23/2019 2124
Benzene	50	47		1	95	70-130	05/23/2019 2124
Bromochloromethane	50	46		1	91	70-130	05/23/2019 2124
Bromodichloromethane	50	46		1	92	70-130	05/23/2019 2124
Bromoform	50	45		1	91	70-130	05/23/2019 2124
Bromomethane (Methyl bromide)	50	49		1	98	70-130	05/23/2019 2124
2-Butanone (MEK)	100	94		1	94	70-130	05/23/2019 2124
Carbon disulfide	50	42		1	85	70-130	05/23/2019 2124
Carbon tetrachloride	50	45		1	90	70-130	05/23/2019 2124
Chlorobenzene	50	47		1	94	70-130	05/23/2019 2124
Chloroethane	50	46		1	93	70-130	05/23/2019 2124
Chloroform	50	44		1	87	70-130	05/23/2019 2124
Chloromethane (Methyl chloride)	50	46		1	93	60-140	05/23/2019 2124
Cyclohexane	50	53		1	106	70-130	05/23/2019 2124
1,2-Dibromo-3-chloropropane (DBCP)	50	41		1	82	70-130	05/23/2019 2124
Dibromochloromethane	50	48		1	95	70-130	05/23/2019 2124
1,2-Dibromoethane (EDB)	50	50		1	100	70-130	05/23/2019 2124
1,2-Dichlorobenzene	50	46		1	92	70-130	05/23/2019 2124
1,3-Dichlorobenzene	50	46		1	91	70-130	05/23/2019 2124
1,4-Dichlorobenzene	50	45		1	90	70-130	05/23/2019 2124
Dichlorodifluoromethane	50	39		1	78	60-140	05/23/2019 2124
1,1-Dichloroethane	50	45		1	90	70-130	05/23/2019 2124
1,2-Dichloroethane	50	46		1	93	70-130	05/23/2019 2124
1,1-Dichloroethene	50	43		1	86	70-130	05/23/2019 2124
cis-1,2-Dichloroethene	50	46		1	92	70-130	05/23/2019 2124
trans-1,2-Dichloroethene	50	46		1	92	70-130	05/23/2019 2124
1,2-Dichloropropane	50	48		1	97	70-130	05/23/2019 2124
cis-1,3-Dichloropropene	50	50		1	100	70-130	05/23/2019 2124
trans-1,3-Dichloropropene	50	49		1	97	70-130	05/23/2019 2124
1,4-Dioxane	500	400		1	80	60-140	05/23/2019 2124
Ethylbenzene	50	48		1	96	70-130	05/23/2019 2124
2-Hexanone	100	100		1	100	70-130	05/23/2019 2124
Isopropylbenzene	50	49		1	98	70-130	05/23/2019 2124
Methyl acetate	50	43		1	85	70-130	05/23/2019 2124
Methyl tertiary butyl ether (MTBE)	50	41		1	81	70-130	05/23/2019 2124
4-Methyl-2-pentanone	100	96		1	96	70-130	05/23/2019 2124
Methylcyclohexane	50	51		1	102	70-130	05/23/2019 2124
Methylene chloride	50	43		1	85	70-130	05/23/2019 2124
Naphthalene	50	47		1	94	70-130	05/23/2019 2124
Styrene	50	51		1	101	70-130	05/23/2019 2124
1,1,2,2-Tetrachloroethane	50	46		1	92	70-130	05/23/2019 2124
Tetrachloroethene	50	48		1	96	70-130	05/23/2019 2124
Toluene	50	46		1	92	70-130	05/23/2019 2124
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	43		1	87	70-130	05/23/2019 2124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17730-002
Batch: 17730
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	45		1	90	70-130	05/23/2019 2124
1,2,4-Trichlorobenzene	50	45		1	90	70-130	05/23/2019 2124
1,1,1-Trichloroethane	50	41		1	83	70-130	05/23/2019 2124
1,1,2-Trichloroethane	50	49		1	97	70-130	05/23/2019 2124
Trichloroethene	50	50		1	99	70-130	05/23/2019 2124
Trichlorofluoromethane	50	41		1	83	70-130	05/23/2019 2124
Vinyl chloride	50	40		1	80	70-130	05/23/2019 2124
Xylenes (total)	100	98		1	98	70-130	05/23/2019 2124
m+p - Xylenes	50	49		1	98	70-130	05/23/2019 2124
o - Xylenes	50	49		1	98	70-130	05/23/2019 2124

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18163-001
Batch: 18163
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	05/29/2019 1006
Benzene	ND		1	250	100	ug/kg	05/29/2019 1006
Bromochloromethane	ND		1	250	100	ug/kg	05/29/2019 1006
Bromodichloromethane	ND		1	250	100	ug/kg	05/29/2019 1006
Bromoform	ND		1	250	100	ug/kg	05/29/2019 1006
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	05/29/2019 1006
2-Butanone (MEK)	ND		1	1000	200	ug/kg	05/29/2019 1006
Carbon disulfide	ND		1	250	100	ug/kg	05/29/2019 1006
Carbon tetrachloride	ND		1	250	100	ug/kg	05/29/2019 1006
Chlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
Chloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
Chloroform	ND		1	250	100	ug/kg	05/29/2019 1006
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	05/29/2019 1006
Cyclohexane	ND		1	250	100	ug/kg	05/29/2019 1006
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	05/29/2019 1006
Dibromochloromethane	ND		1	250	100	ug/kg	05/29/2019 1006
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	05/29/2019 1006
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
Dichlorodifluoromethane	ND		1	250	100	ug/kg	05/29/2019 1006
1,1-Dichloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
1,2-Dichloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
1,1-Dichloroethene	ND		1	250	100	ug/kg	05/29/2019 1006
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/29/2019 1006
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/29/2019 1006
1,2-Dichloropropane	ND		1	250	100	ug/kg	05/29/2019 1006
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/29/2019 1006
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/29/2019 1006
1,4-Dioxane	ND		1	13000	1300	ug/kg	05/29/2019 1006
Ethylbenzene	ND		1	250	100	ug/kg	05/29/2019 1006
2-Hexanone	ND		1	500	200	ug/kg	05/29/2019 1006
Isopropylbenzene	ND		1	250	100	ug/kg	05/29/2019 1006
Methyl acetate	ND		1	250	100	ug/kg	05/29/2019 1006
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	05/29/2019 1006
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	05/29/2019 1006
Methylcyclohexane	ND		1	250	100	ug/kg	05/29/2019 1006
Methylene chloride	ND		1	250	100	ug/kg	05/29/2019 1006
Naphthalene	ND		1	250	100	ug/kg	05/29/2019 1006
Styrene	ND		1	250	100	ug/kg	05/29/2019 1006
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
Tetrachloroethene	ND		1	250	100	ug/kg	05/29/2019 1006
Toluene	ND		1	250	100	ug/kg	05/29/2019 1006
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	05/29/2019 1006

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18163-001
Batch: 18163
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
Trichloroethene	ND		1	250	100	ug/kg	05/29/2019 1006
Trichlorofluoromethane	ND		1	250	100	ug/kg	05/29/2019 1006
Vinyl chloride	ND		1	250	100	ug/kg	05/29/2019 1006
Xylenes (total)	ND		1	500	200	ug/kg	05/29/2019 1006
m+p - Xylenes	ND		1	250	100	ug/kg	05/29/2019 1006
o - Xylenes	ND		1	250	100	ug/kg	05/29/2019 1006

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		100	53-142
Bromofluorobenzene		110	47-138
Toluene-d8		108	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18163-002
Batch: 18163
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	5100		1	101	60-140	05/29/2019 0944
Benzene	2500	2700		1	106	70-130	05/29/2019 0944
Bromochloromethane	2500	2500		1	100	70-130	05/29/2019 0944
Bromodichloromethane	2500	2500		1	101	70-130	05/29/2019 0944
Bromoform	2500	2200		1	88	70-130	05/29/2019 0944
Bromomethane (Methyl bromide)	2500	2100		1	84	70-130	05/29/2019 0944
2-Butanone (MEK)	5000	5100		1	102	60-140	05/29/2019 0944
Carbon disulfide	2500	2400		1	98	70-130	05/29/2019 0944
Carbon tetrachloride	2500	2600		1	104	70-130	05/29/2019 0944
Chlorobenzene	2500	2600		1	103	70-130	05/29/2019 0944
Chloroethane	2500	2700		1	108	70-130	05/29/2019 0944
Chloroform	2500	2500		1	100	70-130	05/29/2019 0944
Chloromethane (Methyl chloride)	2500	2300		1	93	60-140	05/29/2019 0944
Cyclohexane	2500	3000		1	120	70-130	05/29/2019 0944
1,2-Dibromo-3-chloropropane (DBCP)	2500	2100		1	85	70-130	05/29/2019 0944
Dibromochloromethane	2500	2400		1	97	70-130	05/29/2019 0944
1,2-Dibromoethane (EDB)	2500	2500		1	101	70-130	05/29/2019 0944
1,2-Dichlorobenzene	2500	2500		1	100	70-130	05/29/2019 0944
1,3-Dichlorobenzene	2500	2600		1	103	70-130	05/29/2019 0944
1,4-Dichlorobenzene	2500	2600		1	102	70-130	05/29/2019 0944
Dichlorodifluoromethane	2500	1900		1	78	60-140	05/29/2019 0944
1,1-Dichloroethane	2500	2500		1	101	70-130	05/29/2019 0944
1,2-Dichloroethane	2500	2600		1	102	70-130	05/29/2019 0944
1,1-Dichloroethene	2500	2600		1	103	70-130	05/29/2019 0944
cis-1,2-Dichloroethene	2500	2600		1	103	70-130	05/29/2019 0944
trans-1,2-Dichloroethene	2500	2700		1	106	70-130	05/29/2019 0944
1,2-Dichloropropane	2500	2600		1	105	70-130	05/29/2019 0944
cis-1,3-Dichloropropene	2500	2600		1	104	70-130	05/29/2019 0944
trans-1,3-Dichloropropene	2500	2500		1	100	70-130	05/29/2019 0944
1,4-Dioxane	25000	23000		1	91	60-140	05/29/2019 0944
Ethylbenzene	2500	2700		1	109	70-130	05/29/2019 0944
2-Hexanone	5000	5100		1	103	70-130	05/29/2019 0944
Isopropylbenzene	2500	2800		1	111	70-130	05/29/2019 0944
Methyl acetate	2500	2400		1	98	70-130	05/29/2019 0944
Methyl tertiary butyl ether (MTBE)	2500	2400		1	97	70-130	05/29/2019 0944
4-Methyl-2-pentanone	5000	4800		1	95	70-130	05/29/2019 0944
Methylcyclohexane	2500	3100		1	124	70-130	05/29/2019 0944
Methylene chloride	2500	2400		1	96	70-130	05/29/2019 0944
Naphthalene	2500	2500		1	98	70-130	05/29/2019 0944
Styrene	2500	2700		1	107	70-130	05/29/2019 0944
1,1,2,2-Tetrachloroethane	2500	2300		1	94	70-130	05/29/2019 0944
Tetrachloroethene	2500	2800		1	111	70-130	05/29/2019 0944
Toluene	2500	2700		1	108	70-130	05/29/2019 0944
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	2800		1	110	70-130	05/29/2019 0944

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18163-002
Batch: 18163
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2600		1	106	70-130	05/29/2019 0944
1,2,4-Trichlorobenzene	2500	2700		1	108	70-130	05/29/2019 0944
1,1,1-Trichloroethane	2500	2600		1	103	70-130	05/29/2019 0944
1,1,2-Trichloroethane	2500	2500		1	102	70-130	05/29/2019 0944
Trichloroethene	2500	2800		1	112	70-130	05/29/2019 0944
Trichlorofluoromethane	2500	2800		1	111	70-130	05/29/2019 0944
Vinyl chloride	2500	2500		1	102	70-130	05/29/2019 0944
Xylenes (total)	5000	5500		1	109	70-130	05/29/2019 0944
m+p - Xylenes	2500	2800		1	111	70-130	05/29/2019 0944
o - Xylenes	2500	2700		1	108	70-130	05/29/2019 0944

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	53-142
Bromofluorobenzene		101	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18280-001
Batch: 18280
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	05/30/2019 1002
Benzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Bromochloromethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Bromoform	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	05/30/2019 1002
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	05/30/2019 1002
Carbon disulfide	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Chlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Chloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Chloroform	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	05/30/2019 1002
Cyclohexane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	05/30/2019 1002
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,4-Dioxane	ND		1	250	25	ug/kg	05/30/2019 1002
Ethylbenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
2-Hexanone	ND		1	10	4.0	ug/kg	05/30/2019 1002
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Methyl acetate	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	05/30/2019 1002
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Methylene chloride	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Naphthalene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Styrene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Toluene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18280-001
Batch: 18280
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Trichloroethene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Vinyl chloride	ND		1	5.0	3.0	ug/kg	05/30/2019 1002
Xylenes (total)	ND		1	10	4.0	ug/kg	05/30/2019 1002
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
o - Xylenes	ND		1	5.0	2.0	ug/kg	05/30/2019 1002

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	53-142
Bromofluorobenzene		108	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18280-002
Batch: 18280
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	120		1	116	60-140	05/30/2019 0940
Benzene	50	51		1	101	70-130	05/30/2019 0940
Bromochloromethane	50	50		1	100	70-130	05/30/2019 0940
Bromodichloromethane	50	50		1	100	70-130	05/30/2019 0940
Bromoform	50	47		1	94	70-130	05/30/2019 0940
Bromomethane (Methyl bromide)	50	51		1	103	70-130	05/30/2019 0940
2-Butanone (MEK)	100	120		1	116	60-140	05/30/2019 0940
Carbon disulfide	50	47		1	94	70-130	05/30/2019 0940
Carbon tetrachloride	50	48		1	97	70-130	05/30/2019 0940
Chlorobenzene	50	49		1	99	70-130	05/30/2019 0940
Chloroethane	50	55		1	109	70-130	05/30/2019 0940
Chloroform	50	49		1	97	70-130	05/30/2019 0940
Chloromethane (Methyl chloride)	50	52		1	103	60-140	05/30/2019 0940
Cyclohexane	50	52		1	104	70-130	05/30/2019 0940
1,2-Dibromo-3-chloropropane (DBCP)	50	48		1	97	70-130	05/30/2019 0940
Dibromochloromethane	50	49		1	99	70-130	05/30/2019 0940
1,2-Dibromoethane (EDB)	50	53		1	106	70-130	05/30/2019 0940
1,2-Dichlorobenzene	50	49		1	97	70-130	05/30/2019 0940
1,3-Dichlorobenzene	50	49		1	98	70-130	05/30/2019 0940
1,4-Dichlorobenzene	50	49		1	97	70-130	05/30/2019 0940
Dichlorodifluoromethane	50	48		1	96	60-140	05/30/2019 0940
1,1-Dichloroethane	50	49		1	99	70-130	05/30/2019 0940
1,2-Dichloroethane	50	52		1	103	70-130	05/30/2019 0940
1,1-Dichloroethene	50	49		1	97	70-130	05/30/2019 0940
cis-1,2-Dichloroethene	50	50		1	101	70-130	05/30/2019 0940
trans-1,2-Dichloroethene	50	50		1	101	70-130	05/30/2019 0940
1,2-Dichloropropane	50	51		1	102	70-130	05/30/2019 0940
cis-1,3-Dichloropropene	50	51		1	103	70-130	05/30/2019 0940
trans-1,3-Dichloropropene	50	50		1	100	70-130	05/30/2019 0940
1,4-Dioxane	500	480		1	95	60-140	05/30/2019 0940
Ethylbenzene	50	51		1	103	70-130	05/30/2019 0940
2-Hexanone	100	120		1	118	70-130	05/30/2019 0940
Isopropylbenzene	50	51		1	102	70-130	05/30/2019 0940
Methyl acetate	50	53		1	105	70-130	05/30/2019 0940
Methyl tertiary butyl ether (MTBE)	50	50		1	100	70-130	05/30/2019 0940
4-Methyl-2-pentanone	100	110		1	108	70-130	05/30/2019 0940
Methylcyclohexane	50	51		1	102	70-130	05/30/2019 0940
Methylene chloride	50	48		1	95	70-130	05/30/2019 0940
Naphthalene	50	51		1	103	70-130	05/30/2019 0940
Styrene	50	51		1	101	70-130	05/30/2019 0940
1,1,2,2-Tetrachloroethane	50	50		1	100	70-130	05/30/2019 0940
Tetrachloroethene	50	50		1	100	70-130	05/30/2019 0940
Toluene	50	51		1	101	70-130	05/30/2019 0940
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	47		1	93	70-130	05/30/2019 0940

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18280-002
Batch: 18280
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	51		1	101	70-130	05/30/2019 0940
1,2,4-Trichlorobenzene	50	51		1	102	70-130	05/30/2019 0940
1,1,1-Trichloroethane	50	48		1	96	70-130	05/30/2019 0940
1,1,2-Trichloroethane	50	52		1	104	70-130	05/30/2019 0940
Trichloroethene	50	53		1	107	70-130	05/30/2019 0940
Trichlorofluoromethane	50	53		1	105	70-130	05/30/2019 0940
Vinyl chloride	50	52		1	104	70-130	05/30/2019 0940
Xylenes (total)	100	100		1	103	70-130	05/30/2019 0940
m+p - Xylenes	50	52		1	104	70-130	05/30/2019 0940
o - Xylenes	50	51		1	102	70-130	05/30/2019 0940

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		86	53-142
Bromofluorobenzene		107	47-138
Toluene-d8		97	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18374-001
Batch: 18374
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	05/31/2019 1050
Benzene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Bromochloromethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Bromoform	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	05/31/2019 1050
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	05/31/2019 1050
Carbon disulfide	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Chlorobenzene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Chloroethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Chloroform	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	05/31/2019 1050
Cyclohexane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	05/31/2019 1050
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,4-Dioxane	ND		1	250	25	ug/kg	05/31/2019 1050
Ethylbenzene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
2-Hexanone	ND		1	10	4.0	ug/kg	05/31/2019 1050
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Methyl acetate	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	05/31/2019 1050
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Methylene chloride	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Naphthalene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Styrene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Toluene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18374-001
Batch: 18374
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Trichloroethene	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
Vinyl chloride	ND		1	5.0	3.0	ug/kg	05/31/2019 1050
Xylenes (total)	ND		1	10	4.0	ug/kg	05/31/2019 1050
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	05/31/2019 1050
o - Xylenes	ND		1	5.0	2.0	ug/kg	05/31/2019 1050

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18374-002
Batch: 18374
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	100		1	103	60-140	05/31/2019 1028
Benzene	50	50		1	101	70-130	05/31/2019 1028
Bromochloromethane	50	50		1	99	70-130	05/31/2019 1028
Bromodichloromethane	50	49		1	98	70-130	05/31/2019 1028
Bromoform	50	45		1	91	70-130	05/31/2019 1028
Bromomethane (Methyl bromide)	50	48		1	96	70-130	05/31/2019 1028
2-Butanone (MEK)	100	99		1	99	60-140	05/31/2019 1028
Carbon disulfide	50	46		1	92	70-130	05/31/2019 1028
Carbon tetrachloride	50	48		1	96	70-130	05/31/2019 1028
Chlorobenzene	50	49		1	97	70-130	05/31/2019 1028
Chloroethane	50	51		1	103	70-130	05/31/2019 1028
Chloroform	50	48		1	96	70-130	05/31/2019 1028
Chloromethane (Methyl chloride)	50	49		1	99	60-140	05/31/2019 1028
Cyclohexane	50	51		1	101	70-130	05/31/2019 1028
1,2-Dibromo-3-chloropropane (DBCP)	50	45		1	90	70-130	05/31/2019 1028
Dibromochloromethane	50	49		1	98	70-130	05/31/2019 1028
1,2-Dibromoethane (EDB)	50	52		1	104	70-130	05/31/2019 1028
1,2-Dichlorobenzene	50	48		1	95	70-130	05/31/2019 1028
1,3-Dichlorobenzene	50	48		1	95	70-130	05/31/2019 1028
1,4-Dichlorobenzene	50	47		1	94	70-130	05/31/2019 1028
Dichlorodifluoromethane	50	44		1	88	60-140	05/31/2019 1028
1,1-Dichloroethane	50	49		1	98	70-130	05/31/2019 1028
1,2-Dichloroethane	50	51		1	101	70-130	05/31/2019 1028
1,1-Dichloroethene	50	48		1	96	70-130	05/31/2019 1028
cis-1,2-Dichloroethene	50	49		1	99	70-130	05/31/2019 1028
trans-1,2-Dichloroethene	50	50		1	99	70-130	05/31/2019 1028
1,2-Dichloropropane	50	50		1	101	70-130	05/31/2019 1028
cis-1,3-Dichloropropene	50	50		1	100	70-130	05/31/2019 1028
trans-1,3-Dichloropropene	50	49		1	98	70-130	05/31/2019 1028
1,4-Dioxane	500	450		1	90	60-140	05/31/2019 1028
Ethylbenzene	50	51		1	102	70-130	05/31/2019 1028
2-Hexanone	100	100		1	101	70-130	05/31/2019 1028
Isopropylbenzene	50	50		1	101	70-130	05/31/2019 1028
Methyl acetate	50	49		1	98	70-130	05/31/2019 1028
Methyl tertiary butyl ether (MTBE)	50	48		1	96	70-130	05/31/2019 1028
4-Methyl-2-pentanone	100	99		1	99	70-130	05/31/2019 1028
Methylcyclohexane	50	50		1	99	70-130	05/31/2019 1028
Methylene chloride	50	47		1	93	70-130	05/31/2019 1028
Naphthalene	50	46		1	92	70-130	05/31/2019 1028
Styrene	50	49		1	98	70-130	05/31/2019 1028
1,1,2,2-Tetrachloroethane	50	50		1	100	70-130	05/31/2019 1028
Tetrachloroethene	50	50		1	99	70-130	05/31/2019 1028
Toluene	50	51		1	102	70-130	05/31/2019 1028
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	46		1	92	70-130	05/31/2019 1028

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18374-002
Batch: 18374
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	45		1	90	70-130	05/31/2019 1028
1,2,4-Trichlorobenzene	50	45		1	90	70-130	05/31/2019 1028
1,1,1-Trichloroethane	50	48		1	97	70-130	05/31/2019 1028
1,1,2-Trichloroethane	50	51		1	102	70-130	05/31/2019 1028
Trichloroethene	50	53		1	106	70-130	05/31/2019 1028
Trichlorofluoromethane	50	48		1	96	70-130	05/31/2019 1028
Vinyl chloride	50	48		1	97	70-130	05/31/2019 1028
Xylenes (total)	100	100		1	101	70-130	05/31/2019 1028
m+p - Xylenes	50	51		1	102	70-130	05/31/2019 1028
o - Xylenes	50	50		1	100	70-130	05/31/2019 1028

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		104	47-138
Toluene-d8		102	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ17544-001
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	05/30/2019 1216
Acenaphthylene	ND		1	2.7	0.95	ug/kg	05/30/2019 1216
Anthracene	ND		1	2.7	0.51	ug/kg	05/30/2019 1216
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	05/30/2019 1216
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	05/30/2019 1216
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	05/30/2019 1216
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	05/30/2019 1216
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	05/30/2019 1216
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
Carbazole	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	05/30/2019 1216
2-Chlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
Chrysene	ND		1	2.7	0.45	ug/kg	05/30/2019 1216
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	05/30/2019 1216
Dibenzofuran	ND		1	13	5.0	ug/kg	05/30/2019 1216
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	05/30/2019 1216
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
Diethylphthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
Dimethyl phthalate	ND		1	13	7.4	ug/kg	05/30/2019 1216
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	05/30/2019 1216
2,4-Dinitrophenol	ND		1	67	25	ug/kg	05/30/2019 1216
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	05/30/2019 1216
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	05/30/2019 1216
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	05/30/2019 1216
Fluoranthene	ND		1	2.7	0.42	ug/kg	05/30/2019 1216
Fluorene	ND		1	2.7	0.57	ug/kg	05/30/2019 1216
Hexachlorobenzene	ND		1	13	5.0	ug/kg	05/30/2019 1216
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	05/30/2019 1216
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	05/30/2019 1216
Hexachloroethane	ND		1	13	5.0	ug/kg	05/30/2019 1216
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	05/30/2019 1216
Isophorone	ND		1	13	5.0	ug/kg	05/30/2019 1216

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ17544-001
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	05/30/2019 1216
2-Methylphenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
3+4-Methylphenol	ND		1	27	10	ug/kg	05/30/2019 1216
Naphthalene	ND		1	2.7	0.97	ug/kg	05/30/2019 1216
2-Nitroaniline	ND		1	27	10	ug/kg	05/30/2019 1216
3-Nitroaniline	ND		1	27	10	ug/kg	05/30/2019 1216
4-Nitroaniline	ND		1	27	10	ug/kg	05/30/2019 1216
Nitrobenzene	ND		1	13	5.0	ug/kg	05/30/2019 1216
2-Nitrophenol	ND		1	27	10	ug/kg	05/30/2019 1216
4-Nitrophenol	ND		1	67	25	ug/kg	05/30/2019 1216
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	05/30/2019 1216
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	05/30/2019 1216
Pentachlorophenol	ND		1	67	25	ug/kg	05/30/2019 1216
Phenanthrene	ND		1	2.7	0.72	ug/kg	05/30/2019 1216
Phenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
Pyrene	ND		1	2.7	0.50	ug/kg	05/30/2019 1216
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	05/30/2019 1216
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	05/30/2019 1216
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		68	33-102
2-Fluorophenol		74	35-115
Nitrobenzene-d5		87	22-109
Phenol-d5		73	33-122
Terphenyl-d14		103	41-120
2,4,6-Tribromophenol		94	30-117

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17544-002
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	90		1	68	12-111	05/30/2019 1240
Acenaphthylene	130	91		1	69	44-122	05/30/2019 1240
Anthracene	130	100		1	76	16-122	05/30/2019 1240
Benzo(a)anthracene	130	110		1	85	40-121	05/30/2019 1240
Benzo(a)pyrene	130	120		1	88	36-114	05/30/2019 1240
Benzo(b)fluoranthene	130	120		1	90	38-123	05/30/2019 1240
Benzo(g,h,i)perylene	130	130		1	98	43-120	05/30/2019 1240
Benzo(k)fluoranthene	130	110		1	84	40-126	05/30/2019 1240
4-Bromophenyl phenyl ether	130	93		1	70	30-130	05/30/2019 1240
Butyl benzyl phthalate	130	140		1	102	48-124	05/30/2019 1240
Carbazole	130	110		1	84	47-125	05/30/2019 1240
bis (2-Chloro-1-methylethyl) ether	130	97		1	73	41-113	05/30/2019 1240
4-Chloro-3-methyl phenol	130	100		1	76	48-120	05/30/2019 1240
bis(2-Chloroethoxy)methane	130	88		1	66	38-115	05/30/2019 1240
bis(2-Chloroethyl)ether	130	89		1	67	46-122	05/30/2019 1240
2-Chloronaphthalene	130	87		1	65	37-106	05/30/2019 1240
2-Chlorophenol	130	87		1	65	44-122	05/30/2019 1240
4-Chlorophenyl phenyl ether	130	88		1	66	32-107	05/30/2019 1240
Chrysene	130	110		1	82	41-124	05/30/2019 1240
Dibenzo(a,h)anthracene	130	120		1	93	38-125	05/30/2019 1240
Dibenzofuran	130	89		1	67	45-128	05/30/2019 1240
1,2-Dichlorobenzene	130	76		1	57	39-94	05/30/2019 1240
1,3-Dichlorobenzene	130	75		1	57	30-130	05/30/2019 1240
1,4-Dichlorobenzene	130	75		1	57	39-92	05/30/2019 1240
3,3'-Dichlorobenzidine	130	53		1	40	10-119	05/30/2019 1240
2,4-Dichlorophenol	130	86		1	64	30-96	05/30/2019 1240
Diethylphthalate	130	100		1	77	30-130	05/30/2019 1240
Dimethyl phthalate	130	96		1	72	24-127	05/30/2019 1240
2,4-Dimethylphenol	130	110		1	85	30-130	05/30/2019 1240
Di-n-butyl phthalate	130	110		1	85	35-108	05/30/2019 1240
4,6-Dinitro-2-methylphenol	130	94		1	71	53-150	05/30/2019 1240
2,4-Dinitrophenol	270	140		1	54	32-115	05/30/2019 1240
2,4-Dinitrotoluene	130	100		1	76	40-130	05/30/2019 1240
2,6-Dinitrotoluene	130	97		1	73	46-118	05/30/2019 1240
Di-n-octylphthalate	130	130		1	98	49-118	05/30/2019 1240
bis(2-Ethylhexyl)phthalate	130	130		1	97	33-123	05/30/2019 1240
Fluoranthene	130	110		1	82	26-133	05/30/2019 1240
Fluorene	130	91		1	68	19-108	05/30/2019 1240
Hexachlorobenzene	130	93		1	70	10-125	05/30/2019 1240
Hexachlorobutadiene	130	75		1	57	47-116	05/30/2019 1240
Hexachlorocyclopentadiene	670	360		1	54	48-127	05/30/2019 1240
Hexachloroethane	130	77		1	58	18-154	05/30/2019 1240
Indeno(1,2,3-c,d)pyrene	130	120		1	92	42-123	05/30/2019 1240
Isophorone	130	97		1	73	30-130	05/30/2019 1240

LOQ = Limit of Quantitation
DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17544-002
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	84		1	63	10-107	05/30/2019 1240
2-Methylphenol	130	100		1	76	33-103	05/30/2019 1240
3+4-Methylphenol	130	100		1	77	18-121	05/30/2019 1240
Naphthalene	130	83		1	62	10-112	05/30/2019 1240
2-Nitroaniline	130	110		1	81	46-128	05/30/2019 1240
3-Nitroaniline	130	76		1	57	30-130	05/30/2019 1240
4-Nitroaniline	130	100		1	75	51-129	05/30/2019 1240
Nitrobenzene	130	95		1	71	49-142	05/30/2019 1240
2-Nitrophenol	130	85		1	64	33-114	05/30/2019 1240
4-Nitrophenol	270	260		1	97	27-138	05/30/2019 1240
N-Nitrosodi-n-propylamine	130	97		1	73	45-112	05/30/2019 1240
N-Nitrosodiphenylamine (Diphenylamine)	130	110		1	81	49-123	05/30/2019 1240
Pentachlorophenol	270	210		1	79	36-108	05/30/2019 1240
Phenanthrene	130	99		1	75	16-123	05/30/2019 1240
Phenol	130	100		1	77	39-108	05/30/2019 1240
Pyrene	130	120		1	87	34-121	05/30/2019 1240
1,2,4,5-Tetrachlorobenzene	130	83		1	63	30-130	05/30/2019 1240
2,3,4,6-Tetrachlorophenol	130	95		1	72	53-125	05/30/2019 1240
1,2,4-Trichlorobenzene	130	79		1	60	30-130	05/30/2019 1240
2,4,5-Trichlorophenol	130	98		1	74	32-105	05/30/2019 1240
2,4,6-Trichlorophenol	130	95		1	72	31-102	05/30/2019 1240

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		65	33-102
2-Fluorophenol		69	35-115
Nitrobenzene-d5		75	22-109
Phenol-d5		70	33-122
Terphenyl-d14		101	41-120
2,4,6-Tribromophenol		88	30-117

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (screening) - MB

Sample ID: UQ17905-001
Batch: 17905
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TEH	ND		1	10	10	mg/kg	05/29/2019 1336

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		93	40-140
o - Terphenyl (aromatic)		85	40-140
2-Fluorobiphenyl (fractionation 1)		96	40-140
2-Bromonaphthalene (fractionation 2)		93	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (screening) - LCS

Sample ID: UQ17905-002
Batch: 17905
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TEH	160	150		1	99	40-140	05/29/2019 1406

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		89	40-140
o - Terphenyl (aromatic)		89	40-140
2-Fluorobiphenyl (fractionation 1)		94	40-140
2-Bromonaphthalene (fractionation 2)		91	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (screening) - LCSD

Sample ID: UQ17905-003
Batch: 17905
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TEH	160	150		1	97	2.4	40-140	25	05/29/2019 1435

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		88	40-140
o - Terphenyl (aromatic)		89	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
2-Bromonaphthalene (fractionation 2)		95	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ18272-001
Batch: 18272
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1502

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/03/2019 2020
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/03/2019 2020

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		95	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ18272-002
Batch: 18272
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1502

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	44		1	110	40-140	06/03/2019 2049
C9 - C18 Aliphatics	30	24		1	81	40-140	06/03/2019 2049

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		102	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ18272-003
Batch: 18272
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1502

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	40		1	99	9.9	40-140	25	06/03/2019 2118
C9 - C18 Aliphatics	30	22		1	74	8.7	40-140	25	06/03/2019 2118

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		93	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ18274-001
Batch: 18274
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/04/2019 0506

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		80	40-140
2-Fluorobiphenyl (fractionation 1)		82	40-140
o - Terphenyl (aromatic)		82	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ18274-002
Batch: 18274
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	83		1	98	40-140	06/04/2019 0535

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		95	40-140
o - Terphenyl (aromatic)		99	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ18274-003
Batch: 18274
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	79		1	93	5.2	40-140	25	06/04/2019 0604

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		95	40-140
o - Terphenyl (aromatic)		94	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ18527-001
Batch: 18527
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/03/2019 1359

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ18527-002
Batch: 18527
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	20		1	107	70-130	06/03/2019 1302

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ18527-003
Batch: 18527
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	21		1	110	2.5	70-130	25	06/03/2019 1330

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ18528-001
Batch: 18528
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	06/03/2019 1359
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/03/2019 1359
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/03/2019 1359
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/03/2019 1359
Naphthalene	ND		1	0.25	0.13	mg/kg	06/03/2019 1359
Toluene	ND		1	0.25	0.040	mg/kg	06/03/2019 1359
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/03/2019 1359
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/03/2019 1359

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ18528-002
Batch: 18528
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.3		1	104	70-130	06/03/2019 1302
C9 - C10 Aromatics	1.3	1.4		1	112	70-130	06/03/2019 1302
Ethylbenzene	1.3	1.3		1	104	70-130	06/03/2019 1302
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	06/03/2019 1302
Naphthalene	1.3	1.1		1	88	70-130	06/03/2019 1302
Toluene	1.3	1.3		1	104	70-130	06/03/2019 1302
m+p - Xylenes	2.5	2.7		1	108	70-130	06/03/2019 1302
o - Xylenes	1.3	1.3		1	104	70-130	06/03/2019 1302

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ18528-003
Batch: 18528
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	0.00	70-130	25	06/03/2019 1330
C9 - C10 Aromatics	1.3	1.4		1	112	0.00	70-130	25	06/03/2019 1330
Ethylbenzene	1.3	1.3		1	104	0.00	70-130	25	06/03/2019 1330
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	8.7	70-130	25	06/03/2019 1330
Naphthalene	1.3	1.1		1	88	0.00	70-130	25	06/03/2019 1330
Toluene	1.3	1.3		1	104	0.00	70-130	25	06/03/2019 1330
m+p - Xylenes	2.5	2.7		1	108	0.00	70-130	25	06/03/2019 1330
o - Xylenes	1.3	1.3		1	104	0.00	70-130	25	06/03/2019 1330

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ18529-001
Batch: 18529
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/03/2019 1359
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/03/2019 1359

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ18529-002
Batch: 18529
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.3		1	106	70-130	06/03/2019 1302
C9 - C12 Aliphatics, Adjusted	3.8	4.1		1	109	70-130	06/03/2019 1302

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ18529-003
Batch: 18529
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.6		1	112	5.2	70-130	25	06/03/2019 1330
C9 - C12 Aliphatics, Adjusted	3.8	4.2		1	112	2.9	70-130	25	06/03/2019 1330

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ17534-001
Batch: 17534
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 05/23/2019 810

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	05/23/2019 2111
Arsenic	ND		1	0.50	0.20	mg/kg	05/23/2019 2111
Barium	ND		1	1.3	0.31	mg/kg	05/23/2019 2111
Beryllium	ND		1	0.10	0.034	mg/kg	05/23/2019 2111
Cadmium	ND		1	0.13	0.025	mg/kg	05/23/2019 2111
Chromium	0.60	J	1	1.3	0.55	mg/kg	05/24/2019 1108
Cobalt	ND		1	1.3	0.30	mg/kg	05/23/2019 2111
Copper	ND		1	1.3	0.33	mg/kg	05/23/2019 2111
Lead	ND		1	0.25	0.068	mg/kg	05/23/2019 2111
Nickel	ND		1	1.3	0.30	mg/kg	05/23/2019 2111
Selenium	ND		1	1.3	0.47	mg/kg	05/23/2019 2111
Silver	ND		1	0.25	0.060	mg/kg	05/23/2019 2111
Vanadium	ND		1	1.3	0.25	mg/kg	05/23/2019 2111
Zinc	ND		1	2.5	0.50	mg/kg	05/23/2019 2111

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ17534-002
Batch: 17534
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 05/23/2019 810

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	46		1	92	80-120	05/23/2019 2117
Arsenic	50	45		1	91	80-120	05/23/2019 2117
Barium	50	49		1	98	80-120	05/23/2019 2117
Beryllium	50	50		1	101	80-120	05/23/2019 2117
Cadmium	50	46		1	92	80-120	05/23/2019 2117
Chromium	50	51		1	103	80-120	05/24/2019 1114
Cobalt	50	49		1	99	80-120	05/23/2019 2117
Copper	50	49		1	98	80-120	05/23/2019 2117
Lead	50	49		1	98	80-120	05/23/2019 2117
Nickel	50	47		1	94	80-120	05/23/2019 2117
Selenium	50	44		1	87	80-120	05/23/2019 2117
Silver	50	52		1	105	80-120	05/23/2019 2117
Vanadium	50	50		1	99	80-120	05/23/2019 2117
Zinc	50	46		1	91	80-120	05/23/2019 2117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ17526-001
Batch: 17526
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 05/23/2019 1335

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	05/23/2019 1713

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ17526-002
Batch: 17526
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 05/23/2019 1335

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.84		1	101	80-120	05/23/2019 1720

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody

and

Miscellaneous Documents

SHEALY

Chain of Custody Record

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106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
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Number 91646

Client	Ramboll US Corporation
Address	7500 College Boulevard Suite 925
City	Overland Park
State	KS
Zip Code	66210
Project Name	CMR RJAIM East Rail
Project No.	1690012344-003 Task 221
P.O. No.	
Report to Contact	Michael Wilson
Sampler's Signature	x [signature]
Printed Name	Josh Myers
Telephone No. / E-mail	316-644-2303 / mwilson@ramboll.com
Quote No.	
Page	1 of 1

UE21018

KMN2

Analysis (Attach list if more space is needed)

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Grab/Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	Unpres	H2SO4	HNO3	HCl	NaOH	Sodium Bisulfate	MeOH	VOC	VPH	EPH	Metals	SVOC/EPH	SVOC	Remarks / Cooler I.D.
EB14-0.5-1.5-190520	5/20/2019	1110	G		X		2					1	2	X	X		X	X		
CMR-EB06-190516 (struck through)	5/16/2019	1650	G	X			2		1	9				X	X	X	X		X	[initials]
CMR-EB01-190516 (struck through)	5/16/2019	1730	G	X			2		1	9				X	X	X	X		X	[initials]
CMR-EB14-2.0-2.4-190520	5/20/2019	1300	G		X		2					1	2	X	X		X	X		
CMR-EB11-2.0-2.5-190520	↓	1520	G		X		2					1	2	X	X		X	X		
CMR-EB11-2.5-3.0-190520	↓	1525	G		X		2					1	2	X	X		X	X		
TB-03	N/A	N/A	-	X						2				X						Trip Blank

Turn Around Time Required (Prior lab approval required for expedited TAT.) ☒ Standard ☐ Rush (Specify)

Sample Disposal ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☒ Unknown

QC Requirements (Specify)

Relinquished by	Date	Time	Received by	Date	Time
1. Relinquished by: Josh Myers [signature]	5/20/19	1700	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: FedEx	5-21-19	1106	4. Laboratory received by: Erin Brown [signature]	5-21-19	1106

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack
Receipt Temp. 3.3 °C

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

Document Number: F-AD-133 Effective Date: 08-01-2014

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Sample Receipt Checklist (SRC)

Client: Ramboll Cooler Inspected by/date: ETB / 5/21/19 Lot #: UE21018

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

3.3 / 3.3 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☐ No	☑ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: ETB Date: 5/21/19

Comments:

MEMO

Date: **July 17, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UE22021, 3 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UE22021 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB02-0.5-1.0-190521	UE22021-001
CMR-EB02-5.5-6.0-190521	UE22021-002
CMR-EB02-5.5-6.0-190521-FD	UE22021-003
TB-04-20190507	UE22021-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

Field Duplicate Samples
One field duplicate sample was submitted with project samples in order to evaluate precision. In general analytes detected above the reporting limit showed acceptable precision. However, benzene, anthracene, fluorene, 2-methylnaphthalene, naphthalene, and C11-C22 aromatics had results with RPDs above 50% indicating a possible precision issue. Due to this, all detected benzene, anthracene, fluorene, 2-methylnaphthalene, naphthalene, and C11-C22 aromatics results were validated as estimated (J).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UE22021

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 10, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Chromium detected in a method blank below the RL. All project sample detections were above the blank result and the RL, no action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	One field duplicate sample submitted. Results showed acceptable agreement.
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UE22021

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 10, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	No issues	No issues
Deuterated Monitoring Compound or Surrogate Spikes	SVOC surrogates out due to dilutions. No action taken.	Surrogates out on two samples likely due to high analyte concentrations. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with sample results. No action taken.	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	No issues	No issues
Field Duplicates	One field duplicate submitted with samples. Detections showed acceptable agreement with the exception of benzene, anthracene, fluorene, 2-methylnaphthalene, and naphthalene which had RPDs above 50%. All benzene, anthracene, fluorene, 2-methylnaphthalene, and naphthalene results validated as estimated (J).	One field duplicate submitted with samples. Detections showed acceptable agreement with the exception of C11-C22 aromatics which had an RPD above 50%. All C11-C22 aromatics results validated as estimated (J).
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/A
Other Non-conformances	No issues	No other non-conformances noted during analysis or review.

SDG No. UE22021

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 10, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Overall Assessment of Data	All benzene, anthracene, fluorene, 2-methylnaphthalene, and naphthalene results validated as estimated (J).	All C11-C22 aromatics results validated as estimated (J).

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003 Task 221

Lot Number:**UE22021**

Date Completed:06/06/2019
Revision Date: 06/10/2019

06/10/2019 1:44 PM
Approved and released by:
Project Manager: Kelly M. Nance

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UE22021

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

This report supersedes and replaces any prior reports issued under this lot number. The details of the applicable revisions are detailed in a Report Revision Notice provided under separate cover.

Semivolatiles
Samples -002 and -003 were diluted due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Sample -001 was diluted 10X due to the sample matrix. The reporting limits have been raised accordingly.

Montana EPH
Samples -002 and -003 had the surrogate 2-fluorobiphenyl recovered outside of the acceptance limits due to objective evidence of matrix interference.

Montana VPH
Samples -002 and -003 had multiple compounds detected in the VPH analysis above the LOQ. Naphthalene was detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same time as MTBE and naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Samples -002 and -003 were diluted due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Metals
The method blank associated with batch 17534 had chromium detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for chromium have been

flagged with a “B” qualifier.

The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -001 had multiple metals recovered outside of the acceptance limits. Additionally, the RPD for lead exceeded the acceptance limit. The laboratory control sample (LCS) was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample Summary
Ramboll US Corporation
Lot Number: UE22021

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB02-0.5-1.0-190521	Solid	05/21/2019 1105	05/22/2019
002	CMR-EB02-5.5-6.0-190521	Solid	05/21/2019 1120	05/22/2019
003	CMR-EB02-5.5-6.0-190521-FD	Solid	05/21/2019 1125	05/22/2019
004	TB-04-20190521	Aqueous	05/21/2019	05/22/2019

(4 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UE22021

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB02-0.5-1.0-190521	Solid	Acetone	8260B	34		ug/kg	8
001	CMR-EB02-0.5-1.0-190521	Solid	Benzene	8260B	8.2		ug/kg	8
001	CMR-EB02-0.5-1.0-190521	Solid	Cyclohexane	8260B	120		ug/kg	8
001	CMR-EB02-0.5-1.0-190521	Solid	Methyl acetate	8260B	29		ug/kg	8
001	CMR-EB02-0.5-1.0-190521	Solid	Methylcyclohexane	8260B	150		ug/kg	8
001	CMR-EB02-0.5-1.0-190521	Solid	Xylenes (total)	8260B	31		ug/kg	9
001	CMR-EB02-0.5-1.0-190521	Solid	m+p - Xylenes	8260B	5.6		ug/kg	9
001	CMR-EB02-0.5-1.0-190521	Solid	o - Xylenes	8260B	25		ug/kg	9
001	CMR-EB02-0.5-1.0-190521	Solid	Benzo(a)pyrene	8270D	9.9	J	ug/kg	10
001	CMR-EB02-0.5-1.0-190521	Solid	Benzo(g,h,i)perylene	8270D	11	J	ug/kg	10
001	CMR-EB02-0.5-1.0-190521	Solid	Fluoranthene	8270D	7.7	J	ug/kg	10
001	CMR-EB02-0.5-1.0-190521	Solid	2-Methylnaphthalene	8270D	17	J	ug/kg	11
001	CMR-EB02-0.5-1.0-190521	Solid	Naphthalene	8270D	12	J	ug/kg	11
001	CMR-EB02-0.5-1.0-190521	Solid	Pyrene	8270D	11	J	ug/kg	11
001	CMR-EB02-0.5-1.0-190521	Solid	C19 - C36 Aliphatics	Montana EPH	73		mg/kg	12
001	CMR-EB02-0.5-1.0-190521	Solid	C9 - C18 Aliphatics	Montana EPH	41		mg/kg	12
001	CMR-EB02-0.5-1.0-190521	Solid	C11 - C22 Aromatics	Montana EPH	40		mg/kg	13
001	CMR-EB02-0.5-1.0-190521	Solid	Arsenic	6020B	6.8		mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Barium	6020B	500		mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Beryllium	6020B	0.73		mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Cadmium	6020B	0.27		mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Chromium	6020B	17	B	mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Cobalt	6020B	6.3		mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Copper	6020B	26		mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Lead	6020B	68		mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Nickel	6020B	15		mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Selenium	6020B	0.58	J	mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Silver	6020B	0.092	J	mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Vanadium	6020B	44		mg/kg	17
001	CMR-EB02-0.5-1.0-190521	Solid	Zinc	6020B	75		mg/kg	17
002	CMR-EB02-5.5-6.0-190521	Solid	Benzene	8260B	23000		ug/kg	18
002	CMR-EB02-5.5-6.0-190521	Solid	Cyclohexane	8260B	53000		ug/kg	18
002	CMR-EB02-5.5-6.0-190521	Solid	Ethylbenzene	8260B	44000		ug/kg	18
002	CMR-EB02-5.5-6.0-190521	Solid	Isopropylbenzene	8260B	11000		ug/kg	18
002	CMR-EB02-5.5-6.0-190521	Solid	Methylcyclohexane	8260B	97000		ug/kg	18
002	CMR-EB02-5.5-6.0-190521	Solid	Naphthalene	8260B	15000		ug/kg	18
002	CMR-EB02-5.5-6.0-190521	Solid	Toluene	8260B	4200	J	ug/kg	18
002	CMR-EB02-5.5-6.0-190521	Solid	Xylenes (total)	8260B	52000		ug/kg	19
002	CMR-EB02-5.5-6.0-190521	Solid	m+p - Xylenes	8260B	48000		ug/kg	19
002	CMR-EB02-5.5-6.0-190521	Solid	o - Xylenes	8260B	4200	J	ug/kg	19
002	CMR-EB02-5.5-6.0-190521	Solid	Anthracene	8270D	480		ug/kg	20
002	CMR-EB02-5.5-6.0-190521	Solid	Dibenzofuran	8270D	750	J	ug/kg	20
002	CMR-EB02-5.5-6.0-190521	Solid	Fluorene	8270D	1700		ug/kg	20
002	CMR-EB02-5.5-6.0-190521	Solid	2-Methylnaphthalene	8270D	13000		ug/kg	21
002	CMR-EB02-5.5-6.0-190521	Solid	Naphthalene	8270D	9900		ug/kg	21

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-EB02-5.5-6.0-190521	Solid	Phenanthrene	8270D	1500		ug/kg	21
002	CMR-EB02-5.5-6.0-190521	Solid	Pyrene	8270D	140	J	ug/kg	21
002	CMR-EB02-5.5-6.0-190521	Solid	C19 - C36 Aliphatics	Montana EPH	470		mg/kg	22
002	CMR-EB02-5.5-6.0-190521	Solid	C9 - C18 Aliphatics	Montana EPH	3600		mg/kg	22
002	CMR-EB02-5.5-6.0-190521	Solid	C11 - C22 Aromatics	Montana EPH	1400		mg/kg	23
002	CMR-EB02-5.5-6.0-190521	Solid	C5 - C8 Aliphatics,	Montana VPH	5400		mg/kg	24
002	CMR-EB02-5.5-6.0-190521	Solid	C9 - C12 Aliphatics,	Montana VPH	3100		mg/kg	24
002	CMR-EB02-5.5-6.0-190521	Solid	Benzene	Montana VPH	68		mg/kg	25
002	CMR-EB02-5.5-6.0-190521	Solid	C9 - C10 Aromatics	Montana VPH	2100		mg/kg	25
002	CMR-EB02-5.5-6.0-190521	Solid	Ethylbenzene	Montana VPH	160		mg/kg	25
002	CMR-EB02-5.5-6.0-190521	Solid	Naphthalene	Montana VPH	93		mg/kg	25
002	CMR-EB02-5.5-6.0-190521	Solid	Toluene	Montana VPH	21		mg/kg	25
002	CMR-EB02-5.5-6.0-190521	Solid	m+p - Xylenes	Montana VPH	120		mg/kg	25
002	CMR-EB02-5.5-6.0-190521	Solid	o - Xylenes	Montana VPH	29		mg/kg	25
002	CMR-EB02-5.5-6.0-190521	Solid	TPH	Montana VPH	11000		mg/kg	26
002	CMR-EB02-5.5-6.0-190521	Solid	Arsenic	6020B	6.5		mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Barium	6020B	360		mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Beryllium	6020B	0.71		mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Cadmium	6020B	0.16		mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Chromium	6020B	17	B	mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Cobalt	6020B	6.6		mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Copper	6020B	16		mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Lead	6020B	17		mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Nickel	6020B	15		mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Silver	6020B	0.087	J	mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Vanadium	6020B	36		mg/kg	27
002	CMR-EB02-5.5-6.0-190521	Solid	Zinc	6020B	45		mg/kg	27
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Benzene	8260B	24000		ug/kg	28
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Cyclohexane	8260B	50000		ug/kg	28
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Ethylbenzene	8260B	69000		ug/kg	28
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Isopropylbenzene	8260B	16000		ug/kg	28
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Methylcyclohexane	8260B	110000		ug/kg	28
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Naphthalene	8260B	28000		ug/kg	28
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Toluene	8260B	4800	J	ug/kg	28
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Xylenes (total)	8260B	67000		ug/kg	29
003	CMR-EB02-5.5-6.0-190521-FD	Solid	m+p - Xylenes	8260B	59000		ug/kg	29
003	CMR-EB02-5.5-6.0-190521-FD	Solid	o - Xylenes	8260B	8400		ug/kg	29
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Anthracene	8270D	1800		ug/kg	30
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Benzo(a)anthracene	8270D	330		ug/kg	30
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Chrysene	8270D	470		ug/kg	30
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Dibenzofuran	8270D	1600		ug/kg	30
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Fluoranthene	8270D	570		ug/kg	30
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Fluorene	8270D	3900		ug/kg	30
003	CMR-EB02-5.5-6.0-190521-FD	Solid	2-Methylnaphthalene	8270D	56000		ug/kg	31
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Naphthalene	8270D	31000		ug/kg	31
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Phenanthrene	8270D	7700		ug/kg	31
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Pyrene	8270D	1600		ug/kg	31
003	CMR-EB02-5.5-6.0-190521-FD	Solid	C19 - C36 Aliphatics	Montana EPH	340		mg/kg	32

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-EB02-5.5-6.0-190521-FD	Solid	C9 - C18 Aliphatics	Montana EPH	2600		mg/kg	32
003	CMR-EB02-5.5-6.0-190521-FD	Solid	C11 - C22 Aromatics	Montana EPH	1700		mg/kg	33
003	CMR-EB02-5.5-6.0-190521-FD	Solid	C5 - C8 Aliphatics,	Montana VPH	3600		mg/kg	34
003	CMR-EB02-5.5-6.0-190521-FD	Solid	C9 - C12 Aliphatics,	Montana VPH	1800		mg/kg	34
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Benzene	Montana VPH	46		mg/kg	35
003	CMR-EB02-5.5-6.0-190521-FD	Solid	C9 - C10 Aromatics	Montana VPH	1300		mg/kg	35
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Ethylbenzene	Montana VPH	120		mg/kg	35
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Naphthalene	Montana VPH	79		mg/kg	35
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Toluene	Montana VPH	19		mg/kg	35
003	CMR-EB02-5.5-6.0-190521-FD	Solid	m+p - Xylenes	Montana VPH	76		mg/kg	35
003	CMR-EB02-5.5-6.0-190521-FD	Solid	o - Xylenes	Montana VPH	29		mg/kg	35
003	CMR-EB02-5.5-6.0-190521-FD	Solid	TPH	Montana VPH	6400		mg/kg	36
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Arsenic	6020B	6.8		mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Barium	6020B	290		mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Beryllium	6020B	0.65		mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Cadmium	6020B	0.20		mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Chromium	6020B	16	B	mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Cobalt	6020B	5.6		mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Copper	6020B	13		mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Lead	6020B	16		mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Nickel	6020B	13		mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Selenium	6020B	0.57	J	mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Silver	6020B	0.11	J	mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Vanadium	6020B	37		mg/kg	37
003	CMR-EB02-5.5-6.0-190521-FD	Solid	Zinc	6020B	40		mg/kg	37

(118 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-001
Description: CMR-EB02-0.5-1.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1105
% Solids: 86.6 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	05/30/2019 1651	JM1		18280	6.39

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	34		18	7.2	ug/kg	1
Benzene	71-43-2	8260B	8.2		4.5	1.8	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.5	1.8	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.5	1.8	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.5	1.8	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.5	2.7	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		18	3.6	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.5	1.8	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.5	1.8	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.5	1.8	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.5	1.8	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.5	1.8	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.5	2.7	ug/kg	1
Cyclohexane	110-82-7	8260B	120		4.5	1.8	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.5	1.8	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.5	1.8	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.5	1.8	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.5	1.8	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.5	2.7	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.5	1.8	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.5	1.8	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.5	1.8	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.5	1.8	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.5	1.8	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.5	1.8	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		230	23	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.5	1.8	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.0	3.6	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.5	1.8	ug/kg	1
Methyl acetate	79-20-9	8260B	29		4.5	1.8	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.5	1.8	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.0	3.6	ug/kg	1
Methylcyclohexane	108-87-2	8260B	150		4.5	1.8	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.5	1.8	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.5	1.8	ug/kg	1
Styrene	100-42-5	8260B	ND		4.5	1.8	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.5	1.8	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.5	1.8	ug/kg	1
Toluene	108-88-3	8260B	ND		4.5	1.8	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.5	1.8	ug/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-001
Description: CMR-EB02-0.5-1.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1105
% Solids: 86.6 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	05/30/2019 1651	JM1		18280	6.39

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.5	1.8	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.5	1.8	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.5	1.8	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.5	1.8	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.5	1.8	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.5	1.8	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.5	2.7	ug/kg	1
Xylenes (total)	1330-20-7	8260B	31		9.0	3.6	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	5.6		4.5	1.8	ug/kg	1
o - Xylenes	95-47-6	8260B	25		4.5	1.8	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		86	53-142
Bromofluorobenzene		96	47-138
Toluene-d8		107	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-001
Description: CMR-EB02-0.5-1.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1105
% Solids: 86.6 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	06/01/2019 0155	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		30	9.3	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		30	11	ug/kg	1
Anthracene	120-12-7	8270D	ND		30	5.7	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		30	6.6	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	9.9	J	30	7.4	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		30	5.6	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	11	J	30	7.3	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		30	5.4	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		150	56	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		150	56	ug/kg	1
Carbazole	86-74-8	8270D	ND		150	56	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		150	56	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		150	56	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		150	56	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		150	56	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		150	56	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		150	56	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		150	56	ug/kg	1
Chrysene	218-01-9	8270D	ND		30	5.1	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		30	5.7	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		150	56	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		750	280	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		750	280	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		750	280	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		150	56	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		150	56	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		150	56	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		150	83	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		150	56	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		150	56	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		750	280	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		750	280	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		300	110	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		300	110	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		150	56	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		750	280	ug/kg	1
Fluoranthene	206-44-0	8270D	7.7	J	30	4.7	ug/kg	1
Fluorene	86-73-7	8270D	ND		30	6.4	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		150	56	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		150	56	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		750	280	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		150	56	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		30	11	ug/kg	1
Isophorone	78-59-1	8270D	ND		150	56	ug/kg	1

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-001
Description: CMR-EB02-0.5-1.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1105
% Solids: 86.6 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	06/01/2019 0155	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	17	J	30	11	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		150	56	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		300	110	ug/kg	1
Naphthalene	91-20-3	8270D	12	J	30	11	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		300	110	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		300	110	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		300	110	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		150	56	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		300	110	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		750	280	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		150	56	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		150	56	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		750	280	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		30	8.1	ug/kg	1
Phenol	108-95-2	8270D	ND		150	56	ug/kg	1
Pyrene	129-00-0	8270D	11	J	30	5.6	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		370	110	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		750	110	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		750	280	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		150	56	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		150	56	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		78	33-102
2-Fluorophenol		67	35-115
Nitrobenzene-d5		84	22-109
Phenol-d5		71	33-122
Terphenyl-d14		95	41-120
2,4,6-Tribromophenol		80	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-001
Description: CMR-EB02-0.5-1.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1105
% Solids: 86.6 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0240	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	73		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	41		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		94	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-001
Description: CMR-EB02-0.5-1.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1105
% Solids: 86.6 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 1124	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	40		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		85	40-140
2-Fluorobiphenyl (fractionation 1)		89	40-140
o - Terphenyl (aromatic)		103	40-140

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
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H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-001
Description: CMR-EB02-0.5-1.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1105
% Solids: 86.6 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1801	JJG		18529

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.93	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.93	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		107	70-130

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-001
Description: CMR-EB02-0.5-1.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1105
% Solids: 86.6 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1801	JJG		18528

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.31	0.042	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.6	0.62	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.31	0.039	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.31	0.067	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.31	0.16	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.31	0.050	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.31	0.070	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.31	0.035	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE22021-001
Description: CMR-EB02-0.5-1.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1105
% Solids: 86.6 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/03/2019 1801	JJG		18527

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		108	70-130

LOQ = Limit of Quantitation
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-001
Description: CMR-EB02-0.5-1.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1105
% Solids: 86.6 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/24/2019 0531	JCF	05/23/2019 0810	17534
1	7471B	7471B	1	05/23/2019 1736	JMH	05/23/2019 1335	17526
2	3050B	6020B	1	05/24/2019 1231	JCF	05/23/2019 0810	17534

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.47	0.19	mg/kg	1
Arsenic	7440-38-2	6020B	6.8		0.47	0.19	mg/kg	1
Barium	7440-39-3	6020B	500		1.2	0.29	mg/kg	1
Beryllium	7440-41-7	6020B	0.73		0.095	0.032	mg/kg	1
Cadmium	7440-43-9	6020B	0.27		0.12	0.024	mg/kg	1
Chromium	7440-47-3	6020B	17	B	1.2	0.52	mg/kg	2
Cobalt	7440-48-4	6020B	6.3		1.2	0.28	mg/kg	1
Copper	7440-50-8	6020B	26		1.2	0.31	mg/kg	1
Lead	7439-92-1	6020B	68		0.24	0.064	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.083	0.020	mg/kg	1
Nickel	7440-02-0	6020B	15		1.2	0.28	mg/kg	1
Selenium	7782-49-2	6020B	0.58	J	1.2	0.45	mg/kg	1
Silver	7440-22-4	6020B	0.092	J	0.24	0.057	mg/kg	1
Vanadium	7440-62-2	6020B	44		1.2	0.24	mg/kg	1
Zinc	7440-66-6	6020B	75		2.4	0.47	mg/kg	1

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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-002
Description: CMR-EB02-5.5-6.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1120
% Solids: 72.7 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	20	05/30/2019 1905	JM1		18353	6.01

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		30000	6100	ug/kg	2
Benzene	71-43-2	8260B	23000		7600	3000	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		7600	3000	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		7600	3000	ug/kg	2
Bromoform	75-25-2	8260B	ND		7600	3000	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		7600	3000	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		30000	6100	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		7600	3000	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		7600	3000	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		7600	3000	ug/kg	2
Chloroethane	75-00-3	8260B	ND		7600	3000	ug/kg	2
Chloroform	67-66-3	8260B	ND		7600	3000	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		7600	3000	ug/kg	2
Cyclohexane	110-82-7	8260B	53000		7600	3000	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		7600	3000	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		7600	3000	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		7600	3000	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		7600	3000	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		7600	3000	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		7600	3000	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		7600	3000	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		7600	3000	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		7600	3000	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		7600	3000	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		7600	3000	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		7600	3000	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		7600	3000	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		7600	3000	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		7600	3000	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		380000	38000	ug/kg	2
Ethylbenzene	100-41-4	8260B	44000		7600	3000	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		15000	6100	ug/kg	2
Isopropylbenzene	98-82-8	8260B	11000		7600	3000	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		7600	3000	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		7600	3000	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		15000	6100	ug/kg	2
Methylcyclohexane	108-87-2	8260B	97000		7600	3000	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		7600	3000	ug/kg	2
Naphthalene	91-20-3	8260B	15000		7600	3000	ug/kg	2
Styrene	100-42-5	8260B	ND		7600	3000	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		7600	3000	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		7600	3000	ug/kg	2
Toluene	108-88-3	8260B	4200	J	7600	3000	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		7600	3000	ug/kg	2

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Description: CMR-EB02-5.5-6.0-190521
Date Sampled: 05/21/2019 1120
Date Received: 05/22/2019

Laboratory ID: UE22021-002
Matrix: Solid
% Solids: 72.7 05/22/2019 2214

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	20	05/30/2019 1905	JM1		18353	6.01

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		7600	3000	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		7600	3000	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		7600	3000	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		7600	3000	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		7600	3000	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		7600	3000	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		7600	3000	ug/kg	2
Xylenes (total)	1330-20-7	8260B	52000		15000	6100	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	48000		7600	3000	ug/kg	2
o - Xylenes	95-47-6	8260B	4200	J	7600	3000	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		112	53-142
Bromofluorobenzene		132	47-138
Toluene-d8		119	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-002
Description: CMR-EB02-5.5-6.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1120
% Solids: 72.7
05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	05/30/2019 1937	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		180	54	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		180	62	ug/kg	1
Anthracene	120-12-7	8270D	480		180	33	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		180	38	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		180	43	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		180	32	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		180	42	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		180	31	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		840	320	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		840	320	ug/kg	1
Carbazole	86-74-8	8270D	ND		840	320	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		840	320	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		840	320	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		840	320	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		840	320	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		840	320	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		840	320	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		840	320	ug/kg	1
Chrysene	218-01-9	8270D	ND		180	29	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		180	33	ug/kg	1
Dibenzofuran	132-64-9	8270D	750	J	840	320	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4300	1600	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4300	1600	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4300	1600	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		840	320	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		840	320	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		840	320	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		840	480	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		840	320	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		840	320	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4300	1600	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4300	1600	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1800	650	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1800	650	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		840	320	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4300	1600	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		180	27	ug/kg	1
Fluorene	86-73-7	8270D	1700		180	37	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		840	320	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		840	320	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4300	1600	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		840	320	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		180	65	ug/kg	1
Isophorone	78-59-1	8270D	ND		840	320	ug/kg	1

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-002
Description: CMR-EB02-5.5-6.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1120
% Solids: 72.7 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	05/30/2019 1937	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	13000		180	64	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		840	320	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1800	650	ug/kg	1
Naphthalene	91-20-3	8270D	9900		180	63	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1800	650	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1800	650	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1800	650	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		840	320	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1800	650	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		4300	1600	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		840	320	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		840	320	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		4300	1600	ug/kg	1
Phenanthrene	85-01-8	8270D	1500		180	47	ug/kg	1
Phenol	108-95-2	8270D	ND		840	320	ug/kg	1
Pyrene	129-00-0	8270D	140	J	180	32	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		2100	650	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4300	650	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4300	1600	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		840	320	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		840	320	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		100	33-102
2-Fluorophenol	N	166	35-115
Nitrobenzene-d5	N	318	22-109
Phenol-d5		89	33-122
Terphenyl-d14		105	41-120
2,4,6-Tribromophenol		93	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-002
Description: CMR-EB02-5.5-6.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1120
% Solids: 72.7 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0309	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	470		13	13	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	3600		13	13	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		66	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-002
Description: CMR-EB02-5.5-6.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1120
% Solids: 72.7 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 1154	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	1400		13	13	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		72	40-140
2-Fluorobiphenyl (fractionation 1)	N	183	40-140
o - Terphenyl (aromatic)		114	40-140

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-002
Description: CMR-EB02-5.5-6.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1120
% Solids: 72.7 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/03/2019 1829	JJG		18529

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	5400		130	26	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	3100		130	26	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	62	70-130

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-002
Description: CMR-EB02-5.5-6.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1120
% Solids: 72.7 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/03/2019 1829	JJG		18528

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	68		8.6	1.2	mg/kg	1
C9 - C10 Aromatics		Montana VPH	2100		43	17	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	160		8.6	1.1	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		8.6	1.9	mg/kg	1
Naphthalene	91-20-3	Montana VPH	93		8.6	4.5	mg/kg	1
Toluene	108-88-3	Montana VPH	21		8.6	1.4	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	120		8.6	1.9	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	29		8.6	0.96	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	0.00	70-130

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE22021-002
Description: CMR-EB02-5.5-6.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1120
% Solids: 72.7 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/03/2019 1829	JJG		18527

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	11000		180	35	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-002
Description: CMR-EB02-5.5-6.0-190521
Matrix: Solid
Date Sampled: 05/21/2019 1120
% Solids: 72.7 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/24/2019 0612	JCF	05/23/2019 0810	17534
1	7471B	7471B	1	05/23/2019 1748	JMH	05/23/2019 1335	17526
2	3050B	6020B	1	05/24/2019 1316	JCF	05/23/2019 0810	17534

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.53	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	6.5		0.53	0.21	mg/kg	1
Barium	7440-39-3	6020B	360		1.4	0.33	mg/kg	1
Beryllium	7440-41-7	6020B	0.71		0.11	0.036	mg/kg	1
Cadmium	7440-43-9	6020B	0.16		0.14	0.026	mg/kg	1
Chromium	7440-47-3	6020B	17	B	1.4	0.58	mg/kg	2
Cobalt	7440-48-4	6020B	6.6		1.4	0.32	mg/kg	1
Copper	7440-50-8	6020B	16		1.4	0.34	mg/kg	1
Lead	7439-92-1	6020B	17		0.26	0.072	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.11	0.027	mg/kg	1
Nickel	7440-02-0	6020B	15		1.4	0.32	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.50	mg/kg	1
Silver	7440-22-4	6020B	0.087	J	0.26	0.063	mg/kg	1
Vanadium	7440-62-2	6020B	36		1.4	0.26	mg/kg	1
Zinc	7440-66-6	6020B	45		2.6	0.53	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-003
Description: CMR-EB02-5.5-6.0-190521-FD
Matrix: Solid
Date Sampled: 05/21/2019 1125
% Solids: 83.3 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	20	05/30/2019 1927	JM1		18353	6.36

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		23000	4600	ug/kg	2
Benzene	71-43-2	8260B	24000		5700	2300	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		5700	2300	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		5700	2300	ug/kg	2
Bromoform	75-25-2	8260B	ND		5700	2300	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5700	2300	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		23000	4600	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		5700	2300	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		5700	2300	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		5700	2300	ug/kg	2
Chloroethane	75-00-3	8260B	ND		5700	2300	ug/kg	2
Chloroform	67-66-3	8260B	ND		5700	2300	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5700	2300	ug/kg	2
Cyclohexane	110-82-7	8260B	50000		5700	2300	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5700	2300	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		5700	2300	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5700	2300	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		5700	2300	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		5700	2300	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		5700	2300	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		5700	2300	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		5700	2300	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		5700	2300	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		5700	2300	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5700	2300	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5700	2300	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		5700	2300	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5700	2300	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5700	2300	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		290000	29000	ug/kg	2
Ethylbenzene	100-41-4	8260B	69000		5700	2300	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		11000	4600	ug/kg	2
Isopropylbenzene	98-82-8	8260B	16000		5700	2300	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		5700	2300	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5700	2300	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		11000	4600	ug/kg	2
Methylcyclohexane	108-87-2	8260B	110000		5700	2300	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		5700	2300	ug/kg	2
Naphthalene	91-20-3	8260B	28000		5700	2300	ug/kg	2
Styrene	100-42-5	8260B	ND		5700	2300	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5700	2300	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		5700	2300	ug/kg	2
Toluene	108-88-3	8260B	4800	J	5700	2300	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5700	2300	ug/kg	2

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-003
Description: CMR-EB02-5.5-6.0-190521-FD
Matrix: Solid
Date Sampled: 05/21/2019 1125
% Solids: 83.3 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	20	05/30/2019 1927	JM1		18353	6.36

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5700	2300	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5700	2300	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		5700	2300	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		5700	2300	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		5700	2300	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		5700	2300	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		5700	2300	ug/kg	2
Xylenes (total)	1330-20-7	8260B	67000		11000	4600	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	59000		5700	2300	ug/kg	2
o - Xylenes	95-47-6	8260B	8400		5700	2300	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		98	53-142
Bromofluorobenzene		108	47-138
Toluene-d8		121	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-003
Description: CMR-EB02-5.5-6.0-190521-FD
Matrix: Solid
Date Sampled: 05/21/2019 1125
% Solids: 83.3 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	05/30/2019 2001	SCD	05/22/2019 1847	17544
2	3546	8270D	1000	05/31/2019 2354	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		310	94	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		310	110	ug/kg	1
Anthracene	120-12-7	8270D	1800		310	58	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	330		310	67	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		310	75	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		310	57	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		310	74	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		310	54	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		1500	570	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		1500	570	ug/kg	1
Carbazole	86-74-8	8270D	ND		1500	570	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		1500	570	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		1500	570	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		1500	570	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		1500	570	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		1500	570	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		1500	570	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		1500	570	ug/kg	1
Chrysene	218-01-9	8270D	470		310	51	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		310	58	ug/kg	1
Dibenzofuran	132-64-9	8270D	1600		1500	570	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		7600	2800	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		7600	2800	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		7600	2800	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		1500	570	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1500	570	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		1500	570	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		1500	840	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		1500	570	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		1500	570	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		7600	2800	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		7600	2800	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		3100	1100	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		3100	1100	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		1500	570	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		7600	2800	ug/kg	1
Fluoranthene	206-44-0	8270D	570		310	48	ug/kg	1
Fluorene	86-73-7	8270D	3900		310	65	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		1500	570	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		1500	570	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		7600	2800	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		1500	570	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		310	110	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-003
Description: CMR-EB02-5.5-6.0-190521-FD
Matrix: Solid
Date Sampled: 05/21/2019 1125
% Solids: 83.3 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	05/30/2019 2001	SCD	05/22/2019 1847	17544
2	3546	8270D	1000	05/31/2019 2354	SCD	05/22/2019 1847	17544

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		1500	570	ug/kg	1
2-Methylnaphthalene	91-57-6	8270D	56000		3100	1100	ug/kg	2
2-Methylphenol	95-48-7	8270D	ND		1500	570	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		3100	1100	ug/kg	1
Naphthalene	91-20-3	8270D	31000		310	110	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		3100	1100	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		3100	1100	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		3100	1100	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		1500	570	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		3100	1100	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		7600	2800	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		1500	570	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		1500	570	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		7600	2800	ug/kg	1
Phenanthrene	85-01-8	8270D	7700		310	82	ug/kg	1
Phenol	108-95-2	8270D	ND		1500	570	ug/kg	1
Pyrene	129-00-0	8270D	1600		310	57	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		3700	1100	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		7600	1100	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		7600	2800	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		1500	570	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		1500	570	ug/kg	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl	N	109	33-102	N	123	33-102
2-Fluorophenol	N	177	35-115	N	133	35-115
Nitrobenzene-d5	N	784	22-109	N	475	22-109
Phenol-d5	N	146	33-122	N	299	33-122
Terphenyl-d14		109	41-120	N	164	41-120
2,4,6-Tribromophenol		91	30-117	N	0.00	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-003
Description: CMR-EB02-5.5-6.0-190521-FD
Matrix: Solid
Date Sampled: 05/21/2019 1125
% Solids: 83.3 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 0338	CHG	05/28/2019 1502	18272

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	340		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	2600		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		63	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-003
Description: CMR-EB02-5.5-6.0-190521-FD
Matrix: Solid
Date Sampled: 05/21/2019 1125
% Solids: 83.3 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/04/2019 1223	CHG	05/28/2019 1202	18274

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	1700		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		80	40-140
2-Fluorobiphenyl (fractionation 1)	N	204	40-140
o - Terphenyl (aromatic)		104	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-003
Description: CMR-EB02-5.5-6.0-190521-FD
Matrix: Solid
Date Sampled: 05/21/2019 1125
% Solids: 83.3 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/03/2019 1857	JJG		18529

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	3600		91	18	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	1800		91	18	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1150	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22021-003
Description: CMR-EB02-5.5-6.0-190521-FD
Matrix: Solid
Date Sampled: 05/21/2019 1125
% Solids: 83.3 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/03/2019 1857	JJG		18528

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	46		6.1	0.83	mg/kg	1
C9 - C10 Aromatics		Montana VPH	1300		30	12	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	120		6.1	0.75	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		6.1	1.3	mg/kg	1
Naphthalene	91-20-3	Montana VPH	79		6.1	3.2	mg/kg	1
Toluene	108-88-3	Montana VPH	19		6.1	0.97	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	76		6.1	1.4	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	29		6.1	0.68	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	354	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE22021-003
Description: CMR-EB02-5.5-6.0-190521-FD
Matrix: Solid
Date Sampled: 05/21/2019 1125
% Solids: 83.3 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/03/2019 1857	JJG		18527

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	6400		180	35	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1170	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-003
Description: CMR-EB02-5.5-6.0-190521-FD
Matrix: Solid
Date Sampled: 05/21/2019 1125
% Solids: 83.3 05/22/2019 2214
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	05/24/2019 0618	JCF	05/23/2019 0810	17534
1	7471B	7471B	1	05/23/2019 1750	JMH	05/23/2019 1335	17526
2	3050B	6020B	1	05/24/2019 1321	JCF	05/23/2019 0810	17534

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.46	0.18	mg/kg	1
Arsenic	7440-38-2	6020B	6.8		0.46	0.18	mg/kg	1
Barium	7440-39-3	6020B	290		1.2	0.28	mg/kg	1
Beryllium	7440-41-7	6020B	0.65		0.092	0.031	mg/kg	1
Cadmium	7440-43-9	6020B	0.20		0.12	0.023	mg/kg	1
Chromium	7440-47-3	6020B	16	B	1.2	0.51	mg/kg	2
Cobalt	7440-48-4	6020B	5.6		1.2	0.28	mg/kg	1
Copper	7440-50-8	6020B	13		1.2	0.30	mg/kg	1
Lead	7439-92-1	6020B	16		0.23	0.062	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.099	0.024	mg/kg	1
Nickel	7440-02-0	6020B	13		1.2	0.28	mg/kg	1
Selenium	7782-49-2	6020B	0.57	J	1.2	0.43	mg/kg	1
Silver	7440-22-4	6020B	0.11	J	0.23	0.055	mg/kg	1
Vanadium	7440-62-2	6020B	37		1.2	0.23	mg/kg	1
Zinc	7440-66-6	6020B	40		2.3	0.46	mg/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-004
Description: TB-04-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/03/2019 1256	BWS		18513

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22021-004
Description: TB-04-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/03/2019 1256	BWS		18513

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		96	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18280-001
Batch: 18280
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	05/30/2019 1002
Benzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Bromochloromethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Bromoform	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	05/30/2019 1002
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	05/30/2019 1002
Carbon disulfide	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Chlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Chloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Chloroform	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	05/30/2019 1002
Cyclohexane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	05/30/2019 1002
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,4-Dioxane	ND		1	250	25	ug/kg	05/30/2019 1002
Ethylbenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
2-Hexanone	ND		1	10	4.0	ug/kg	05/30/2019 1002
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Methyl acetate	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	05/30/2019 1002
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Methylene chloride	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Naphthalene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Styrene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Toluene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18280-001
Batch: 18280
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Trichloroethene	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
Vinyl chloride	ND		1	5.0	3.0	ug/kg	05/30/2019 1002
Xylenes (total)	ND		1	10	4.0	ug/kg	05/30/2019 1002
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	05/30/2019 1002
o - Xylenes	ND		1	5.0	2.0	ug/kg	05/30/2019 1002

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	53-142
Bromofluorobenzene		108	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18280-002
Batch: 18280
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	120		1	116	60-140	05/30/2019 0940
Benzene	50	51		1	101	70-130	05/30/2019 0940
Bromochloromethane	50	50		1	100	70-130	05/30/2019 0940
Bromodichloromethane	50	50		1	100	70-130	05/30/2019 0940
Bromoform	50	47		1	94	70-130	05/30/2019 0940
Bromomethane (Methyl bromide)	50	51		1	103	70-130	05/30/2019 0940
2-Butanone (MEK)	100	120		1	116	60-140	05/30/2019 0940
Carbon disulfide	50	47		1	94	70-130	05/30/2019 0940
Carbon tetrachloride	50	48		1	97	70-130	05/30/2019 0940
Chlorobenzene	50	49		1	99	70-130	05/30/2019 0940
Chloroethane	50	55		1	109	70-130	05/30/2019 0940
Chloroform	50	49		1	97	70-130	05/30/2019 0940
Chloromethane (Methyl chloride)	50	52		1	103	60-140	05/30/2019 0940
Cyclohexane	50	52		1	104	70-130	05/30/2019 0940
1,2-Dibromo-3-chloropropane (DBCP)	50	48		1	97	70-130	05/30/2019 0940
Dibromochloromethane	50	49		1	99	70-130	05/30/2019 0940
1,2-Dibromoethane (EDB)	50	53		1	106	70-130	05/30/2019 0940
1,2-Dichlorobenzene	50	49		1	97	70-130	05/30/2019 0940
1,3-Dichlorobenzene	50	49		1	98	70-130	05/30/2019 0940
1,4-Dichlorobenzene	50	49		1	97	70-130	05/30/2019 0940
Dichlorodifluoromethane	50	48		1	96	60-140	05/30/2019 0940
1,1-Dichloroethane	50	49		1	99	70-130	05/30/2019 0940
1,2-Dichloroethane	50	52		1	103	70-130	05/30/2019 0940
1,1-Dichloroethene	50	49		1	97	70-130	05/30/2019 0940
cis-1,2-Dichloroethene	50	50		1	101	70-130	05/30/2019 0940
trans-1,2-Dichloroethene	50	50		1	101	70-130	05/30/2019 0940
1,2-Dichloropropane	50	51		1	102	70-130	05/30/2019 0940
cis-1,3-Dichloropropene	50	51		1	103	70-130	05/30/2019 0940
trans-1,3-Dichloropropene	50	50		1	100	70-130	05/30/2019 0940
1,4-Dioxane	500	480		1	95	60-140	05/30/2019 0940
Ethylbenzene	50	51		1	103	70-130	05/30/2019 0940
2-Hexanone	100	120		1	118	70-130	05/30/2019 0940
Isopropylbenzene	50	51		1	102	70-130	05/30/2019 0940
Methyl acetate	50	53		1	105	70-130	05/30/2019 0940
Methyl tertiary butyl ether (MTBE)	50	50		1	100	70-130	05/30/2019 0940
4-Methyl-2-pentanone	100	110		1	108	70-130	05/30/2019 0940
Methylcyclohexane	50	51		1	102	70-130	05/30/2019 0940
Methylene chloride	50	48		1	95	70-130	05/30/2019 0940
Naphthalene	50	51		1	103	70-130	05/30/2019 0940
Styrene	50	51		1	101	70-130	05/30/2019 0940
1,1,2,2-Tetrachloroethane	50	50		1	100	70-130	05/30/2019 0940
Tetrachloroethene	50	50		1	100	70-130	05/30/2019 0940
Toluene	50	51		1	101	70-130	05/30/2019 0940
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	47		1	93	70-130	05/30/2019 0940

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18280-002
Batch: 18280
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	51		1	101	70-130	05/30/2019 0940
1,2,4-Trichlorobenzene	50	51		1	102	70-130	05/30/2019 0940
1,1,1-Trichloroethane	50	48		1	96	70-130	05/30/2019 0940
1,1,2-Trichloroethane	50	52		1	104	70-130	05/30/2019 0940
Trichloroethene	50	53		1	107	70-130	05/30/2019 0940
Trichlorofluoromethane	50	53		1	105	70-130	05/30/2019 0940
Vinyl chloride	50	52		1	104	70-130	05/30/2019 0940
Xylenes (total)	100	100		1	103	70-130	05/30/2019 0940
m+p - Xylenes	50	52		1	104	70-130	05/30/2019 0940
o - Xylenes	50	51		1	102	70-130	05/30/2019 0940

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		86	53-142
Bromofluorobenzene		107	47-138
Toluene-d8		97	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18353-001
Batch: 18353
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	05/29/2019 1006
Benzene	ND		1	250	100	ug/kg	05/29/2019 1006
Bromochloromethane	ND		1	250	100	ug/kg	05/29/2019 1006
Bromodichloromethane	ND		1	250	100	ug/kg	05/29/2019 1006
Bromoform	ND		1	250	100	ug/kg	05/29/2019 1006
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	05/29/2019 1006
2-Butanone (MEK)	ND		1	1000	200	ug/kg	05/29/2019 1006
Carbon disulfide	ND		1	250	100	ug/kg	05/29/2019 1006
Carbon tetrachloride	ND		1	250	100	ug/kg	05/29/2019 1006
Chlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
Chloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
Chloroform	ND		1	250	100	ug/kg	05/29/2019 1006
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	05/29/2019 1006
Cyclohexane	ND		1	250	100	ug/kg	05/29/2019 1006
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	05/29/2019 1006
Dibromochloromethane	ND		1	250	100	ug/kg	05/29/2019 1006
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	05/29/2019 1006
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
Dichlorodifluoromethane	ND		1	250	100	ug/kg	05/29/2019 1006
1,1-Dichloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
1,2-Dichloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
1,1-Dichloroethene	ND		1	250	100	ug/kg	05/29/2019 1006
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/29/2019 1006
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	05/29/2019 1006
1,2-Dichloropropane	ND		1	250	100	ug/kg	05/29/2019 1006
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/29/2019 1006
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	05/29/2019 1006
1,4-Dioxane	ND		1	13000	1300	ug/kg	05/29/2019 1006
Ethylbenzene	ND		1	250	100	ug/kg	05/29/2019 1006
2-Hexanone	ND		1	500	200	ug/kg	05/29/2019 1006
Isopropylbenzene	ND		1	250	100	ug/kg	05/29/2019 1006
Methyl acetate	ND		1	250	100	ug/kg	05/29/2019 1006
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	05/29/2019 1006
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	05/29/2019 1006
Methylcyclohexane	ND		1	250	100	ug/kg	05/29/2019 1006
Methylene chloride	ND		1	250	100	ug/kg	05/29/2019 1006
Naphthalene	ND		1	250	100	ug/kg	05/29/2019 1006
Styrene	ND		1	250	100	ug/kg	05/29/2019 1006
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
Tetrachloroethene	ND		1	250	100	ug/kg	05/29/2019 1006
Toluene	ND		1	250	100	ug/kg	05/29/2019 1006
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	05/29/2019 1006

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18353-001
Batch: 18353
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	05/29/2019 1006
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	05/29/2019 1006
Trichloroethene	ND		1	250	100	ug/kg	05/29/2019 1006
Trichlorofluoromethane	ND		1	250	100	ug/kg	05/29/2019 1006
Vinyl chloride	ND		1	250	100	ug/kg	05/29/2019 1006
Xylenes (total)	ND		1	500	200	ug/kg	05/29/2019 1006
m+p - Xylenes	ND		1	250	100	ug/kg	05/29/2019 1006
o - Xylenes	ND		1	250	100	ug/kg	05/29/2019 1006

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		100	53-142
Bromofluorobenzene		110	47-138
Toluene-d8		108	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18353-002
Batch: 18353
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	5100		1	101	60-140	05/29/2019 0944
Benzene	2500	2700		1	106	70-130	05/29/2019 0944
Bromochloromethane	2500	2500		1	100	70-130	05/29/2019 0944
Bromodichloromethane	2500	2500		1	101	70-130	05/29/2019 0944
Bromoform	2500	2200		1	88	70-130	05/29/2019 0944
Bromomethane (Methyl bromide)	2500	2100		1	84	70-130	05/29/2019 0944
2-Butanone (MEK)	5000	5100		1	102	60-140	05/29/2019 0944
Carbon disulfide	2500	2400		1	98	70-130	05/29/2019 0944
Carbon tetrachloride	2500	2600		1	104	70-130	05/29/2019 0944
Chlorobenzene	2500	2600		1	103	70-130	05/29/2019 0944
Chloroethane	2500	2700		1	108	70-130	05/29/2019 0944
Chloroform	2500	2500		1	100	70-130	05/29/2019 0944
Chloromethane (Methyl chloride)	2500	2300		1	93	60-140	05/29/2019 0944
Cyclohexane	2500	3000		1	120	70-130	05/29/2019 0944
1,2-Dibromo-3-chloropropane (DBCP)	2500	2100		1	85	70-130	05/29/2019 0944
Dibromochloromethane	2500	2400		1	97	70-130	05/29/2019 0944
1,2-Dibromoethane (EDB)	2500	2500		1	101	70-130	05/29/2019 0944
1,2-Dichlorobenzene	2500	2500		1	100	70-130	05/29/2019 0944
1,3-Dichlorobenzene	2500	2600		1	103	70-130	05/29/2019 0944
1,4-Dichlorobenzene	2500	2600		1	102	70-130	05/29/2019 0944
Dichlorodifluoromethane	2500	1900		1	78	60-140	05/29/2019 0944
1,1-Dichloroethane	2500	2500		1	101	70-130	05/29/2019 0944
1,2-Dichloroethane	2500	2600		1	102	70-130	05/29/2019 0944
1,1-Dichloroethene	2500	2600		1	103	70-130	05/29/2019 0944
cis-1,2-Dichloroethene	2500	2600		1	103	70-130	05/29/2019 0944
trans-1,2-Dichloroethene	2500	2700		1	106	70-130	05/29/2019 0944
1,2-Dichloropropane	2500	2600		1	105	70-130	05/29/2019 0944
cis-1,3-Dichloropropene	2500	2600		1	104	70-130	05/29/2019 0944
trans-1,3-Dichloropropene	2500	2500		1	100	70-130	05/29/2019 0944
1,4-Dioxane	25000	23000		1	91	60-140	05/29/2019 0944
Ethylbenzene	2500	2700		1	109	70-130	05/29/2019 0944
2-Hexanone	5000	5100		1	103	70-130	05/29/2019 0944
Isopropylbenzene	2500	2800		1	111	70-130	05/29/2019 0944
Methyl acetate	2500	2400		1	98	70-130	05/29/2019 0944
Methyl tertiary butyl ether (MTBE)	2500	2400		1	97	70-130	05/29/2019 0944
4-Methyl-2-pentanone	5000	4800		1	95	70-130	05/29/2019 0944
Methylcyclohexane	2500	3100		1	124	70-130	05/29/2019 0944
Methylene chloride	2500	2400		1	96	70-130	05/29/2019 0944
Naphthalene	2500	2500		1	98	70-130	05/29/2019 0944
Styrene	2500	2700		1	107	70-130	05/29/2019 0944
1,1,2,2-Tetrachloroethane	2500	2300		1	94	70-130	05/29/2019 0944
Tetrachloroethene	2500	2800		1	111	70-130	05/29/2019 0944
Toluene	2500	2700		1	108	70-130	05/29/2019 0944
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	2800		1	110	70-130	05/29/2019 0944

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18353-002
Batch: 18353
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2600		1	106	70-130	05/29/2019 0944
1,2,4-Trichlorobenzene	2500	2700		1	108	70-130	05/29/2019 0944
1,1,1-Trichloroethane	2500	2600		1	103	70-130	05/29/2019 0944
1,1,2-Trichloroethane	2500	2500		1	102	70-130	05/29/2019 0944
Trichloroethene	2500	2800		1	112	70-130	05/29/2019 0944
Trichlorofluoromethane	2500	2800		1	111	70-130	05/29/2019 0944
Vinyl chloride	2500	2500		1	102	70-130	05/29/2019 0944
Xylenes (total)	5000	5500		1	109	70-130	05/29/2019 0944
m+p - Xylenes	2500	2800		1	111	70-130	05/29/2019 0944
o - Xylenes	2500	2700		1	108	70-130	05/29/2019 0944

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	53-142
Bromofluorobenzene		101	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18513-001
Batch: 18513
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/03/2019 1109
Benzene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Bromoform	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/03/2019 1109
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/03/2019 1109
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Chloroethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Chloroform	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Cyclohexane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/03/2019 1109
1,4-Dioxane	ND		1	20	13	ug/L	06/03/2019 1109
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
2-Hexanone	ND		1	10	2.0	ug/L	06/03/2019 1109
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Methyl acetate	ND		1	1.0	0.40	ug/L	06/03/2019 1109
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/03/2019 1109
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/03/2019 1109
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/03/2019 1109
Methylene chloride	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Naphthalene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Styrene	ND		1	0.50	0.41	ug/L	06/03/2019 1109
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Toluene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/03/2019 1109

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ18513-001
Batch: 18513
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Trichloroethene	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/03/2019 1109
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/03/2019 1109
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/03/2019 1109
o - Xylenes	ND		1	0.50	0.40	ug/L	06/03/2019 1109

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		104	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18513-002
Batch: 18513
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	86		1	86	60-140	06/03/2019 1010
Benzene	50	46		1	91	70-130	06/03/2019 1010
Bromochloromethane	50	46		1	92	70-130	06/03/2019 1010
Bromodichloromethane	50	46		1	93	70-130	06/03/2019 1010
Bromoform	50	47		1	95	70-130	06/03/2019 1010
Bromomethane (Methyl bromide)	50	50		1	101	70-130	06/03/2019 1010
2-Butanone (MEK)	100	90		1	90	70-130	06/03/2019 1010
Carbon disulfide	50	38		1	76	70-130	06/03/2019 1010
Carbon tetrachloride	50	43		1	86	70-130	06/03/2019 1010
Chlorobenzene	50	45		1	90	70-130	06/03/2019 1010
Chloroethane	50	48		1	95	70-130	06/03/2019 1010
Chloroform	50	43		1	87	70-130	06/03/2019 1010
Chloromethane (Methyl chloride)	50	47		1	93	60-140	06/03/2019 1010
Cyclohexane	50	48		1	97	70-130	06/03/2019 1010
1,2-Dibromo-3-chloropropane (DBCP)	50	41		1	82	70-130	06/03/2019 1010
Dibromochloromethane	50	47		1	95	70-130	06/03/2019 1010
1,2-Dibromoethane (EDB)	50	50		1	99	70-130	06/03/2019 1010
1,2-Dichlorobenzene	50	44		1	88	70-130	06/03/2019 1010
1,3-Dichlorobenzene	50	45		1	90	70-130	06/03/2019 1010
1,4-Dichlorobenzene	50	44		1	88	70-130	06/03/2019 1010
Dichlorodifluoromethane	50	37		1	74	60-140	06/03/2019 1010
1,1-Dichloroethane	50	45		1	90	70-130	06/03/2019 1010
1,2-Dichloroethane	50	46		1	92	70-130	06/03/2019 1010
1,1-Dichloroethene	50	40		1	81	70-130	06/03/2019 1010
cis-1,2-Dichloroethene	50	45		1	89	70-130	06/03/2019 1010
trans-1,2-Dichloroethene	50	44		1	88	70-130	06/03/2019 1010
1,2-Dichloropropane	50	47		1	94	70-130	06/03/2019 1010
cis-1,3-Dichloropropene	50	49		1	99	70-130	06/03/2019 1010
trans-1,3-Dichloropropene	50	48		1	97	70-130	06/03/2019 1010
1,4-Dioxane	500	390		1	77	60-140	06/03/2019 1010
Ethylbenzene	50	46		1	93	70-130	06/03/2019 1010
2-Hexanone	100	96		1	96	70-130	06/03/2019 1010
Isopropylbenzene	50	47		1	94	70-130	06/03/2019 1010
Methyl acetate	50	44		1	89	70-130	06/03/2019 1010
Methyl tertiary butyl ether (MTBE)	50	41		1	83	70-130	06/03/2019 1010
4-Methyl-2-pentanone	100	96		1	96	70-130	06/03/2019 1010
Methylcyclohexane	50	45		1	91	70-130	06/03/2019 1010
Methylene chloride	50	44		1	89	70-130	06/03/2019 1010
Naphthalene	50	44		1	88	70-130	06/03/2019 1010
Styrene	50	49		1	97	70-130	06/03/2019 1010
1,1,2,2-Tetrachloroethane	50	46		1	91	70-130	06/03/2019 1010
Tetrachloroethene	50	45		1	91	70-130	06/03/2019 1010
Toluene	50	45		1	90	70-130	06/03/2019 1010
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	38		1	76	70-130	06/03/2019 1010

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18513-002
Batch: 18513
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	43		1	86	70-130	06/03/2019 1010
1,2,4-Trichlorobenzene	50	42		1	85	70-130	06/03/2019 1010
1,1,1-Trichloroethane	50	41		1	82	70-130	06/03/2019 1010
1,1,2-Trichloroethane	50	47		1	94	70-130	06/03/2019 1010
Trichloroethene	50	48		1	96	70-130	06/03/2019 1010
Trichlorofluoromethane	50	43		1	86	70-130	06/03/2019 1010
Vinyl chloride	50	39		1	79	70-130	06/03/2019 1010
Xylenes (total)	100	94		1	94	70-130	06/03/2019 1010
m+p - Xylenes	50	47		1	94	70-130	06/03/2019 1010
o - Xylenes	50	47		1	94	70-130	06/03/2019 1010

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		105	70-130

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ17544-001
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	05/30/2019 1216
Acenaphthylene	ND		1	2.7	0.95	ug/kg	05/30/2019 1216
Anthracene	ND		1	2.7	0.51	ug/kg	05/30/2019 1216
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	05/30/2019 1216
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	05/30/2019 1216
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	05/30/2019 1216
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	05/30/2019 1216
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	05/30/2019 1216
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
Carbazole	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	05/30/2019 1216
2-Chlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	05/30/2019 1216
Chrysene	ND		1	2.7	0.45	ug/kg	05/30/2019 1216
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	05/30/2019 1216
Dibenzofuran	ND		1	13	5.0	ug/kg	05/30/2019 1216
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	05/30/2019 1216
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
Diethylphthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
Dimethyl phthalate	ND		1	13	7.4	ug/kg	05/30/2019 1216
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	05/30/2019 1216
2,4-Dinitrophenol	ND		1	67	25	ug/kg	05/30/2019 1216
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	05/30/2019 1216
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	05/30/2019 1216
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	05/30/2019 1216
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	05/30/2019 1216
Fluoranthene	ND		1	2.7	0.42	ug/kg	05/30/2019 1216
Fluorene	ND		1	2.7	0.57	ug/kg	05/30/2019 1216
Hexachlorobenzene	ND		1	13	5.0	ug/kg	05/30/2019 1216
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	05/30/2019 1216
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	05/30/2019 1216
Hexachloroethane	ND		1	13	5.0	ug/kg	05/30/2019 1216
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	05/30/2019 1216
Isophorone	ND		1	13	5.0	ug/kg	05/30/2019 1216

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ17544-001
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	05/30/2019 1216
2-Methylphenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
3+4-Methylphenol	ND		1	27	10	ug/kg	05/30/2019 1216
Naphthalene	ND		1	2.7	0.97	ug/kg	05/30/2019 1216
2-Nitroaniline	ND		1	27	10	ug/kg	05/30/2019 1216
3-Nitroaniline	ND		1	27	10	ug/kg	05/30/2019 1216
4-Nitroaniline	ND		1	27	10	ug/kg	05/30/2019 1216
Nitrobenzene	ND		1	13	5.0	ug/kg	05/30/2019 1216
2-Nitrophenol	ND		1	27	10	ug/kg	05/30/2019 1216
4-Nitrophenol	ND		1	67	25	ug/kg	05/30/2019 1216
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	05/30/2019 1216
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	05/30/2019 1216
Pentachlorophenol	ND		1	67	25	ug/kg	05/30/2019 1216
Phenanthrene	ND		1	2.7	0.72	ug/kg	05/30/2019 1216
Phenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
Pyrene	ND		1	2.7	0.50	ug/kg	05/30/2019 1216
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	05/30/2019 1216
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	05/30/2019 1216
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	05/30/2019 1216
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	05/30/2019 1216

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		68	33-102
2-Fluorophenol		74	35-115
Nitrobenzene-d5		87	22-109
Phenol-d5		73	33-122
Terphenyl-d14		103	41-120
2,4,6-Tribromophenol		94	30-117

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17544-002
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	90		1	68	12-111	05/30/2019 1240
Acenaphthylene	130	91		1	69	44-122	05/30/2019 1240
Anthracene	130	100		1	76	16-122	05/30/2019 1240
Benzo(a)anthracene	130	110		1	85	40-121	05/30/2019 1240
Benzo(a)pyrene	130	120		1	88	36-114	05/30/2019 1240
Benzo(b)fluoranthene	130	120		1	90	38-123	05/30/2019 1240
Benzo(g,h,i)perylene	130	130		1	98	43-120	05/30/2019 1240
Benzo(k)fluoranthene	130	110		1	84	40-126	05/30/2019 1240
4-Bromophenyl phenyl ether	130	93		1	70	30-130	05/30/2019 1240
Butyl benzyl phthalate	130	140		1	102	48-124	05/30/2019 1240
Carbazole	130	110		1	84	47-125	05/30/2019 1240
bis (2-Chloro-1-methylethyl) ether	130	97		1	73	41-113	05/30/2019 1240
4-Chloro-3-methyl phenol	130	100		1	76	48-120	05/30/2019 1240
bis(2-Chloroethoxy)methane	130	88		1	66	38-115	05/30/2019 1240
bis(2-Chloroethyl)ether	130	89		1	67	46-122	05/30/2019 1240
2-Chloronaphthalene	130	87		1	65	37-106	05/30/2019 1240
2-Chlorophenol	130	87		1	65	44-122	05/30/2019 1240
4-Chlorophenyl phenyl ether	130	88		1	66	32-107	05/30/2019 1240
Chrysene	130	110		1	82	41-124	05/30/2019 1240
Dibenzo(a,h)anthracene	130	120		1	93	38-125	05/30/2019 1240
Dibenzofuran	130	89		1	67	45-128	05/30/2019 1240
1,2-Dichlorobenzene	130	76		1	57	39-94	05/30/2019 1240
1,3-Dichlorobenzene	130	75		1	57	30-130	05/30/2019 1240
1,4-Dichlorobenzene	130	75		1	57	39-92	05/30/2019 1240
3,3'-Dichlorobenzidine	130	53		1	40	10-119	05/30/2019 1240
2,4-Dichlorophenol	130	86		1	64	30-96	05/30/2019 1240
Diethylphthalate	130	100		1	77	30-130	05/30/2019 1240
Dimethyl phthalate	130	96		1	72	24-127	05/30/2019 1240
2,4-Dimethylphenol	130	110		1	85	30-130	05/30/2019 1240
Di-n-butyl phthalate	130	110		1	85	35-108	05/30/2019 1240
4,6-Dinitro-2-methylphenol	130	94		1	71	53-150	05/30/2019 1240
2,4-Dinitrophenol	270	140		1	54	32-115	05/30/2019 1240
2,4-Dinitrotoluene	130	100		1	76	40-130	05/30/2019 1240
2,6-Dinitrotoluene	130	97		1	73	46-118	05/30/2019 1240
Di-n-octylphthalate	130	130		1	98	49-118	05/30/2019 1240
bis(2-Ethylhexyl)phthalate	130	130		1	97	33-123	05/30/2019 1240
Fluoranthene	130	110		1	82	26-133	05/30/2019 1240
Fluorene	130	91		1	68	19-108	05/30/2019 1240
Hexachlorobenzene	130	93		1	70	10-125	05/30/2019 1240
Hexachlorobutadiene	130	75		1	57	47-116	05/30/2019 1240
Hexachlorocyclopentadiene	670	360		1	54	48-127	05/30/2019 1240
Hexachloroethane	130	77		1	58	18-154	05/30/2019 1240
Indeno(1,2,3-c,d)pyrene	130	120		1	92	42-123	05/30/2019 1240
Isophorone	130	97		1	73	30-130	05/30/2019 1240

LOQ = Limit of Quantitation
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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17544-002
Batch: 17544
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 05/22/2019 1847

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	84		1	63	10-107	05/30/2019 1240
2-Methylphenol	130	100		1	76	33-103	05/30/2019 1240
3+4-Methylphenol	130	100		1	77	18-121	05/30/2019 1240
Naphthalene	130	83		1	62	10-112	05/30/2019 1240
2-Nitroaniline	130	110		1	81	46-128	05/30/2019 1240
3-Nitroaniline	130	76		1	57	30-130	05/30/2019 1240
4-Nitroaniline	130	100		1	75	51-129	05/30/2019 1240
Nitrobenzene	130	95		1	71	49-142	05/30/2019 1240
2-Nitrophenol	130	85		1	64	33-114	05/30/2019 1240
4-Nitrophenol	270	260		1	97	27-138	05/30/2019 1240
N-Nitrosodi-n-propylamine	130	97		1	73	45-112	05/30/2019 1240
N-Nitrosodiphenylamine (Diphenylamine)	130	110		1	81	49-123	05/30/2019 1240
Pentachlorophenol	270	210		1	79	36-108	05/30/2019 1240
Phenanthrene	130	99		1	75	16-123	05/30/2019 1240
Phenol	130	100		1	77	39-108	05/30/2019 1240
Pyrene	130	120		1	87	34-121	05/30/2019 1240
1,2,4,5-Tetrachlorobenzene	130	83		1	63	30-130	05/30/2019 1240
2,3,4,6-Tetrachlorophenol	130	95		1	72	53-125	05/30/2019 1240
1,2,4-Trichlorobenzene	130	79		1	60	30-130	05/30/2019 1240
2,4,5-Trichlorophenol	130	98		1	74	32-105	05/30/2019 1240
2,4,6-Trichlorophenol	130	95		1	72	31-102	05/30/2019 1240

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		65	33-102
2-Fluorophenol		69	35-115
Nitrobenzene-d5		75	22-109
Phenol-d5		70	33-122
Terphenyl-d14		101	41-120
2,4,6-Tribromophenol		88	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ18272-001
Batch: 18272
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1502

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/03/2019 2020
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/03/2019 2020

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		95	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ18272-002
Batch: 18272
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1502

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	44		1	110	40-140	06/03/2019 2049
C9 - C18 Aliphatics	30	24		1	81	40-140	06/03/2019 2049

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		102	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ18272-003
Batch: 18272
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1502

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	40		1	99	9.9	40-140	25	06/03/2019 2118
C9 - C18 Aliphatics	30	22		1	74	8.7	40-140	25	06/03/2019 2118

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		93	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ18274-001
Batch: 18274
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/04/2019 0506

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		80	40-140
2-Fluorobiphenyl (fractionation 1)		82	40-140
o - Terphenyl (aromatic)		82	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ18274-002
Batch: 18274
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	83		1	98	40-140	06/04/2019 0535

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		95	40-140
o - Terphenyl (aromatic)		99	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ18274-003
Batch: 18274
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 05/28/2019 1202

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	79		1	93	5.2	40-140	25	06/04/2019 0604

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		95	40-140
o - Terphenyl (aromatic)		94	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ18527-001
Batch: 18527
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/03/2019 1359

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ18527-002
Batch: 18527
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	20		1	107	70-130	06/03/2019 1302

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ18527-003
Batch: 18527
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	21		1	110	2.5	70-130	25	06/03/2019 1330

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ18528-001
Batch: 18528
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	06/03/2019 1359
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/03/2019 1359
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/03/2019 1359
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/03/2019 1359
Naphthalene	ND		1	0.25	0.13	mg/kg	06/03/2019 1359
Toluene	ND		1	0.25	0.040	mg/kg	06/03/2019 1359
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/03/2019 1359
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/03/2019 1359

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ18528-002
Batch: 18528
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.3		1	104	70-130	06/03/2019 1302
C9 - C10 Aromatics	1.3	1.4		1	112	70-130	06/03/2019 1302
Ethylbenzene	1.3	1.3		1	104	70-130	06/03/2019 1302
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	06/03/2019 1302
Naphthalene	1.3	1.1		1	88	70-130	06/03/2019 1302
Toluene	1.3	1.3		1	104	70-130	06/03/2019 1302
m+p - Xylenes	2.5	2.7		1	108	70-130	06/03/2019 1302
o - Xylenes	1.3	1.3		1	104	70-130	06/03/2019 1302

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ18528-003
Batch: 18528
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	0.00	70-130	25	06/03/2019 1330
C9 - C10 Aromatics	1.3	1.4		1	112	0.00	70-130	25	06/03/2019 1330
Ethylbenzene	1.3	1.3		1	104	0.00	70-130	25	06/03/2019 1330
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	8.7	70-130	25	06/03/2019 1330
Naphthalene	1.3	1.1		1	88	0.00	70-130	25	06/03/2019 1330
Toluene	1.3	1.3		1	104	0.00	70-130	25	06/03/2019 1330
m+p - Xylenes	2.5	2.7		1	108	0.00	70-130	25	06/03/2019 1330
o - Xylenes	1.3	1.3		1	104	0.00	70-130	25	06/03/2019 1330

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ18529-001
Batch: 18529
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/03/2019 1359
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/03/2019 1359

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ18529-002
Batch: 18529
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.3		1	106	70-130	06/03/2019 1302
C9 - C12 Aliphatics, Adjusted	3.8	4.1		1	109	70-130	06/03/2019 1302

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ18529-003
Batch: 18529
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.6		1	112	5.2	70-130	25	06/03/2019 1330
C9 - C12 Aliphatics, Adjusted	3.8	4.2		1	112	2.9	70-130	25	06/03/2019 1330

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ17534-001
Batch: 17534
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 05/23/2019 810

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	05/23/2019 2111
Arsenic	ND		1	0.50	0.20	mg/kg	05/23/2019 2111
Barium	ND		1	1.3	0.31	mg/kg	05/23/2019 2111
Beryllium	ND		1	0.10	0.034	mg/kg	05/23/2019 2111
Cadmium	ND		1	0.13	0.025	mg/kg	05/23/2019 2111
Chromium	0.60	J	1	1.3	0.55	mg/kg	05/24/2019 1108
Cobalt	ND		1	1.3	0.30	mg/kg	05/23/2019 2111
Copper	ND		1	1.3	0.33	mg/kg	05/23/2019 2111
Lead	ND		1	0.25	0.068	mg/kg	05/23/2019 2111
Nickel	ND		1	1.3	0.30	mg/kg	05/23/2019 2111
Selenium	ND		1	1.3	0.47	mg/kg	05/23/2019 2111
Silver	ND		1	0.25	0.060	mg/kg	05/23/2019 2111
Vanadium	ND		1	1.3	0.25	mg/kg	05/23/2019 2111
Zinc	ND		1	2.5	0.50	mg/kg	05/23/2019 2111

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ17534-002
Batch: 17534
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 05/23/2019 810

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	46		1	92	80-120	05/23/2019 2117
Arsenic	50	45		1	91	80-120	05/23/2019 2117
Barium	50	49		1	98	80-120	05/23/2019 2117
Beryllium	50	50		1	101	80-120	05/23/2019 2117
Cadmium	50	46		1	92	80-120	05/23/2019 2117
Chromium	50	51		1	103	80-120	05/24/2019 1114
Cobalt	50	49		1	99	80-120	05/23/2019 2117
Copper	50	49		1	98	80-120	05/23/2019 2117
Lead	50	49		1	98	80-120	05/23/2019 2117
Nickel	50	47		1	94	80-120	05/23/2019 2117
Selenium	50	44		1	87	80-120	05/23/2019 2117
Silver	50	52		1	105	80-120	05/23/2019 2117
Vanadium	50	50		1	99	80-120	05/23/2019 2117
Zinc	50	46		1	91	80-120	05/23/2019 2117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UE22021-001MS
Batch: 17534
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 05/23/2019 810

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	ND	50	28	N	1	57	75-125	05/24/2019 0548
Arsenic	6.8	50	50		1	86	75-125	05/24/2019 0548
Barium	500	50	460	N	1	-69	75-125	05/24/2019 0548
Beryllium	0.73	50	47		1	92	75-125	05/24/2019 0548
Cadmium	0.27	50	44		1	86	75-125	05/24/2019 0548
Chromium	17	50	71		1	109	75-125	05/24/2019 1237
Cobalt	6.3	50	51		1	90	75-125	05/24/2019 0548
Copper	26	50	71		1	90	75-125	05/24/2019 0548
Lead	68	50	100	N	1	73	75-125	05/24/2019 0548
Nickel	15	50	58		1	85	75-125	05/24/2019 0548
Selenium	0.58	50	44		1	87	75-125	05/24/2019 0548
Silver	0.092	50	49		1	97	75-125	05/24/2019 0548
Vanadium	44	50	110	N	1	137	75-125	05/24/2019 0548
Zinc	75	50	110	N	1	69	75-125	05/24/2019 0548

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UE22021-001MD
Batch: 17534
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 05/23/2019 810

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Antimony	ND	51	31	N	1	61	8.2	75-125	20	05/24/2019 0554
Arsenic	6.8	51	53		1	91	6.0	75-125	20	05/24/2019 0554
Barium	500	51	530	N	1	71	14	75-125	20	05/24/2019 0554
Beryllium	0.73	51	52		1	101	9.9	75-125	20	05/24/2019 0554
Cadmium	0.27	51	48		1	94	9.0	75-125	20	05/24/2019 0554
Chromium	17	51	71		1	108	0.037	75-125	20	05/24/2019 1243
Cobalt	6.3	51	57		1	100	9.9	75-125	20	05/24/2019 0554
Copper	26	51	82		1	111	15	75-125	20	05/24/2019 0554
Lead	68	51	160	N,+	1	188	44	75-125	20	05/24/2019 0554
Nickel	15	51	63		1	94	8.2	75-125	20	05/24/2019 0554
Selenium	0.58	51	47		1	92	7.1	75-125	20	05/24/2019 0554
Silver	0.092	51	52		1	103	7.7	75-125	20	05/24/2019 0554
Vanadium	44	51	130	N	1	162	11	75-125	20	05/24/2019 0554
Zinc	75	51	130		1	108	17	75-125	20	05/24/2019 0554

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - MB

Sample ID: UQ17526-001
Batch: 17526
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 05/23/2019 1335

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	05/23/2019 1713

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ17526-002
Batch: 17526
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 05/23/2019 1335

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.84		1	101	80-120	05/23/2019 1720

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - MS

Sample ID: UE22021-001MS
Batch: 17526
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 05/23/2019 1335

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	ND	0.89	1.0		1	118	80-120	05/23/2019 1739

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - MSD

Sample ID: UE22021-001MD
Batch: 17526
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 05/23/2019 1335

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Mercury	ND	0.92	0.98		1	107	7.1	80-120	20	05/23/2019 1741

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Chain of Custody

and

Miscellaneous Documents

SHEALY

Chain of Custody Record

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

Number 91644

Client: Rambill US Corporation
Address: 7900 College Boulevard Suite 925
City: Overland Park State: Ks Zip Code: 66210
Project Name: CMR REAIM East Rail
Project No.: 1690012344-003 Task 221
P.O. No.:
Report to Contact: Michael Wilson
Sampler's Signature: [signature]
Printed Name: Josh Myers
Telephone No. / E-mail: 316-644-2303 / mwilson@ramboll.com
Quote No.: 21552
Page 1 of 1

UE22021

Analysis (Attach list if more space is needed)

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G-Grab C-Composite	Aqueous	Solid	Non-aqueous	Unpres.	H2SO4	HNO3	HCl	NaOH	Na2S2O3	MeOH	VOC	VPH	EPH	Metals	SVOC/EPH	SVOC
CMR-EB02-0.5-1.0-190521	5/21/19	1105	G		X		2					1	2	X	X		X	X	
~~CMR-EB5.5-6.0~~																			
CMR-EB02-5.5-6.0-190521	↓	1120	G		X		2					1	2	X	X		X	X	
CMR-EB02-5.5-6.0-190521-FD	↓	1125	G		X		2					1	2	X	X		X	X	
TB-01	N/A	N/A		X						2				X					

Turn Around Time Required (Prior lab approval required for expedited TAT.) ☑ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☑ Disposal by Lab

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☑ Unknown

QC Requirements (Specify)

Relinquished by	Date	Time	Received by	Date	Time
1. Josh Myers / [signature]	5/21/19	1230	1.		
2.			2.		
3.			3.		
4. FEDEX	5-22-19	1014	4. Laboratory received by [signature]	5-22-19	1014

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack Receipt Temp. 3.0 °C TB

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 08-01-2014

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: ECC / 5/22/2019 Lot #: UE22021

Means of receipt: ☐ SESI ☑ Client ☐ UPS ☐ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

3.0 / 3.0 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☑ None

☑ Yes	☐ No	☐ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # _____

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with _____mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # _____.
Time of preservation _____. If more than one preservative is needed, please note in the comments below.

Sample(s) -004(1) were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L. (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: ECC Date: 5/22/19

Comments:

MEMO

Date: **June 17, 2019**

To: **File**

From: **R Huening**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UE22029, 5 Groundwater Samples, 4 Water Samples

Data validation and usability assessment was conducted for data package UE22029 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB06-190516	UE22029-001
CMR-EB07-190516	UE22029-002
CMR-EB11-190520	UE22029-003
CMR-EB14-190520	UE22029-004
CMR-EB05-190521	UE22029-005
CMR-EB-01-20190521	UE22029-006
CMR-EB-02-20190521	UE22029-007
TB-05-20190516	UE22029-008
TB-06-20190516	UE22029-009

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance

- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

MS/MSD Recoveries
For the SVOC analysis suite MS/MSD results were reported. Recoveries were largely outside of criteria with the low recoveries indicating likely low bias. These out of criteria recoveries indicate a possible systemic bias to results. Therefore, ALL SVOC were flagged as estimated (J, UJ).

In the metals analysis beryllium recovered out of criteria low, indicating possible low bias. Therefore all beryllium results were validated as estimated (J, UJ).

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

Blank Detections
During analysis, bis(2-ethylhexyl)phthalate, naphthalene, and toluene were detected in trip, method, and/or equipment blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All bis(2-ethylhexyl)phthalate, naphthalene, and toluene results below the RL or below 5x the blank result have been validated as non-detect (U).

Sample Receipt Issues
The lab reported in the narrative that some samples arrived at the lab in broken containers. In order to complete analyses, sample media was taken from other sample containers to complete analysis. These results are usable though RLs had to be raised due to limited sample volume. No additional validation was warranted.

Hold Time
All samples were analyzed by the lab within their hold time requirements. However, due to QC issues during the initial analysis some samples were reanalyzed outside of hold time. While these out of hold time results are generally usable, the results within hold time should be used preferentially.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UE22029

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 5 GW, 4 Water

Reviewer Name R Huening

Completion Date July 10, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	MS/MSD results for beryllium out of criteria low. All beryllium results (all NDs) validated as estimated (UJ).
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All beryllium results (all NDs) validated as estimated (UJ).

SDG No. UE22029

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 5 GW, 4 Water

Reviewer Name R Huening

Completion Date July 10, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	One sample had EPH bottles received broken. Spare SVOC bottle was used for analysis with raised RLs. No additional action taken.
Blanks	Bis(2-ethylhexyl)phthalate detected in equipment blank samples. Project sample detections of bis(2-ethylhexyl)phthalate validated as non-detect at the RL (U).	VPH naphthalene and toluene detected in equipment blank samples. All VPH toluene and naphthalene results below the RL validated as non-detect (U) at the RL.
Deuterated Monitoring Compound or Surrogate Spikes	Several surrogates out of criteria due to dilutions. No action taken.	Several surrogates out of criteria due to matrix interference. No action taken.
Matrix Spike/Matrix Spike Duplicate	MS/MSD sample pair had a high number (28) of analytes out of criteria with no obvious cause beyond matrix issues. ALL SVOC results validated as estimated (J, UJ).	No MS/MSD results reported with project samples. No action taken.
Laboratory Control Sample	SVOCs 2-clorophenol, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-methylphenol, 2-nitroaniline, and phenol had LCS recoveries below criteria. See discussion above.	RPDs for C5-C8 aliphatics and MTBE out of criteria. No other QC issues, no action taken.
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/A
Other Non-conformances	Several compounds were rerun at dilutions which led to raised RLs. Additional SVOC run done out of hold time on several samples due to QC issues. Both data sets are usable though the run within hold time should have preference.	No other issues noted or identified.

SDG No. UE22029

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 5 GW, 4 Water

Reviewer Name R Huening

Completion Date July 10, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Overall Assessment of Data	Project sample detections of bis(2-ethylhexyl)phthalate validated as non-detect at the RL (U). ALL SVOC results validated as estimated (J, UJ).	All VPH toluene and naphthalene results below the RL validated as non-detect (U) at the RL.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 16-0012344-003 Task 221

Lot Number:**UE22029**

Date Completed:06/06/2019
Revision Date: 06/10/2019

06/10/2019 1:52 PM
Approved and released by:
Project Manager: Kelly M. Nance

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UE22029

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

This report supersedes and replaces any prior reports issued under this lot number. The details of the applicable revisions are detailed in a Report Revision Notice provided under separate cover.

Sample Receiving
Sample -007 was received with both 1L amber jars with HCl preservative for EPH analysis broken. One of the 250mL amber jars for semivolatiles analysis was preserved with HCL to pH <2 in the laboratory and used for EPH analysis. As a result, a reduced initial volume was used and the reporting limits have been raised accordingly.

Volatiles
Sample -001 was diluted 5X due to the sample matrix. The reporting limits have been raised accordingly.

Semivolatiles
The laboratory control sample (LCS) associated with batch 17674 had 2-clorophenol, 2,4-dinitrotoluene, 2,6-dinitrotoluene, 2-methylphenol, 2-nitroaniline, and phenol recovered below the acceptance limits. The matrix spike/matrix spike duplicate (MS/MSD) had multiple compounds recovered outside of the acceptance limits. Samples -001 and -007 had insufficient sample volume remaining for re-extraction and re-analysis. All other samples were re-extracted and re-analyzed outside of the holding time. The LCS associated with re-extract batch 18268 had 2,4-dinitrotoluene, 2,6-dinitrotoluene, di-n-octylphthalate, and bis(2-ethylhexyl)phthalate recovered below the acceptance limits. Both sets of data are reported.

Samples -001 and -002 were diluted 10X due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
The RPD for methyl tertiary butyl ether (MTBE) exceeded method control limits in batch 17877; however, all other criteria for this compound in the LCS/LCSD were within acceptance criteria and method control limits. The associated sample results were reported and no corrective action was required.

The RPD for C5-C8 Aliphatics exceeded method control limits in batch 17878; however, all other criteria for this compound in the LCS/LCSD were within acceptance criteria and method control limits. The

associated sample results were reported and no corrective action was required.

Samples -001, -002, -003, -004, and -005 had multiple compounds detected in the VPH analysis above the LOQ. Naphthalene was detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same time as MTBE and naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Samples -001, -002, and -005 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The MS/MSD associated with sample -002 had beryllium recovered outside of the acceptance limits. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample Summary
Ramboll US Corporation
Lot Number: UE22029

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB06-190516	Aqueous	05/16/2019 1650	05/22/2019
002	CMR-EB07-190516	Aqueous	05/16/2019 1730	05/22/2019
003	CMR-EB11-190520	Aqueous	05/20/2019 1700	05/22/2019
004	CMR-EB14-190520	Aqueous	05/20/2019 1605	05/22/2019
005	CMR-EB05-190521	Aqueous	05/21/2019 1605	05/22/2019
006	CMR-EB-01-20190521	Aqueous	05/21/2019 1440	05/22/2019
007	CMR-EB-02-20190521	Aqueous	05/21/2019 1445	05/22/2019
008	TB-05-20190516	Aqueous	05/16/2019	05/22/2019
009	TB-06-20190516	Aqueous	05/16/2019	05/22/2019

(9 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UE22029

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB06-190516	Aqueous	Benzene	8260B	94		ug/L	12
001	CMR-EB06-190516	Aqueous	Cyclohexane	8260B	4.9		ug/L	12
001	CMR-EB06-190516	Aqueous	Isopropylbenzene	8260B	2.9		ug/L	12
001	CMR-EB06-190516	Aqueous	Methylcyclohexane	8260B	5.7	J	ug/L	12
001	CMR-EB06-190516	Aqueous	Naphthalene	8260B	8.3		ug/L	12
001	CMR-EB06-190516	Aqueous	Xylenes (total)	8260B	6.0		ug/L	13
001	CMR-EB06-190516	Aqueous	m+p - Xylenes	8260B	2.2	J	ug/L	13
001	CMR-EB06-190516	Aqueous	o - Xylenes	8260B	3.8		ug/L	13
001	CMR-EB06-190516	Aqueous	Acenaphthene	8270D	6.9		ug/L	14
001	CMR-EB06-190516	Aqueous	Anthracene	8270D	0.92	J	ug/L	14
001	CMR-EB06-190516	Aqueous	Carbazole	8270D	17		ug/L	14
001	CMR-EB06-190516	Aqueous	Dibenzofuran	8270D	3.1	J	ug/L	14
001	CMR-EB06-190516	Aqueous	Fluorene	8270D	4.5		ug/L	14
001	CMR-EB06-190516	Aqueous	2-Methylnaphthalene	8270D	0.77	J	ug/L	15
001	CMR-EB06-190516	Aqueous	Naphthalene	8270D	4.7		ug/L	15
001	CMR-EB06-190516	Aqueous	Phenanthrene	8270D	1.3	J	ug/L	15
001	CMR-EB06-190516	Aqueous	Pyrene	8270D	0.58	J	ug/L	15
001	CMR-EB06-190516	Aqueous	C19 - C36 Aliphatics	Montana EPH	5700		ug/L	16
001	CMR-EB06-190516	Aqueous	C9 - C18 Aliphatics	Montana EPH	13000		ug/L	16
001	CMR-EB06-190516	Aqueous	C11 - C22 Aromatics	Montana EPH	12000		ug/L	17
001	CMR-EB06-190516	Aqueous	C5 - C8 Aliphatics,	Montana VPH	210		ug/L	18
001	CMR-EB06-190516	Aqueous	C9 - C12 Aliphatics,	Montana VPH	750		ug/L	18
001	CMR-EB06-190516	Aqueous	Benzene	Montana VPH	96		ug/L	19
001	CMR-EB06-190516	Aqueous	C9 - C10 Aromatics	Montana VPH	550		ug/L	19
001	CMR-EB06-190516	Aqueous	Ethylbenzene	Montana VPH	5.0		ug/L	19
001	CMR-EB06-190516	Aqueous	Naphthalene	Montana VPH	35		ug/L	19
001	CMR-EB06-190516	Aqueous	Toluene	Montana VPH	1.6	J	ug/L	19
001	CMR-EB06-190516	Aqueous	m+p - Xylenes	Montana VPH	2.6	J	ug/L	19
001	CMR-EB06-190516	Aqueous	o - Xylenes	Montana VPH	7.5		ug/L	19
001	CMR-EB06-190516	Aqueous	TPH	Montana VPH	1500		ug/L	20
001	CMR-EB06-190516	Aqueous	Antimony	6020B	1.3	J	ug/L	21
001	CMR-EB06-190516	Aqueous	Arsenic	6020B	150		ug/L	21
001	CMR-EB06-190516	Aqueous	Barium	6020B	1300		ug/L	21
001	CMR-EB06-190516	Aqueous	Chromium	6020B	1.5	J	ug/L	21
001	CMR-EB06-190516	Aqueous	Cobalt	6020B	2.5	J	ug/L	21
001	CMR-EB06-190516	Aqueous	Copper	6020B	3.7	J	ug/L	21
001	CMR-EB06-190516	Aqueous	Lead	6020B	0.83	J	ug/L	21
001	CMR-EB06-190516	Aqueous	Nickel	6020B	11		ug/L	21
001	CMR-EB06-190516	Aqueous	Vanadium	6020B	4.2	J	ug/L	21
001	CMR-EB06-190516	Aqueous	Zinc	6020B	12		ug/L	21
002	CMR-EB07-190516	Aqueous	Acetone	8260B	53		ug/L	22
002	CMR-EB07-190516	Aqueous	Benzene	8260B	37		ug/L	22
002	CMR-EB07-190516	Aqueous	2-Butanone (MEK)	8260B	66		ug/L	22
002	CMR-EB07-190516	Aqueous	Cyclohexane	8260B	32		ug/L	22
002	CMR-EB07-190516	Aqueous	Ethylbenzene	8260B	33		ug/L	22

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-EB07-190516	Aqueous	Isopropylbenzene	8260B	21		ug/L	22
002	CMR-EB07-190516	Aqueous	Methylcyclohexane	8260B	65		ug/L	22
002	CMR-EB07-190516	Aqueous	Naphthalene	8260B	330		ug/L	22
002	CMR-EB07-190516	Aqueous	Xylenes (total)	8260B	6.1		ug/L	23
002	CMR-EB07-190516	Aqueous	m+p - Xylenes	8260B	3.1		ug/L	23
002	CMR-EB07-190516	Aqueous	o - Xylenes	8260B	3.0		ug/L	23
002	CMR-EB07-190516	Aqueous	Acenaphthene	8270D	6.6		ug/L	24
002	CMR-EB07-190516	Aqueous	Anthracene	8270D	2.0		ug/L	24
002	CMR-EB07-190516	Aqueous	Dibenzofuran	8270D	5.9	J	ug/L	24
002	CMR-EB07-190516	Aqueous	Fluorene	8270D	8.9		ug/L	24
002	CMR-EB07-190516	Aqueous	2-Methylnaphthalene	8270D	420		ug/L	25
002	CMR-EB07-190516	Aqueous	Naphthalene	8270D	95		ug/L	25
002	CMR-EB07-190516	Aqueous	Phenanthrene	8270D	8.5		ug/L	25
002	CMR-EB07-190516	Aqueous	Pyrene	8270D	1.5	J	ug/L	25
002	CMR-EB07-190516	Aqueous	C19 - C36 Aliphatics	Montana EPH	4500		ug/L	28
002	CMR-EB07-190516	Aqueous	C9 - C18 Aliphatics	Montana EPH	9900		ug/L	28
002	CMR-EB07-190516	Aqueous	C11 - C22 Aromatics	Montana EPH	13000		ug/L	29
002	CMR-EB07-190516	Aqueous	C5 - C8 Aliphatics,	Montana VPH	2100		ug/L	30
002	CMR-EB07-190516	Aqueous	C9 - C12 Aliphatics,	Montana VPH	6800		ug/L	30
002	CMR-EB07-190516	Aqueous	Benzene	Montana VPH	36	J	ug/L	31
002	CMR-EB07-190516	Aqueous	C9 - C10 Aromatics	Montana VPH	5800		ug/L	31
002	CMR-EB07-190516	Aqueous	Ethylbenzene	Montana VPH	140		ug/L	31
002	CMR-EB07-190516	Aqueous	Naphthalene	Montana VPH	1100		ug/L	31
002	CMR-EB07-190516	Aqueous	o - Xylenes	Montana VPH	140		ug/L	31
002	CMR-EB07-190516	Aqueous	TPH	Montana VPH	15000		ug/L	32
002	CMR-EB07-190516	Aqueous	Antimony	6020B	4.7		ug/L	33
002	CMR-EB07-190516	Aqueous	Arsenic	6020B	3.4		ug/L	33
002	CMR-EB07-190516	Aqueous	Barium	6020B	180		ug/L	33
002	CMR-EB07-190516	Aqueous	Copper	6020B	5.5		ug/L	33
002	CMR-EB07-190516	Aqueous	Nickel	6020B	7.0		ug/L	33
002	CMR-EB07-190516	Aqueous	Vanadium	6020B	5.9		ug/L	33
002	CMR-EB07-190516	Aqueous	Zinc	6020B	5.5	J	ug/L	33
003	CMR-EB11-190520	Aqueous	Acetone	8260B	2.1	J	ug/L	34
003	CMR-EB11-190520	Aqueous	Benzene	8260B	0.57		ug/L	34
003	CMR-EB11-190520	Aqueous	Cyclohexane	8260B	8.2		ug/L	34
003	CMR-EB11-190520	Aqueous	Ethylbenzene	8260B	8.6		ug/L	34
003	CMR-EB11-190520	Aqueous	Isopropylbenzene	8260B	1.5		ug/L	34
003	CMR-EB11-190520	Aqueous	Methylcyclohexane	8260B	13		ug/L	34
003	CMR-EB11-190520	Aqueous	Naphthalene	8260B	2.2		ug/L	34
003	CMR-EB11-190520	Aqueous	Toluene	8260B	0.53		ug/L	34
003	CMR-EB11-190520	Aqueous	Xylenes (total)	8260B	41		ug/L	35
003	CMR-EB11-190520	Aqueous	m+p - Xylenes	8260B	32		ug/L	35
003	CMR-EB11-190520	Aqueous	o - Xylenes	8260B	9.4		ug/L	35
003	CMR-EB11-190520	Aqueous	2,4-Dimethylphenol	8270D	0.51	J	ug/L	36
003	CMR-EB11-190520	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.49	J	ug/L	36
003	CMR-EB11-190520	Aqueous	Fluorene	8270D	0.051	J	ug/L	36
003	CMR-EB11-190520	Aqueous	2-Methylnaphthalene	8270D	1.8		ug/L	37
003	CMR-EB11-190520	Aqueous	Naphthalene	8270D	1.7		ug/L	37

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-EB11-190520	Aqueous	Phenanthrene	8270D	0.090	J	ug/L	37
003	CMR-EB11-190520	Aqueous	Pyrene	8270D	0.045	J	ug/L	37
003	CMR-EB11-190520	Aqueous	TEH	Montana EPH	580		ug/L	40
003	CMR-EB11-190520	Aqueous	C5 - C8 Aliphatics,	Montana VPH	330		ug/L	41
003	CMR-EB11-190520	Aqueous	C9 - C12 Aliphatics,	Montana VPH	250		ug/L	41
003	CMR-EB11-190520	Aqueous	Benzene	Montana VPH	0.84	J	ug/L	42
003	CMR-EB11-190520	Aqueous	C9 - C10 Aromatics	Montana VPH	250		ug/L	42
003	CMR-EB11-190520	Aqueous	Ethylbenzene	Montana VPH	17		ug/L	42
003	CMR-EB11-190520	Aqueous	Naphthalene	Montana VPH	7.7		ug/L	42
003	CMR-EB11-190520	Aqueous	Toluene	Montana VPH	1.7	J	ug/L	42
003	CMR-EB11-190520	Aqueous	m+p - Xylenes	Montana VPH	43		ug/L	42
003	CMR-EB11-190520	Aqueous	o - Xylenes	Montana VPH	16		ug/L	42
003	CMR-EB11-190520	Aqueous	TPH	Montana VPH	850		ug/L	43
003	CMR-EB11-190520	Aqueous	Antimony	6020B	1.7	J	ug/L	44
003	CMR-EB11-190520	Aqueous	Arsenic	6020B	120		ug/L	44
003	CMR-EB11-190520	Aqueous	Barium	6020B	22		ug/L	44
003	CMR-EB11-190520	Aqueous	Cadmium	6020B	9.6		ug/L	44
003	CMR-EB11-190520	Aqueous	Cobalt	6020B	100		ug/L	44
003	CMR-EB11-190520	Aqueous	Copper	6020B	45		ug/L	44
003	CMR-EB11-190520	Aqueous	Lead	6020B	1.4		ug/L	44
003	CMR-EB11-190520	Aqueous	Nickel	6020B	67		ug/L	44
003	CMR-EB11-190520	Aqueous	Silver	6020B	0.57	J	ug/L	44
003	CMR-EB11-190520	Aqueous	Zinc	6020B	1300		ug/L	44
004	CMR-EB14-190520	Aqueous	Methylcyclohexane	8260B	1.2	J	ug/L	45
004	CMR-EB14-190520	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.53	J	ug/L	47
004	CMR-EB14-190520	Aqueous	TEH	Montana EPH	330		ug/L	51
004	CMR-EB14-190520	Aqueous	C5 - C8 Aliphatics,	Montana VPH	48	J	ug/L	52
004	CMR-EB14-190520	Aqueous	C9 - C12 Aliphatics,	Montana VPH	220		ug/L	52
004	CMR-EB14-190520	Aqueous	C9 - C10 Aromatics	Montana VPH	150		ug/L	53
004	CMR-EB14-190520	Aqueous	Ethylbenzene	Montana VPH	1.2	J	ug/L	53
004	CMR-EB14-190520	Aqueous	Naphthalene	Montana VPH	6.6		ug/L	53
004	CMR-EB14-190520	Aqueous	Toluene	Montana VPH	0.76	J	ug/L	53
004	CMR-EB14-190520	Aqueous	o - Xylenes	Montana VPH	1.1	J	ug/L	53
004	CMR-EB14-190520	Aqueous	TPH	Montana VPH	410		ug/L	54
004	CMR-EB14-190520	Aqueous	Antimony	6020B	1.4	J	ug/L	55
004	CMR-EB14-190520	Aqueous	Arsenic	6020B	4.6		ug/L	55
004	CMR-EB14-190520	Aqueous	Barium	6020B	19		ug/L	55
004	CMR-EB14-190520	Aqueous	Cadmium	6020B	9.8		ug/L	55
004	CMR-EB14-190520	Aqueous	Cobalt	6020B	2.5	J	ug/L	55
004	CMR-EB14-190520	Aqueous	Copper	6020B	20		ug/L	55
004	CMR-EB14-190520	Aqueous	Nickel	6020B	15		ug/L	55
004	CMR-EB14-190520	Aqueous	Zinc	6020B	1700		ug/L	55
005	CMR-EB05-190521	Aqueous	Acetone	8260B	15	J	ug/L	56
005	CMR-EB05-190521	Aqueous	Benzene	8260B	49		ug/L	56
005	CMR-EB05-190521	Aqueous	Ethylbenzene	8260B	20		ug/L	56
005	CMR-EB05-190521	Aqueous	Isopropylbenzene	8260B	3.4		ug/L	56
005	CMR-EB05-190521	Aqueous	Naphthalene	8260B	340		ug/L	56
005	CMR-EB05-190521	Aqueous	Toluene	8260B	2.1	J	ug/L	56

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
005	CMR-EB05-190521	Aqueous	Xylenes (total)	8260B	12		ug/L	57
005	CMR-EB05-190521	Aqueous	m+p - Xylenes	8260B	7.2		ug/L	57
005	CMR-EB05-190521	Aqueous	o - Xylenes	8260B	4.8		ug/L	57
005	CMR-EB05-190521	Aqueous	C5 - C8 Aliphatics,	Montana VPH	29	J	ug/L	58
005	CMR-EB05-190521	Aqueous	C9 - C12 Aliphatics,	Montana VPH	420		ug/L	58
005	CMR-EB05-190521	Aqueous	Benzene	Montana VPH	45		ug/L	59
005	CMR-EB05-190521	Aqueous	C9 - C10 Aromatics	Montana VPH	1900		ug/L	59
005	CMR-EB05-190521	Aqueous	Ethylbenzene	Montana VPH	33		ug/L	59
005	CMR-EB05-190521	Aqueous	Naphthalene	Montana VPH	770		ug/L	59
005	CMR-EB05-190521	Aqueous	Toluene	Montana VPH	4.8	J	ug/L	59
005	CMR-EB05-190521	Aqueous	m+p - Xylenes	Montana VPH	15	J	ug/L	59
005	CMR-EB05-190521	Aqueous	o - Xylenes	Montana VPH	8.9	J	ug/L	59
005	CMR-EB05-190521	Aqueous	TPH	Montana VPH	1300		ug/L	60
006	CMR-EB-01-20190521	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.55	J	ug/L	63
006	CMR-EB-01-20190521	Aqueous	Naphthalene	Montana VPH	0.85	J	ug/L	69
006	CMR-EB-01-20190521	Aqueous	Toluene	Montana VPH	0.95	J	ug/L	69
007	CMR-EB-02-20190521	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.43	J	ug/L	74
007	CMR-EB-02-20190521	Aqueous	Toluene	Montana VPH	0.59	J	ug/L	79

(159 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-001
Description: CMR-EB06-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1650
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	05/24/2019 1707	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		50	10	ug/L	1
Benzene	71-43-2	8260B	94		2.5	2.0	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		2.5	2.0	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		2.5	2.0	ug/L	1
Bromoform	75-25-2	8260B	ND		2.5	2.0	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.5	2.0	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		50	10	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		2.5	2.0	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		2.5	2.0	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		2.5	2.0	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.5	2.0	ug/L	1
Chloroform	67-66-3	8260B	ND		2.5	2.0	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		2.5	2.0	ug/L	1
Cyclohexane	110-82-7	8260B	4.9		2.5	2.0	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		2.5	2.0	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		2.5	2.0	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		2.5	2.0	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		2.5	2.0	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		2.5	2.0	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.5	2.0	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		2.5	2.0	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		2.5	2.0	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		2.5	2.0	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		2.5	2.0	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		2.5	2.0	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		2.5	0.55	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		100	67	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		2.5	2.0	ug/L	1
2-Hexanone	591-78-6	8260B	ND		50	10	ug/L	1
Isopropylbenzene	98-82-8	8260B	2.9		2.5	2.0	ug/L	1
Methyl acetate	79-20-9	8260B	ND		5.0	2.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		2.5	2.0	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		50	10	ug/L	1
Methylcyclohexane	108-87-2	8260B	5.7	J	25	2.0	ug/L	1
Methylene chloride	75-09-2	8260B	ND		2.5	2.0	ug/L	1
Naphthalene	91-20-3	8260B	8.3		2.5	2.0	ug/L	1
Styrene	100-42-5	8260B	ND		2.5	2.1	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		2.5	2.0	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		2.5	2.0	ug/L	1
Toluene	108-88-3	8260B	ND		2.5	2.0	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.0	2.1	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-001
Description: CMR-EB06-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1650
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	05/24/2019 1707	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		2.5	2.0	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		2.5	2.0	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		2.5	2.0	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		2.5	2.0	ug/L	1
Trichloroethene	79-01-6	8260B	ND		2.5	2.0	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		2.5	2.0	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		2.5	2.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	6.0		5.0	2.0	ug/L	1
m+p - Xylenes	179601-23-1	8260B	2.2	J	2.5	2.0	ug/L	1
o - Xylenes	95-47-6	8260B	3.8		2.5	2.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-001
Description: CMR-EB06-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1650
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	05/30/2019 2202	SCD	05/23/2019 1615	17674

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	6.9		1.6	0.40	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		1.6	0.40	ug/L	1
Anthracene	120-12-7	8270D	0.92	J	1.6	0.40	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		1.6	0.40	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		1.6	0.40	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		1.6	0.40	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		8.0	1.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		40	2.1	ug/L	1
Carbazole	86-74-8	8270D	17		8.0	0.40	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		8.0	1.7	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		8.0	2.6	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		8.0	0.60	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		8.0	1.6	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		8.0	1.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		8.0	1.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		8.0	1.6	ug/L	1
Chrysene	218-01-9	8270D	ND		1.6	0.40	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		1.6	0.40	ug/L	1
Dibenzofuran	132-64-9	8270D	3.1	J	8.0	1.6	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		8.0	1.7	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		8.0	1.8	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		8.0	1.6	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		40	8.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		8.0	1.9	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		40	1.9	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		40	1.8	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		8.0	1.5	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		40	4.2	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		40	8.9	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		40	13	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		16	3.6	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		16	3.4	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		40	4.8	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		40	3.8	ug/L	1
Fluoranthene	206-44-0	8270D	ND		1.6	0.40	ug/L	1
Fluorene	86-73-7	8270D	4.5		1.6	0.40	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		8.0	1.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		8.0	1.7	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		40	11	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		8.0	1.7	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		1.6	0.40	ug/L	1
Isophorone	78-59-1	8270D	ND		8.0	2.2	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-001
Description: CMR-EB06-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1650
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	05/30/2019 2202	SCD	05/23/2019 1615	17674

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	0.77	J	1.6	0.40	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		8.0	2.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		16	4.6	ug/L	1
Naphthalene	91-20-3	8270D	4.7		1.6	0.40	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		16	6.6	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		16	1.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		16	13	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		8.0	1.7	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		16	4.4	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		40	21	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		8.0	2.8	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		8.0	5.0	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		40	13	ug/L	1
Phenanthrene	85-01-8	8270D	1.3	J	1.6	0.40	ug/L	1
Phenol	108-95-2	8270D	ND		8.0	1.9	ug/L	1
Pyrene	129-00-0	8270D	0.58	J	1.6	0.40	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		8.0	2.5	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		8.0	5.5	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		8.0	3.7	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		8.0	1.9	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		8.0	2.2	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		42	37-129
2-Fluorophenol	N	23	24-127
Nitrobenzene-d5		73	38-127
Phenol-d5		37	28-128
Terphenyl-d14		22	10-148
2,4,6-Tribromophenol		73	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-001
Description: CMR-EB06-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1650
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/03/2019 1723	CHG	05/23/2019 2138	18169

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	5700		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	13000		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		53	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-001
Description: CMR-EB06-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1650
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/03/2019 1852	CHG	05/23/2019 2138	18170

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	12000		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		97	40-140
2-Fluorobiphenyl (fractionation 1)		124	40-140
o - Terphenyl (aromatic)		106	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-001
Description: CMR-EB06-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1650
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/24/2019 0020	JJG		17878

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	210		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	750		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	2030	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-001
Description: CMR-EB06-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1650
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/24/2019 0020	JJG		17877

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	96		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	550		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	5.0		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	35		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	1.6	J	5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	2.6	J	5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	7.5		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	968	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE22029-001
Description: CMR-EB06-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1650
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/24/2019 0020	JJG		17879

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1500		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1320	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-001
Description: CMR-EB06-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1650
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	05/29/2019 1358	JMH	05/28/2019 1151	17938
1	3005A	6020B	1	05/27/2019 0526	LLL	05/23/2019 1754	17690

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.3	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	150		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	1300		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	1.5	J	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	2.5	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	3.7	J	5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	0.83	J	1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	11		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	4.2	J	5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	12		10	2.5	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	05/24/2019 1730	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	53		50	10	ug/L	1
Benzene	71-43-2	8260B	37		2.5	2.0	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		2.5	2.0	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		2.5	2.0	ug/L	1
Bromoform	75-25-2	8260B	ND		2.5	2.0	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.5	2.0	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	66		50	10	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		2.5	2.0	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		2.5	2.0	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		2.5	2.0	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.5	2.0	ug/L	1
Chloroform	67-66-3	8260B	ND		2.5	2.0	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		2.5	2.0	ug/L	1
Cyclohexane	110-82-7	8260B	32		2.5	2.0	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		2.5	2.0	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		2.5	2.0	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		2.5	2.0	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		2.5	2.0	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		2.5	2.0	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.5	2.0	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		2.5	2.0	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		2.5	2.0	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		2.5	2.0	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		2.5	2.0	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		2.5	2.0	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		2.5	0.55	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		100	67	ug/L	1
Ethylbenzene	100-41-4	8260B	33		2.5	2.0	ug/L	1
2-Hexanone	591-78-6	8260B	ND		50	10	ug/L	1
Isopropylbenzene	98-82-8	8260B	21		2.5	2.0	ug/L	1
Methyl acetate	79-20-9	8260B	ND		5.0	2.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		2.5	2.0	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		50	10	ug/L	1
Methylcyclohexane	108-87-2	8260B	65		25	2.0	ug/L	1
Methylene chloride	75-09-2	8260B	ND		2.5	2.0	ug/L	1
Naphthalene	91-20-3	8260B	330		2.5	2.0	ug/L	1
Styrene	100-42-5	8260B	ND		2.5	2.1	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		2.5	2.0	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		2.5	2.0	ug/L	1
Toluene	108-88-3	8260B	ND		2.5	2.0	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.0	2.1	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	05/24/2019 1730	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		2.5	2.0	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		2.5	2.0	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		2.5	2.0	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		2.5	2.0	ug/L	1
Trichloroethene	79-01-6	8260B	ND		2.5	2.0	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		2.5	2.0	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		2.5	2.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	6.1		5.0	2.0	ug/L	1
m+p - Xylenes	179601-23-1	8260B	3.1		2.5	2.0	ug/L	1
o - Xylenes	95-47-6	8260B	3.0		2.5	2.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	06/01/2019 0018	SCD	05/23/2019 1615	17674
2	3520C	8270D	50	06/03/2019 1923	JCG	05/23/2019 1615	17674
3	3520C	8270D	10	06/03/2019 2102	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	6.6		1.6	0.40	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		1.6	0.40	ug/L	1
Anthracene	120-12-7	8270D	2.0		1.6	0.40	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		1.6	0.40	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		1.6	0.40	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		1.6	0.40	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		8.0	1.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		40	2.1	ug/L	1
Carbazole	86-74-8	8270D	ND		8.0	0.40	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		8.0	1.7	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		8.0	2.6	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		8.0	0.60	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		8.0	1.6	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		8.0	1.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		8.0	1.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		8.0	1.6	ug/L	1
Chrysene	218-01-9	8270D	ND		1.6	0.40	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		1.6	0.40	ug/L	1
Dibenzofuran	132-64-9	8270D	5.9	J	8.0	1.6	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		8.0	1.7	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		8.0	1.8	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		8.0	1.6	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		40	8.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		8.0	1.9	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		40	1.9	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		40	1.8	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		8.0	1.5	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		40	4.2	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		40	8.9	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		40	13	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		16	3.6	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		16	3.4	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		40	4.8	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		40	3.8	ug/L	1
Fluoranthene	206-44-0	8270D	ND		1.6	0.40	ug/L	1
Fluorene	86-73-7	8270D	8.9		1.6	0.40	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		8.0	1.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		8.0	1.7	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		40	11	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		8.0	1.7	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	06/01/2019 0018	SCD	05/23/2019 1615	17674
2	3520C	8270D	50	06/03/2019 1923	JCG	05/23/2019 1615	17674
3	3520C	8270D	10	06/03/2019 2102	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		1.6	0.40	ug/L	1
Isophorone	78-59-1	8270D	ND		8.0	2.2	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	420		8.0	2.0	ug/L	2
2-Methylphenol	95-48-7	8270D	ND		8.0	2.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		16	4.6	ug/L	1
Naphthalene	91-20-3	8270D	95		1.6	0.40	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		16	6.6	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		16	1.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		16	13	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		8.0	1.7	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		16	4.4	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		40	21	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		8.0	2.8	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		8.0	5.0	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		40	13	ug/L	1
Phenanthrene	85-01-8	8270D	8.5		1.6	0.40	ug/L	1
Phenol	108-95-2	8270D	ND		8.0	1.9	ug/L	1
Pyrene	129-00-0	8270D	1.5	J	1.6	0.40	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		8.0	2.5	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		8.0	5.5	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		8.0	3.7	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		8.0	1.9	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		8.0	2.2	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	Q	Run 3 % Recovery	Acceptance Limits
2-Fluorobiphenyl	N	34	37-129		42	37-129	H	64	37-129
2-Fluorophenol		32	24-127		37	24-127	H	43	24-127
Nitrobenzene-d5		79	38-127		48	38-127	H	82	38-127
Phenol-d5		41	28-128		34	28-128	H	56	28-128
Terphenyl-d14		23	10-148		28	10-148	H	31	10-148
2,4,6-Tribromophenol		68	35-144	N	25	35-144	H	85	35-144

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	06/01/2019 0018	SCD	05/23/2019 1615	17674
2	3520C	8270D	50	06/03/2019 1923	JCG	05/23/2019 1615	17674
3	3520C	8270D	10	06/03/2019 2102	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	16	H	1.6	0.40	ug/L	3
Acenaphthylene	208-96-8	8270D	ND	H	1.6	0.40	ug/L	3
Anthracene	120-12-7	8270D	3.0	H	1.6	0.40	ug/L	3
Benzo(a)anthracene	56-55-3	8270D	ND	H	1.6	0.40	ug/L	3
Benzo(a)pyrene	50-32-8	8270D	ND	H	1.6	0.40	ug/L	3
Benzo(b)fluoranthene	205-99-2	8270D	ND	H	1.6	0.40	ug/L	3
Benzo(g,h,i)perylene	191-24-2	8270D	ND	H	1.6	0.40	ug/L	3
Benzo(k)fluoranthene	207-08-9	8270D	ND	H	1.6	0.40	ug/L	3
4-Bromophenyl phenyl ether	101-55-3	8270D	ND	H	8.0	1.5	ug/L	3
Butyl benzyl phthalate	85-68-7	8270D	ND	H	40	2.1	ug/L	3
Carbazole	86-74-8	8270D	ND	H	8.0	0.40	ug/L	3
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND	H	8.0	1.7	ug/L	3
4-Chloro-3-methyl phenol	59-50-7	8270D	ND	H	8.0	2.6	ug/L	3
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND	H	8.0	0.60	ug/L	3
bis(2-Chloroethyl)ether	111-44-4	8270D	ND	H	8.0	1.6	ug/L	3
2-Chloronaphthalene	91-58-7	8270D	ND	H	8.0	1.5	ug/L	3
2-Chlorophenol	95-57-8	8270D	ND	H	8.0	1.5	ug/L	3
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND	H	8.0	1.6	ug/L	3
Chrysene	218-01-9	8270D	ND	H	1.6	0.40	ug/L	3
Dibenzo(a,h)anthracene	53-70-3	8270D	ND	H	1.6	0.40	ug/L	3
Dibenzofuran	132-64-9	8270D	8.9	H	8.0	1.6	ug/L	3
1,2-Dichlorobenzene	95-50-1	8270D	ND	H	8.0	1.7	ug/L	3
1,3-Dichlorobenzene	541-73-1	8270D	ND	H	8.0	1.8	ug/L	3
1,4-Dichlorobenzene	106-46-7	8270D	ND	H	8.0	1.6	ug/L	3
3,3'-Dichlorobenzidine	91-94-1	8270D	ND	H	40	8.1	ug/L	3
2,4-Dichlorophenol	120-83-2	8270D	ND	H	8.0	1.9	ug/L	3
Diethylphthalate	84-66-2	8270D	ND	H	40	1.9	ug/L	3
Dimethyl phthalate	131-11-3	8270D	ND	H	40	1.8	ug/L	3
2,4-Dimethylphenol	105-67-9	8270D	ND	H	8.0	1.5	ug/L	3
Di-n-butyl phthalate	84-74-2	8270D	ND	H	40	4.2	ug/L	3
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND	H	40	8.9	ug/L	3
2,4-Dinitrophenol	51-28-5	8270D	ND	H	40	13	ug/L	3
2,4-Dinitrotoluene	121-14-2	8270D	ND	H	16	3.6	ug/L	3
2,6-Dinitrotoluene	606-20-2	8270D	ND	H	16	3.4	ug/L	3
Di-n-octylphthalate	117-84-0	8270D	ND	H	40	4.8	ug/L	3
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND	H	40	3.8	ug/L	3
Fluoranthene	206-44-0	8270D	ND	H	1.6	0.40	ug/L	3
Fluorene	86-73-7	8270D	14	H	1.6	0.40	ug/L	3
Hexachlorobenzene	118-74-1	8270D	ND	H	8.0	1.5	ug/L	3
Hexachlorobutadiene	87-68-3	8270D	ND	H	8.0	1.7	ug/L	3
Hexachlorocyclopentadiene	77-47-4	8270D	ND	H	40	11	ug/L	3
Hexachloroethane	67-72-1	8270D	ND	H	8.0	1.7	ug/L	3

LOQ = Limit of Quantitation
B = Detected in the method blank
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	06/01/2019 0018	SCD	05/23/2019 1615	17674
2	3520C	8270D	50	06/03/2019 1923	JCG	05/23/2019 1615	17674
3	3520C	8270D	10	06/03/2019 2102	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND	H	1.6	0.40	ug/L	3
Isophorone	78-59-1	8270D	ND	H	8.0	2.2	ug/L	3
2-Methylnaphthalene	91-57-6	8270D	510	HE	1.6	0.40	ug/L	3
2-Methylphenol	95-48-7	8270D	ND	H	8.0	2.1	ug/L	3
3+4-Methylphenol	106-44-5	8270D	ND	H	16	4.6	ug/L	3
Naphthalene	91-20-3	8270D	130	H	1.6	0.40	ug/L	3
2-Nitroaniline	88-74-4	8270D	ND	H	16	6.6	ug/L	3
3-Nitroaniline	99-09-2	8270D	ND	H	16	1.5	ug/L	3
4-Nitroaniline	100-01-6	8270D	ND	H	16	13	ug/L	3
Nitrobenzene	98-95-3	8270D	ND	H	8.0	1.7	ug/L	3
2-Nitrophenol	88-75-5	8270D	ND	H	16	4.4	ug/L	3
4-Nitrophenol	100-02-7	8270D	ND	H	40	21	ug/L	3
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND	H	8.0	2.8	ug/L	3
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND	H	8.0	5.0	ug/L	3
Pentachlorophenol	87-86-5	8270D	ND	H	40	13	ug/L	3
Phenanthrene	85-01-8	8270D	12	H	1.6	0.40	ug/L	3
Phenol	108-95-2	8270D	ND	H	8.0	1.9	ug/L	3
Pyrene	129-00-0	8270D	1.8	H	1.6	0.40	ug/L	3
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND	H	8.0	2.5	ug/L	3
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND	H	8.0	5.5	ug/L	3
1,2,4-Trichlorobenzene	120-82-1	8270D	ND	H	8.0	3.7	ug/L	3
2,4,5-Trichlorophenol	95-95-4	8270D	ND	H	8.0	1.9	ug/L	3
2,4,6-Trichlorophenol	88-06-2	8270D	ND	H	8.0	2.2	ug/L	3

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits	Q	Run 3 % Recovery	Acceptance Limits
2-Fluorobiphenyl	N	34	37-129		42	37-129	H	64	37-129
2-Fluorophenol		32	24-127		37	24-127	H	43	24-127
Nitrobenzene-d5		79	38-127		48	38-127	H	82	38-127
Phenol-d5		41	28-128		34	28-128	H	56	28-128
Terphenyl-d14		23	10-148		28	10-148	H	31	10-148
2,4,6-Tribromophenol		68	35-144	N	25	35-144	H	85	35-144

LOQ = Limit of Quantitation
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/03/2019 1753	CHG	05/23/2019 2138	18169

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	4500		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	9900		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		53	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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W = Reported on wet weight basis

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/03/2019 1921	CHG	05/23/2019 2138	18170

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	13000		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		96	40-140
2-Fluorobiphenyl (fractionation 1)		130	40-140
o - Terphenyl (aromatic)		85	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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ND = Not detected at or above the DL
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J = Estimated result < LOQ and ≥ DL
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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1454	JJG		17893

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	2100		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	6800		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	2600	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	10	05/30/2019 1750	JJG		18517

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	36	J	50	5.1	ug/L	2
C9 - C10 Aromatics		Montana VPH	5800		250	50	ug/L	2
Ethylbenzene	100-41-4	Montana VPH	140		50	6.2	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		50	12	ug/L	2
Naphthalene	91-20-3	Montana VPH	1100		50	7.0	ug/L	2
Toluene	108-88-3	Montana VPH	ND		50	5.3	ug/L	2
m+p - Xylenes	179601-23-1	Montana VPH	ND		50	12	ug/L	2
o - Xylenes	95-47-6	Montana VPH	140		50	5.8	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	440	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1454	JJG		17894

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	15000		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	2700	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-002
Description: CMR-EB07-190516
Matrix: Aqueous
Date Sampled: 05/16/2019 1730
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	05/29/2019 1401	JMH	05/28/2019 1151	17938
1	3005A	6020B	1	05/27/2019 0532	LLL	05/23/2019 1754	17690

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	4.7		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	3.4		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	180		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	5.5		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	7.0		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	5.9		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	5.5	J	10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/24/2019 1425	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	2.1	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	0.57		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	8.2		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	8.6		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	1.5		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	13		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	2.2		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	0.53		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/24/2019 1425	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	41		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	32		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	9.4		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/01/2019 0043	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 1948	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	0.51	J	0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.49	J	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	0.051	J	0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1

LOQ = Limit of Quantitation
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ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/01/2019 0043	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 1948	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	1.8		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	1.7		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	0.090	J	0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	0.045	J	0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		52	37-129	H	70	37-129
2-Fluorophenol		62	24-127	H	56	24-127
Nitrobenzene-d5		75	38-127	H	95	38-127
Phenol-d5		63	28-128	H	70	28-128
Terphenyl-d14		73	10-148	H	92	10-148
2,4,6-Tribromophenol		75	35-144	H	82	35-144

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B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/01/2019 0043	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 1948	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	0.080	HJ	0.16	0.040	ug/L	2
Acenaphthylene	208-96-8	8270D	ND	H	0.16	0.040	ug/L	2
Anthracene	120-12-7	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(a)anthracene	56-55-3	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(a)pyrene	50-32-8	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(b)fluoranthene	205-99-2	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(g,h,i)perylene	191-24-2	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(k)fluoranthene	207-08-9	8270D	ND	H	0.16	0.040	ug/L	2
4-Bromophenyl phenyl ether	101-55-3	8270D	ND	H	0.80	0.15	ug/L	2
Butyl benzyl phthalate	85-68-7	8270D	ND	H	4.0	0.21	ug/L	2
Carbazole	86-74-8	8270D	ND	H	0.80	0.040	ug/L	2
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND	H	0.80	0.17	ug/L	2
4-Chloro-3-methyl phenol	59-50-7	8270D	ND	H	0.80	0.26	ug/L	2
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND	H	0.80	0.060	ug/L	2
bis(2-Chloroethyl)ether	111-44-4	8270D	ND	H	0.80	0.16	ug/L	2
2-Chloronaphthalene	91-58-7	8270D	ND	H	0.80	0.15	ug/L	2
2-Chlorophenol	95-57-8	8270D	ND	H	0.80	0.15	ug/L	2
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND	H	0.80	0.16	ug/L	2
Chrysene	218-01-9	8270D	ND	H	0.16	0.040	ug/L	2
Dibenzo(a,h)anthracene	53-70-3	8270D	ND	H	0.16	0.040	ug/L	2
Dibenzofuran	132-64-9	8270D	ND	H	0.80	0.16	ug/L	2
1,2-Dichlorobenzene	95-50-1	8270D	ND	H	0.80	0.17	ug/L	2
1,3-Dichlorobenzene	541-73-1	8270D	ND	H	0.80	0.18	ug/L	2
1,4-Dichlorobenzene	106-46-7	8270D	ND	H	0.80	0.16	ug/L	2
3,3'-Dichlorobenzidine	91-94-1	8270D	ND	H	4.0	0.81	ug/L	2
2,4-Dichlorophenol	120-83-2	8270D	ND	H	0.80	0.19	ug/L	2
Diethylphthalate	84-66-2	8270D	ND	H	4.0	0.19	ug/L	2
Dimethyl phthalate	131-11-3	8270D	ND	H	4.0	0.18	ug/L	2
2,4-Dimethylphenol	105-67-9	8270D	0.78	HJ	0.80	0.15	ug/L	2
Di-n-butyl phthalate	84-74-2	8270D	ND	H	4.0	0.42	ug/L	2
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND	H	4.0	0.89	ug/L	2
2,4-Dinitrophenol	51-28-5	8270D	ND	H	4.0	1.3	ug/L	2
2,4-Dinitrotoluene	121-14-2	8270D	ND	H	1.6	0.36	ug/L	2
2,6-Dinitrotoluene	606-20-2	8270D	ND	H	1.6	0.34	ug/L	2
Di-n-octylphthalate	117-84-0	8270D	ND	H	4.0	0.48	ug/L	2
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.90	HJ	4.0	0.38	ug/L	2
Fluoranthene	206-44-0	8270D	ND	H	0.16	0.040	ug/L	2
Fluorene	86-73-7	8270D	0.057	HJ	0.16	0.040	ug/L	2
Hexachlorobenzene	118-74-1	8270D	ND	H	0.80	0.15	ug/L	2
Hexachlorobutadiene	87-68-3	8270D	ND	H	0.80	0.17	ug/L	2
Hexachlorocyclopentadiene	77-47-4	8270D	ND	H	4.0	1.1	ug/L	2
Hexachloroethane	67-72-1	8270D	ND	H	0.80	0.17	ug/L	2
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND	H	0.16	0.040	ug/L	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/01/2019 0043	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 1948	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND	H	0.80	0.22	ug/L	2
2-Methylnaphthalene	91-57-6	8270D	2.0	H	0.16	0.040	ug/L	2
2-Methylphenol	95-48-7	8270D	ND	H	0.80	0.21	ug/L	2
3+4-Methylphenol	106-44-5	8270D	ND	H	1.6	0.46	ug/L	2
Naphthalene	91-20-3	8270D	1.7	H	0.16	0.040	ug/L	2
2-Nitroaniline	88-74-4	8270D	ND	H	1.6	0.66	ug/L	2
3-Nitroaniline	99-09-2	8270D	ND	H	1.6	0.15	ug/L	2
4-Nitroaniline	100-01-6	8270D	ND	H	1.6	1.3	ug/L	2
Nitrobenzene	98-95-3	8270D	ND	H	0.80	0.17	ug/L	2
2-Nitrophenol	88-75-5	8270D	ND	H	1.6	0.44	ug/L	2
4-Nitrophenol	100-02-7	8270D	ND	H	4.0	2.1	ug/L	2
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND	H	0.80	0.28	ug/L	2
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND	H	0.80	0.50	ug/L	2
Pentachlorophenol	87-86-5	8270D	ND	H	4.0	1.3	ug/L	2
Phenanthrene	85-01-8	8270D	0.10	HJ	0.16	0.040	ug/L	2
Phenol	108-95-2	8270D	ND	H	0.80	0.19	ug/L	2
Pyrene	129-00-0	8270D	0.052	HJ	0.16	0.040	ug/L	2
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND	H	0.80	0.25	ug/L	2
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND	H	0.80	0.55	ug/L	2
1,2,4-Trichlorobenzene	120-82-1	8270D	ND	H	0.80	0.37	ug/L	2
2,4,5-Trichlorophenol	95-95-4	8270D	ND	H	0.80	0.19	ug/L	2
2,4,6-Trichlorophenol	88-06-2	8270D	ND	H	0.80	0.22	ug/L	2

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		52	37-129	H	70	37-129
2-Fluorophenol		62	24-127	H	56	24-127
Nitrobenzene-d5		75	38-127	H	95	38-127
Phenol-d5		63	28-128	H	70	28-128
Terphenyl-d14		73	10-148	H	92	10-148
2,4,6-Tribromophenol		75	35-144	H	82	35-144

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Montana EPH (screening)

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	05/25/2019 0639	CHG	05/23/2019 2138	17684

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TEH		Montana EPH	580		200	200	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		114	40-140
1-Chloro-octadecane (aliphatic)		112	40-140
2-Fluorobiphenyl (fractionation 1)		122	40-140
o - Terphenyl (aromatic)		109	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1551	JJG		17893

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	330		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	250		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		97	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1551	JJG		17892

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.84	J	5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	250		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	17		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	7.7		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	1.7	J	5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	43		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	16		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		87	70-130

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ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1551	JJG		17894

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	850		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		98	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-003
Description: CMR-EB11-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1700
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	05/29/2019 1403	JMH	05/28/2019 1151	17938
1	3005A	6020B	1	05/27/2019 0614	LLL	05/23/2019 1754	17690

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.7	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	120		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	22		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	9.6		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	100		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	45		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	1.4		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	67		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	0.57	J	1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	1300		10	2.5	ug/L	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/24/2019 1448	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	1.2	J	5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
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ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/24/2019 1448	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/30/2019 2049	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 2013	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.53	J	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/30/2019 2049	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 2013	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		48	37-129	H	63	37-129
2-Fluorophenol		31	24-127	H	45	24-127
Nitrobenzene-d5		61	38-127	H	78	38-127
Phenol-d5		42	28-128	H	54	28-128
Terphenyl-d14		57	10-148	H	77	10-148
2,4,6-Tribromophenol		63	35-144	H	76	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/30/2019 2049	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 2013	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	0.054	HJ	0.16	0.040	ug/L	2
Acenaphthylene	208-96-8	8270D	ND	H	0.16	0.040	ug/L	2
Anthracene	120-12-7	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(a)anthracene	56-55-3	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(a)pyrene	50-32-8	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(b)fluoranthene	205-99-2	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(g,h,i)perylene	191-24-2	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(k)fluoranthene	207-08-9	8270D	ND	H	0.16	0.040	ug/L	2
4-Bromophenyl phenyl ether	101-55-3	8270D	ND	H	0.80	0.15	ug/L	2
Butyl benzyl phthalate	85-68-7	8270D	ND	H	4.0	0.21	ug/L	2
Carbazole	86-74-8	8270D	ND	H	0.80	0.040	ug/L	2
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND	H	0.80	0.17	ug/L	2
4-Chloro-3-methyl phenol	59-50-7	8270D	ND	H	0.80	0.26	ug/L	2
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND	H	0.80	0.060	ug/L	2
bis(2-Chloroethyl)ether	111-44-4	8270D	ND	H	0.80	0.16	ug/L	2
2-Chloronaphthalene	91-58-7	8270D	ND	H	0.80	0.15	ug/L	2
2-Chlorophenol	95-57-8	8270D	ND	H	0.80	0.15	ug/L	2
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND	H	0.80	0.16	ug/L	2
Chrysene	218-01-9	8270D	ND	H	0.16	0.040	ug/L	2
Dibenzo(a,h)anthracene	53-70-3	8270D	ND	H	0.16	0.040	ug/L	2
Dibenzofuran	132-64-9	8270D	ND	H	0.80	0.16	ug/L	2
1,2-Dichlorobenzene	95-50-1	8270D	ND	H	0.80	0.17	ug/L	2
1,3-Dichlorobenzene	541-73-1	8270D	ND	H	0.80	0.18	ug/L	2
1,4-Dichlorobenzene	106-46-7	8270D	ND	H	0.80	0.16	ug/L	2
3,3'-Dichlorobenzidine	91-94-1	8270D	ND	H	4.0	0.81	ug/L	2
2,4-Dichlorophenol	120-83-2	8270D	ND	H	0.80	0.19	ug/L	2
Diethylphthalate	84-66-2	8270D	ND	H	4.0	0.19	ug/L	2
Dimethyl phthalate	131-11-3	8270D	ND	H	4.0	0.18	ug/L	2
2,4-Dimethylphenol	105-67-9	8270D	ND	H	0.80	0.15	ug/L	2
Di-n-butyl phthalate	84-74-2	8270D	ND	H	4.0	0.42	ug/L	2
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND	H	4.0	0.89	ug/L	2
2,4-Dinitrophenol	51-28-5	8270D	ND	H	4.0	1.3	ug/L	2
2,4-Dinitrotoluene	121-14-2	8270D	ND	H	1.6	0.36	ug/L	2
2,6-Dinitrotoluene	606-20-2	8270D	ND	H	1.6	0.34	ug/L	2
Di-n-octylphthalate	117-84-0	8270D	ND	H	4.0	0.48	ug/L	2
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.63	HJ	4.0	0.38	ug/L	2
Fluoranthene	206-44-0	8270D	ND	H	0.16	0.040	ug/L	2
Fluorene	86-73-7	8270D	ND	H	0.16	0.040	ug/L	2
Hexachlorobenzene	118-74-1	8270D	ND	H	0.80	0.15	ug/L	2
Hexachlorobutadiene	87-68-3	8270D	ND	H	0.80	0.17	ug/L	2
Hexachlorocyclopentadiene	77-47-4	8270D	ND	H	4.0	1.1	ug/L	2
Hexachloroethane	67-72-1	8270D	ND	H	0.80	0.17	ug/L	2
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND	H	0.16	0.040	ug/L	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/30/2019 2049	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 2013	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND	H	0.80	0.22	ug/L	2
2-Methylnaphthalene	91-57-6	8270D	ND	H	0.16	0.040	ug/L	2
2-Methylphenol	95-48-7	8270D	ND	H	0.80	0.21	ug/L	2
3+4-Methylphenol	106-44-5	8270D	ND	H	1.6	0.46	ug/L	2
Naphthalene	91-20-3	8270D	ND	H	0.16	0.040	ug/L	2
2-Nitroaniline	88-74-4	8270D	ND	H	1.6	0.66	ug/L	2
3-Nitroaniline	99-09-2	8270D	ND	H	1.6	0.15	ug/L	2
4-Nitroaniline	100-01-6	8270D	ND	H	1.6	1.3	ug/L	2
Nitrobenzene	98-95-3	8270D	ND	H	0.80	0.17	ug/L	2
2-Nitrophenol	88-75-5	8270D	ND	H	1.6	0.44	ug/L	2
4-Nitrophenol	100-02-7	8270D	ND	H	4.0	2.1	ug/L	2
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND	H	0.80	0.28	ug/L	2
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND	H	0.80	0.50	ug/L	2
Pentachlorophenol	87-86-5	8270D	ND	H	4.0	1.3	ug/L	2
Phenanthrene	85-01-8	8270D	0.070	HJ	0.16	0.040	ug/L	2
Phenol	108-95-2	8270D	ND	H	0.80	0.19	ug/L	2
Pyrene	129-00-0	8270D	ND	H	0.16	0.040	ug/L	2
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND	H	0.80	0.25	ug/L	2
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND	H	0.80	0.55	ug/L	2
1,2,4-Trichlorobenzene	120-82-1	8270D	ND	H	0.80	0.37	ug/L	2
2,4,5-Trichlorophenol	95-95-4	8270D	ND	H	0.80	0.19	ug/L	2
2,4,6-Trichlorophenol	88-06-2	8270D	ND	H	0.80	0.22	ug/L	2

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		48	37-129	H	63	37-129
2-Fluorophenol		31	24-127	H	45	24-127
Nitrobenzene-d5		61	38-127	H	78	38-127
Phenol-d5		42	28-128	H	54	28-128
Terphenyl-d14		57	10-148	H	77	10-148
2,4,6-Tribromophenol		63	35-144	H	76	35-144

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (screening)

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	05/25/2019 0708	CHG	05/23/2019 2138	17684

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TEH		Montana EPH	330		200	200	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		108	40-140
1-Chloro-octadecane (aliphatic)		89	40-140
2-Fluorobiphenyl (fractionation 1)		117	40-140
o - Terphenyl (aromatic)		89	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1620	JJG		17893

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	48	J	75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	220		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1620	JJG		17892

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	150		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	1.2	J	5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	6.6		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	0.76	J	5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	1.1	J	5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		81	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1620	JJG		17894

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	410		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		85	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-004
Description: CMR-EB14-190520
Matrix: Aqueous
Date Sampled: 05/20/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	05/29/2019 1406	JMH	05/28/2019 1151	17938
1	3005A	6020B	1	05/27/2019 0620	LLL	05/23/2019 1754	17690

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.4	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	4.6		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	19		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	9.8		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	2.5	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	20		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	15		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	1700		10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-005
Description: CMR-EB05-190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	05/24/2019 1753	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	15	J	50	10	ug/L	1
Benzene	71-43-2	8260B	49		2.5	2.0	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		2.5	2.0	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		2.5	2.0	ug/L	1
Bromoform	75-25-2	8260B	ND		2.5	2.0	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		2.5	2.0	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		50	10	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		2.5	2.0	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		2.5	2.0	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		2.5	2.0	ug/L	1
Chloroethane	75-00-3	8260B	ND		2.5	2.0	ug/L	1
Chloroform	67-66-3	8260B	ND		2.5	2.0	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		2.5	2.0	ug/L	1
Cyclohexane	110-82-7	8260B	ND		2.5	2.0	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		2.5	2.0	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		2.5	2.0	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		2.5	2.0	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		2.5	2.0	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		2.5	2.0	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		2.5	2.0	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		2.5	2.0	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		2.5	2.0	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		2.5	2.0	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		2.5	2.0	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		2.5	2.0	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		2.5	2.0	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		2.5	0.55	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		100	67	ug/L	1
Ethylbenzene	100-41-4	8260B	20		2.5	2.0	ug/L	1
2-Hexanone	591-78-6	8260B	ND		50	10	ug/L	1
Isopropylbenzene	98-82-8	8260B	3.4		2.5	2.0	ug/L	1
Methyl acetate	79-20-9	8260B	ND		5.0	2.0	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		2.5	2.0	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		50	10	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		25	2.0	ug/L	1
Methylene chloride	75-09-2	8260B	ND		2.5	2.0	ug/L	1
Naphthalene	91-20-3	8260B	340		2.5	2.0	ug/L	1
Styrene	100-42-5	8260B	ND		2.5	2.1	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		2.5	2.0	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		2.5	2.0	ug/L	1
Toluene	108-88-3	8260B	2.1	J	2.5	2.0	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.0	2.1	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-005
Description: CMR-EB05-190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	5	05/24/2019 1753	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		2.5	2.0	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		2.5	2.0	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		2.5	2.0	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		2.5	2.0	ug/L	1
Trichloroethene	79-01-6	8260B	ND		2.5	2.0	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		2.5	2.0	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		2.5	2.0	ug/L	1
Xylenes (total)	1330-20-7	8260B	12		5.0	2.0	ug/L	1
m+p - Xylenes	179601-23-1	8260B	7.2		2.5	2.0	ug/L	1
o - Xylenes	95-47-6	8260B	4.8		2.5	2.0	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-005
Description: CMR-EB05-190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1648	JJG		17893

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	29	J	75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	420		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1700	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-005
Description: CMR-EB05-190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	5	05/30/2019 1818	JJG		18517

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	45		25	2.6	ug/L	2
C9 - C10 Aromatics		Montana VPH	1900		130	25	ug/L	2
Ethylbenzene	100-41-4	Montana VPH	33		25	3.1	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		25	6.0	ug/L	2
Naphthalene	91-20-3	Montana VPH	770		25	3.5	ug/L	2
Toluene	108-88-3	Montana VPH	4.8	J	25	2.7	ug/L	2
m+p - Xylenes	179601-23-1	Montana VPH	15	J	25	6.0	ug/L	2
o - Xylenes	95-47-6	Montana VPH	8.9	J	25	2.9	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	620	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE22029-005
Description: CMR-EB05-190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1605
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1648	JJG		17894

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1300		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1630	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/24/2019 1512	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/24/2019 1512	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/30/2019 2113	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 2037	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.55	J	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/30/2019 2113	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 2037	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		62	37-129	H	64	37-129
2-Fluorophenol		36	24-127	H	45	24-127
Nitrobenzene-d5		80	38-127	H	77	38-127
Phenol-d5		52	28-128	H	54	28-128
Terphenyl-d14		79	10-148	H	103	10-148
2,4,6-Tribromophenol		68	35-144	H	62	35-144

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/30/2019 2113	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 2037	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND	H	0.16	0.040	ug/L	2
Acenaphthylene	208-96-8	8270D	ND	H	0.16	0.040	ug/L	2
Anthracene	120-12-7	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(a)anthracene	56-55-3	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(a)pyrene	50-32-8	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(b)fluoranthene	205-99-2	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(g,h,i)perylene	191-24-2	8270D	ND	H	0.16	0.040	ug/L	2
Benzo(k)fluoranthene	207-08-9	8270D	ND	H	0.16	0.040	ug/L	2
4-Bromophenyl phenyl ether	101-55-3	8270D	ND	H	0.80	0.15	ug/L	2
Butyl benzyl phthalate	85-68-7	8270D	ND	H	4.0	0.21	ug/L	2
Carbazole	86-74-8	8270D	ND	H	0.80	0.040	ug/L	2
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND	H	0.80	0.17	ug/L	2
4-Chloro-3-methyl phenol	59-50-7	8270D	ND	H	0.80	0.26	ug/L	2
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND	H	0.80	0.060	ug/L	2
bis(2-Chloroethyl)ether	111-44-4	8270D	ND	H	0.80	0.16	ug/L	2
2-Chloronaphthalene	91-58-7	8270D	ND	H	0.80	0.15	ug/L	2
2-Chlorophenol	95-57-8	8270D	ND	H	0.80	0.15	ug/L	2
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND	H	0.80	0.16	ug/L	2
Chrysene	218-01-9	8270D	ND	H	0.16	0.040	ug/L	2
Dibenzo(a,h)anthracene	53-70-3	8270D	ND	H	0.16	0.040	ug/L	2
Dibenzofuran	132-64-9	8270D	ND	H	0.80	0.16	ug/L	2
1,2-Dichlorobenzene	95-50-1	8270D	ND	H	0.80	0.17	ug/L	2
1,3-Dichlorobenzene	541-73-1	8270D	ND	H	0.80	0.18	ug/L	2
1,4-Dichlorobenzene	106-46-7	8270D	ND	H	0.80	0.16	ug/L	2
3,3'-Dichlorobenzidine	91-94-1	8270D	ND	H	4.0	0.81	ug/L	2
2,4-Dichlorophenol	120-83-2	8270D	ND	H	0.80	0.19	ug/L	2
Diethylphthalate	84-66-2	8270D	ND	H	4.0	0.19	ug/L	2
Dimethyl phthalate	131-11-3	8270D	ND	H	4.0	0.18	ug/L	2
2,4-Dimethylphenol	105-67-9	8270D	ND	H	0.80	0.15	ug/L	2
Di-n-butyl phthalate	84-74-2	8270D	ND	H	4.0	0.42	ug/L	2
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND	H	4.0	0.89	ug/L	2
2,4-Dinitrophenol	51-28-5	8270D	ND	H	4.0	1.3	ug/L	2
2,4-Dinitrotoluene	121-14-2	8270D	ND	H	1.6	0.36	ug/L	2
2,6-Dinitrotoluene	606-20-2	8270D	ND	H	1.6	0.34	ug/L	2
Di-n-octylphthalate	117-84-0	8270D	ND	H	4.0	0.48	ug/L	2
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND	H	4.0	0.38	ug/L	2
Fluoranthene	206-44-0	8270D	ND	H	0.16	0.040	ug/L	2
Fluorene	86-73-7	8270D	ND	H	0.16	0.040	ug/L	2
Hexachlorobenzene	118-74-1	8270D	ND	H	0.80	0.15	ug/L	2
Hexachlorobutadiene	87-68-3	8270D	ND	H	0.80	0.17	ug/L	2
Hexachlorocyclopentadiene	77-47-4	8270D	ND	H	4.0	1.1	ug/L	2
Hexachloroethane	67-72-1	8270D	ND	H	0.80	0.17	ug/L	2
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND	H	0.16	0.040	ug/L	2

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/30/2019 2113	SCD	05/23/2019 1615	17674
2	3520C	8270D	1	06/03/2019 2037	JCG	05/30/2019 1615	18268

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND	H	0.80	0.22	ug/L	2
2-Methylnaphthalene	91-57-6	8270D	ND	H	0.16	0.040	ug/L	2
2-Methylphenol	95-48-7	8270D	ND	H	0.80	0.21	ug/L	2
3+4-Methylphenol	106-44-5	8270D	ND	H	1.6	0.46	ug/L	2
Naphthalene	91-20-3	8270D	ND	H	0.16	0.040	ug/L	2
2-Nitroaniline	88-74-4	8270D	ND	H	1.6	0.66	ug/L	2
3-Nitroaniline	99-09-2	8270D	ND	H	1.6	0.15	ug/L	2
4-Nitroaniline	100-01-6	8270D	ND	H	1.6	1.3	ug/L	2
Nitrobenzene	98-95-3	8270D	ND	H	0.80	0.17	ug/L	2
2-Nitrophenol	88-75-5	8270D	ND	H	1.6	0.44	ug/L	2
4-Nitrophenol	100-02-7	8270D	ND	H	4.0	2.1	ug/L	2
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND	H	0.80	0.28	ug/L	2
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND	H	0.80	0.50	ug/L	2
Pentachlorophenol	87-86-5	8270D	ND	H	4.0	1.3	ug/L	2
Phenanthrene	85-01-8	8270D	ND	H	0.16	0.040	ug/L	2
Phenol	108-95-2	8270D	ND	H	0.80	0.19	ug/L	2
Pyrene	129-00-0	8270D	ND	H	0.16	0.040	ug/L	2
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND	H	0.80	0.25	ug/L	2
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND	H	0.80	0.55	ug/L	2
1,2,4-Trichlorobenzene	120-82-1	8270D	ND	H	0.80	0.37	ug/L	2
2,4,5-Trichlorophenol	95-95-4	8270D	ND	H	0.80	0.19	ug/L	2
2,4,6-Trichlorophenol	88-06-2	8270D	ND	H	0.80	0.22	ug/L	2

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		62	37-129	H	64	37-129
2-Fluorophenol		36	24-127	H	45	24-127
Nitrobenzene-d5		80	38-127	H	77	38-127
Phenol-d5		52	28-128	H	54	28-128
Terphenyl-d14		79	10-148	H	103	10-148
2,4,6-Tribromophenol		68	35-144	H	62	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (screening)

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	05/25/2019 0738	CHG	05/23/2019 2138	17684

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TEH		Montana EPH	ND		200	200	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		110	40-140
1-Chloro-octadecane (aliphatic)		115	40-140
2-Fluorobiphenyl (fractionation 1)		117	40-140
o - Terphenyl (aromatic)		105	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1717	JJG		17893

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		102	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1717	JJG		17892

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	0.85	J	5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	0.95	J	5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		98	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1717	JJG		17894

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-006
Description: CMR-EB-01-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1440
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	05/29/2019 1413	JMH	05/28/2019 1151	17938
1	3005A	6020B	1	05/27/2019 0626	LLL	05/23/2019 1754	17690

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	ND		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	ND		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	ND		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	ND		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	ND		10	2.5	ug/L	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-007
Description: CMR-EB-02-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1445
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/24/2019 1535	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-007
Description: CMR-EB-02-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1445
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/24/2019 1535	BWS		17794

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		102	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-007
Description: CMR-EB-02-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1445
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/30/2019 2138	SCD	05/23/2019 1615	17674

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.43	J	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-007
Description: CMR-EB-02-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1445
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	05/30/2019 2138	SCD	05/23/2019 1615	17674

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		69	37-129
2-Fluorophenol		40	24-127
Nitrobenzene-d5		90	38-127
Phenol-d5		57	28-128
Terphenyl-d14		85	10-148
2,4,6-Tribromophenol		78	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-007
Description: CMR-EB-02-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1445
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/03/2019 1822	CHG	05/23/2019 2138	18169

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		380	380	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		380	380	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		99	40-140

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J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-007
Description: CMR-EB-02-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1445
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/03/2019 1951	CHG	05/23/2019 2138	18170

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		380	380	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		95	40-140
2-Fluorobiphenyl (fractionation 1)		112	40-140
o - Terphenyl (aromatic)		109	40-140

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-007
Description: CMR-EB-02-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1445
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1745	JJG		17893

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		98	70-130

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UE22029-007
Description: CMR-EB-02-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1445
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1745	JJG		17892

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	0.59	J	5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		97	70-130

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UE22029-007
Description: CMR-EB-02-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1445
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	05/26/2019 1745	JJG		17894

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		99	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-007
Description: CMR-EB-02-20190521
Matrix: Aqueous
Date Sampled: 05/21/2019 1445
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	05/29/2019 1416	JMH	05/28/2019 1151	17938
1	3005A	6020B	1	05/27/2019 0632	LLL	05/23/2019 1754	17690

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	ND		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	ND		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	ND		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	ND		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	ND		10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-008
Description: TB-05-20190516
Matrix: Aqueous
Date Sampled: 05/16/2019
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/24/2019 2355	STM		17850

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-008
Description: TB-05-20190516
Matrix: Aqueous
Date Sampled: 05/16/2019
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/24/2019 2355	STM		17850

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-009
Description: TB-06-20190516
Matrix: Aqueous
Date Sampled: 05/16/2019
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/25/2019 0018	STM		17850

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UE22029-009
Description: TB-06-20190516
Matrix: Aqueous
Date Sampled: 05/16/2019
Date Received: 05/22/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	05/25/2019 0018	STM		17850

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		104	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17794-001
Batch: 17794
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	05/24/2019 1105
Benzene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Bromochloromethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Bromodichloromethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Bromoform	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	05/24/2019 1105
2-Butanone (MEK)	ND		1	10	2.0	ug/L	05/24/2019 1105
Carbon disulfide	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Chlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Chloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Chloroform	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Cyclohexane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Dibromochloromethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	05/24/2019 1105
1,4-Dioxane	ND		1	20	13	ug/L	05/24/2019 1105
Ethylbenzene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
2-Hexanone	ND		1	10	2.0	ug/L	05/24/2019 1105
Isopropylbenzene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Methyl acetate	ND		1	1.0	0.40	ug/L	05/24/2019 1105
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	05/24/2019 1105
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	05/24/2019 1105
Methylcyclohexane	ND		1	5.0	0.40	ug/L	05/24/2019 1105
Methylene chloride	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Naphthalene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Styrene	ND		1	0.50	0.41	ug/L	05/24/2019 1105
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Tetrachloroethene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Toluene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	05/24/2019 1105

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17794-001
Batch: 17794
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Trichloroethene	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Vinyl chloride	ND		1	0.50	0.40	ug/L	05/24/2019 1105
Xylenes (total)	ND		1	1.0	0.40	ug/L	05/24/2019 1105
m+p - Xylenes	ND		1	0.50	0.40	ug/L	05/24/2019 1105
o - Xylenes	ND		1	0.50	0.40	ug/L	05/24/2019 1105

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		99	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17794-002
Batch: 17794
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	92		1	92	60-140	05/24/2019 1007
Benzene	50	48		1	96	70-130	05/24/2019 1007
Bromochloromethane	50	47		1	95	70-130	05/24/2019 1007
Bromodichloromethane	50	47		1	94	70-130	05/24/2019 1007
Bromoform	50	47		1	94	70-130	05/24/2019 1007
Bromomethane (Methyl bromide)	50	51		1	102	70-130	05/24/2019 1007
2-Butanone (MEK)	100	97		1	97	70-130	05/24/2019 1007
Carbon disulfide	50	47		1	93	70-130	05/24/2019 1007
Carbon tetrachloride	50	46		1	92	70-130	05/24/2019 1007
Chlorobenzene	50	47		1	95	70-130	05/24/2019 1007
Chloroethane	50	49		1	99	70-130	05/24/2019 1007
Chloroform	50	45		1	89	70-130	05/24/2019 1007
Chloromethane (Methyl chloride)	50	47		1	94	60-140	05/24/2019 1007
Cyclohexane	50	55		1	110	70-130	05/24/2019 1007
1,2-Dibromo-3-chloropropane (DBCP)	50	41		1	82	70-130	05/24/2019 1007
Dibromochloromethane	50	48		1	96	70-130	05/24/2019 1007
1,2-Dibromoethane (EDB)	50	50		1	101	70-130	05/24/2019 1007
1,2-Dichlorobenzene	50	46		1	92	70-130	05/24/2019 1007
1,3-Dichlorobenzene	50	46		1	92	70-130	05/24/2019 1007
1,4-Dichlorobenzene	50	45		1	91	70-130	05/24/2019 1007
Dichlorodifluoromethane	50	41		1	81	60-140	05/24/2019 1007
1,1-Dichloroethane	50	47		1	94	70-130	05/24/2019 1007
1,2-Dichloroethane	50	48		1	96	70-130	05/24/2019 1007
1,1-Dichloroethene	50	47		1	93	70-130	05/24/2019 1007
cis-1,2-Dichloroethene	50	46		1	93	70-130	05/24/2019 1007
trans-1,2-Dichloroethene	50	48		1	96	70-130	05/24/2019 1007
1,2-Dichloropropane	50	49		1	97	70-130	05/24/2019 1007
cis-1,3-Dichloropropene	50	51		1	102	70-130	05/24/2019 1007
trans-1,3-Dichloropropene	50	50		1	100	70-130	05/24/2019 1007
1,4-Dioxane	500	370		1	74	60-140	05/24/2019 1007
Ethylbenzene	50	48		1	97	70-130	05/24/2019 1007
2-Hexanone	100	100		1	101	70-130	05/24/2019 1007
Isopropylbenzene	50	50		1	99	70-130	05/24/2019 1007
Methyl acetate	50	45		1	90	70-130	05/24/2019 1007
Methyl tertiary butyl ether (MTBE)	50	42		1	84	70-130	05/24/2019 1007
4-Methyl-2-pentanone	100	96		1	96	70-130	05/24/2019 1007
Methylcyclohexane	50	51		1	103	70-130	05/24/2019 1007
Methylene chloride	50	46		1	91	70-130	05/24/2019 1007
Naphthalene	50	46		1	92	70-130	05/24/2019 1007
Styrene	50	51		1	102	70-130	05/24/2019 1007
1,1,2,2-Tetrachloroethane	50	46		1	93	70-130	05/24/2019 1007
Tetrachloroethene	50	48		1	97	70-130	05/24/2019 1007
Toluene	50	47		1	95	70-130	05/24/2019 1007
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	46		1	91	70-130	05/24/2019 1007

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17794-002
Batch: 17794
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	44		1	88	70-130	05/24/2019 1007
1,2,4-Trichlorobenzene	50	44		1	89	70-130	05/24/2019 1007
1,1,1-Trichloroethane	50	43		1	86	70-130	05/24/2019 1007
1,1,2-Trichloroethane	50	49		1	98	70-130	05/24/2019 1007
Trichloroethene	50	51		1	103	70-130	05/24/2019 1007
Trichlorofluoromethane	50	44		1	88	70-130	05/24/2019 1007
Vinyl chloride	50	41		1	81	70-130	05/24/2019 1007
Xylenes (total)	100	99		1	99	70-130	05/24/2019 1007
m+p - Xylenes	50	50		1	99	70-130	05/24/2019 1007
o - Xylenes	50	50		1	99	70-130	05/24/2019 1007

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17850-001
Batch: 17850
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	05/24/2019 2315
Benzene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Bromochloromethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Bromodichloromethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Bromoform	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	05/24/2019 2315
2-Butanone (MEK)	ND		1	10	2.0	ug/L	05/24/2019 2315
Carbon disulfide	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Chlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Chloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Chloroform	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Cyclohexane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Dibromochloromethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	05/24/2019 2315
1,4-Dioxane	ND		1	20	13	ug/L	05/24/2019 2315
Ethylbenzene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
2-Hexanone	ND		1	10	2.0	ug/L	05/24/2019 2315
Isopropylbenzene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Methyl acetate	ND		1	1.0	0.40	ug/L	05/24/2019 2315
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	05/24/2019 2315
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	05/24/2019 2315
Methylcyclohexane	ND		1	5.0	0.40	ug/L	05/24/2019 2315
Methylene chloride	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Naphthalene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Styrene	ND		1	0.50	0.41	ug/L	05/24/2019 2315
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Tetrachloroethene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Toluene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	05/24/2019 2315

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ17850-001
Batch: 17850
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Trichloroethene	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Vinyl chloride	ND		1	0.50	0.40	ug/L	05/24/2019 2315
Xylenes (total)	ND		1	1.0	0.40	ug/L	05/24/2019 2315
m+p - Xylenes	ND		1	0.50	0.40	ug/L	05/24/2019 2315
o - Xylenes	ND		1	0.50	0.40	ug/L	05/24/2019 2315

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		99	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17850-002
Batch: 17850
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	75		1	75	60-140	05/24/2019 2214
Benzene	50	49		1	99	70-130	05/24/2019 2214
Bromochloromethane	50	47		1	93	70-130	05/24/2019 2214
Bromodichloromethane	50	49		1	98	70-130	05/24/2019 2214
Bromoform	50	51		1	102	70-130	05/24/2019 2214
Bromomethane (Methyl bromide)	50	51		1	102	70-130	05/24/2019 2214
2-Butanone (MEK)	100	89		1	89	70-130	05/24/2019 2214
Carbon disulfide	50	45		1	90	70-130	05/24/2019 2214
Carbon tetrachloride	50	48		1	97	70-130	05/24/2019 2214
Chlorobenzene	50	50		1	99	70-130	05/24/2019 2214
Chloroethane	50	50		1	101	70-130	05/24/2019 2214
Chloroform	50	45		1	91	70-130	05/24/2019 2214
Chloromethane (Methyl chloride)	50	44		1	88	60-140	05/24/2019 2214
Cyclohexane	50	54		1	109	70-130	05/24/2019 2214
1,2-Dibromo-3-chloropropane (DBCP)	50	43		1	86	70-130	05/24/2019 2214
Dibromochloromethane	50	50		1	101	70-130	05/24/2019 2214
1,2-Dibromoethane (EDB)	50	53		1	107	70-130	05/24/2019 2214
1,2-Dichlorobenzene	50	48		1	95	70-130	05/24/2019 2214
1,3-Dichlorobenzene	50	48		1	96	70-130	05/24/2019 2214
1,4-Dichlorobenzene	50	48		1	96	70-130	05/24/2019 2214
Dichlorodifluoromethane	50	41		1	82	60-140	05/24/2019 2214
1,1-Dichloroethane	50	47		1	93	70-130	05/24/2019 2214
1,2-Dichloroethane	50	48		1	96	70-130	05/24/2019 2214
1,1-Dichloroethene	50	46		1	92	70-130	05/24/2019 2214
cis-1,2-Dichloroethene	50	47		1	95	70-130	05/24/2019 2214
trans-1,2-Dichloroethene	50	48		1	96	70-130	05/24/2019 2214
1,2-Dichloropropane	50	49		1	98	70-130	05/24/2019 2214
cis-1,3-Dichloropropene	50	52		1	104	70-130	05/24/2019 2214
trans-1,3-Dichloropropene	50	51		1	103	70-130	05/24/2019 2214
1,4-Dioxane	500	380		1	75	60-140	05/24/2019 2214
Ethylbenzene	50	51		1	103	70-130	05/24/2019 2214
2-Hexanone	100	98		1	98	70-130	05/24/2019 2214
Isopropylbenzene	50	53		1	107	70-130	05/24/2019 2214
Methyl acetate	50	42		1	85	70-130	05/24/2019 2214
Methyl tertiary butyl ether (MTBE)	50	42		1	84	70-130	05/24/2019 2214
4-Methyl-2-pentanone	100	96		1	96	70-130	05/24/2019 2214
Methylcyclohexane	50	54		1	109	70-130	05/24/2019 2214
Methylene chloride	50	45		1	90	70-130	05/24/2019 2214
Naphthalene	50	48		1	97	70-130	05/24/2019 2214
Styrene	50	54		1	108	70-130	05/24/2019 2214
1,1,2,2-Tetrachloroethane	50	47		1	93	70-130	05/24/2019 2214
Tetrachloroethene	50	52		1	104	70-130	05/24/2019 2214
Toluene	50	50		1	99	70-130	05/24/2019 2214
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	46		1	92	70-130	05/24/2019 2214

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17850-002
Batch: 17850
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	47		1	94	70-130	05/24/2019 2214
1,2,4-Trichlorobenzene	50	47		1	94	70-130	05/24/2019 2214
1,1,1-Trichloroethane	50	46		1	92	70-130	05/24/2019 2214
1,1,2-Trichloroethane	50	51		1	101	70-130	05/24/2019 2214
Trichloroethene	50	54		1	108	70-130	05/24/2019 2214
Trichlorofluoromethane	50	46		1	92	70-130	05/24/2019 2214
Vinyl chloride	50	41		1	81	70-130	05/24/2019 2214
Xylenes (total)	100	100		1	105	70-130	05/24/2019 2214
m+p - Xylenes	50	53		1	105	70-130	05/24/2019 2214
o - Xylenes	50	52		1	105	70-130	05/24/2019 2214

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	70-130
Bromofluorobenzene		105	70-130
Toluene-d8		105	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ17674-001
Batch: 17674
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2019 1615

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Acenaphthylene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Anthracene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	05/29/2019 1058
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	05/29/2019 1058
Carbazole	ND		1	0.80	0.040	ug/L	05/29/2019 1058
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	05/29/2019 1058
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	05/29/2019 1058
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	05/29/2019 1058
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	05/29/2019 1058
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	05/29/2019 1058
2-Chlorophenol	ND		1	0.80	0.15	ug/L	05/29/2019 1058
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	05/29/2019 1058
Chrysene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Dibenzofuran	ND		1	0.80	0.16	ug/L	05/29/2019 1058
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	05/29/2019 1058
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	05/29/2019 1058
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	05/29/2019 1058
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	05/29/2019 1058
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	05/29/2019 1058
Diethylphthalate	ND		1	4.0	0.19	ug/L	05/29/2019 1058
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	05/29/2019 1058
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	05/29/2019 1058
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	05/29/2019 1058
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	05/29/2019 1058
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	05/29/2019 1058
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	05/29/2019 1058
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	05/29/2019 1058
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	05/29/2019 1058
bis(2-Ethylhexyl)phthalate	ND		1	4.0	0.38	ug/L	05/29/2019 1058
Fluoranthene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Fluorene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	05/29/2019 1058
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	05/29/2019 1058
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	05/29/2019 1058
Hexachloroethane	ND		1	0.80	0.17	ug/L	05/29/2019 1058
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Isophorone	ND		1	0.80	0.22	ug/L	05/29/2019 1058

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ17674-001
Batch: 17674
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2019 1615

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
2-Methylphenol	ND		1	0.80	0.21	ug/L	05/29/2019 1058
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	05/29/2019 1058
Naphthalene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
2-Nitroaniline	ND		1	1.6	0.66	ug/L	05/29/2019 1058
3-Nitroaniline	ND		1	1.6	0.15	ug/L	05/29/2019 1058
4-Nitroaniline	ND		1	1.6	1.3	ug/L	05/29/2019 1058
Nitrobenzene	ND		1	0.80	0.17	ug/L	05/29/2019 1058
2-Nitrophenol	ND		1	1.6	0.44	ug/L	05/29/2019 1058
4-Nitrophenol	ND		1	4.0	2.1	ug/L	05/29/2019 1058
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	05/29/2019 1058
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	05/29/2019 1058
Pentachlorophenol	ND		1	4.0	1.3	ug/L	05/29/2019 1058
Phenanthrene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
Phenol	ND		1	0.80	0.19	ug/L	05/29/2019 1058
Pyrene	ND		1	0.16	0.040	ug/L	05/29/2019 1058
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	05/29/2019 1058
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	05/29/2019 1058
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	05/29/2019 1058
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	05/29/2019 1058
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	05/29/2019 1058

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		50	37-129
2-Fluorophenol		28	24-127
Nitrobenzene-d5		62	38-127
Phenol-d5		39	28-128
Terphenyl-d14		74	10-148
2,4,6-Tribromophenol		57	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17674-002
Batch: 17674
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2019 1615

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.0		1	50	30-122	05/29/2019 1235
Acenaphthylene	8.0	4.1		1	51	30-130	05/29/2019 1235
Anthracene	8.0	4.1		1	51	30-123	05/29/2019 1235
Benzo(a)anthracene	8.0	5.4		1	67	40-125	05/29/2019 1235
Benzo(a)pyrene	8.0	5.1		1	64	40-128	05/29/2019 1235
Benzo(b)fluoranthene	8.0	5.4		1	68	30-130	05/29/2019 1235
Benzo(g,h,i)perylene	8.0	5.5		1	69	30-130	05/29/2019 1235
Benzo(k)fluoranthene	8.0	5.3		1	66	30-130	05/29/2019 1235
4-Bromophenyl phenyl ether	8.0	3.8		1	47	30-124	05/29/2019 1235
Butyl benzyl phthalate	8.0	5.9		1	74	54-135	05/29/2019 1235
Carbazole	8.0	4.6		1	58	45-101	05/29/2019 1235
bis (2-Chloro-1-methylethyl) ether	8.0	5.8		1	73	42-124	05/29/2019 1235
4-Chloro-3-methyl phenol	8.0	4.1		1	51	30-123	05/29/2019 1235
bis(2-Chloroethoxy)methane	8.0	4.5		1	56	44-127	05/29/2019 1235
bis(2-Chloroethyl)ether	8.0	5.1		1	64	46-120	05/29/2019 1235
2-Chloronaphthalene	8.0	3.7		1	47	46-100	05/29/2019 1235
2-Chlorophenol	8.0	3.5	N	1	44	50-117	05/29/2019 1235
4-Chlorophenyl phenyl ether	8.0	3.7		1	47	30-121	05/29/2019 1235
Chrysene	8.0	5.4		1	67	30-130	05/29/2019 1235
Dibenzo(a,h)anthracene	8.0	5.3		1	67	30-130	05/29/2019 1235
Dibenzofuran	8.0	4.0		1	49	30-118	05/29/2019 1235
1,2-Dichlorobenzene	8.0	3.7		1	47	32-111	05/29/2019 1235
1,3-Dichlorobenzene	8.0	3.7		1	46	28-110	05/29/2019 1235
1,4-Dichlorobenzene	8.0	3.6		1	46	29-112	05/29/2019 1235
3,3'-Dichlorobenzidine	8.0	2.7		1	34	10-126	05/29/2019 1235
2,4-Dichlorophenol	8.0	3.5		1	43	30-121	05/29/2019 1235
Diethylphthalate	8.0	4.5		1	56	40-125	05/29/2019 1235
Dimethyl phthalate	8.0	4.2		1	53	40-127	05/29/2019 1235
2,4-Dimethylphenol	8.0	3.9		1	49	20-125	05/29/2019 1235
Di-n-butyl phthalate	8.0	5.4		1	67	40-127	05/29/2019 1235
4,6-Dinitro-2-methylphenol	8.0	5.1		1	64	56-128	05/29/2019 1235
2,4-Dinitrophenol	16	7.6		1	48	11-126	05/29/2019 1235
2,4-Dinitrotoluene	8.0	4.5	N	1	56	59-127	05/29/2019 1235
2,6-Dinitrotoluene	8.0	4.3	N	1	53	59-126	05/29/2019 1235
Di-n-octylphthalate	8.0	4.9		1	62	50-136	05/29/2019 1235
bis(2-Ethylhexyl)phthalate	8.0	5.6		1	70	56-128	05/29/2019 1235
Fluoranthene	8.0	5.0		1	62	40-128	05/29/2019 1235
Fluorene	8.0	4.0		1	49	30-124	05/29/2019 1235
Hexachlorobenzene	8.0	3.8		1	47	30-125	05/29/2019 1235
Hexachlorobutadiene	8.0	3.5		1	44	24-110	05/29/2019 1235
Hexachlorocyclopentadiene	40	11		1	28	16-96	05/29/2019 1235
Hexachloroethane	8.0	3.5		1	44	31-110	05/29/2019 1235
Indeno(1,2,3-c,d)pyrene	8.0	5.3		1	66	30-130	05/29/2019 1235
Isophorone	8.0	4.8		1	60	57-123	05/29/2019 1235

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ17674-002
Batch: 17674
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2019 1615

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	3.9		1	48	40-132	05/29/2019 1235
2-Methylphenol	8.0	4.4	N	1	54	56-119	05/29/2019 1235
3+4-Methylphenol	8.0	4.9		1	61	53-119	05/29/2019 1235
Naphthalene	8.0	4.0		1	50	30-130	05/29/2019 1235
2-Nitroaniline	8.0	4.3	N	1	53	60-124	05/29/2019 1235
3-Nitroaniline	8.0	3.8		1	48	43-123	05/29/2019 1235
4-Nitroaniline	8.0	4.4		1	55	30-135	05/29/2019 1235
Nitrobenzene	8.0	5.0		1	63	51-122	05/29/2019 1235
2-Nitrophenol	8.0	4.3		1	54	51-118	05/29/2019 1235
4-Nitrophenol	16	10		1	64	53-130	05/29/2019 1235
N-Nitrosodi-n-propylamine	8.0	5.6		1	70	54-127	05/29/2019 1235
N-Nitrosodiphenylamine (Diphenylamine)	8.0	4.2		1	52	30-123	05/29/2019 1235
Pentachlorophenol	16	8.7		1	54	42-131	05/29/2019 1235
Phenanthrene	8.0	4.1		1	51	40-123	05/29/2019 1235
Phenol	8.0	3.0	N	1	38	49-117	05/29/2019 1235
Pyrene	8.0	5.2		1	65	40-126	05/29/2019 1235
1,2,4,5-Tetrachlorobenzene	8.0	3.4		1	42	30-130	05/29/2019 1235
2,3,4,6-Tetrachlorophenol	8.0	3.8		1	47	30-130	05/29/2019 1235
1,2,4-Trichlorobenzene	8.0	3.6		1	46	20-90	05/29/2019 1235
2,4,5-Trichlorophenol	8.0	3.7		1	46	30-123	05/29/2019 1235
2,4,6-Trichlorophenol	8.0	3.9		1	48	30-125	05/29/2019 1235

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		49	37-129
2-Fluorophenol		32	24-127
Nitrobenzene-d5		64	38-127
Phenol-d5		36	28-128
Terphenyl-d14		76	10-148
2,4,6-Tribromophenol		55	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UE22029-001MS
Batch: 17674
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2019 1615

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	6.9	16	14		10	47	30-122	05/30/2019 2226
Acenaphthylene	ND	16	8.7		10	54	30-130	05/30/2019 2226
Anthracene	0.92	16	6.4		10	34	30-123	05/30/2019 2226
Benzo(a)anthracene	ND	16	4.2	N	10	26	40-125	05/30/2019 2226
Benzo(a)pyrene	ND	16	2.8	N	10	18	40-128	05/30/2019 2226
Benzo(b)fluoranthene	ND	16	3.3	N	10	20	30-130	05/30/2019 2226
Benzo(g,h,i)perylene	ND	16	1.6	N	10	10	30-130	05/30/2019 2226
Benzo(k)fluoranthene	ND	16	2.9	N	10	18	30-130	05/30/2019 2226
4-Bromophenyl phenyl ether	ND	16	4.9		10	31	30-124	05/30/2019 2226
Butyl benzyl phthalate	ND	16	5.5	N	10	34	54-135	05/30/2019 2226
Carbazole	17	16	28		10	63	45-101	05/30/2019 2226
bis (2-Chloro-1-methylethyl) ether	ND	16	11		10	69	42-124	05/30/2019 2226
4-Chloro-3-methyl phenol	ND	16	9.7		10	61	30-123	05/30/2019 2226
bis(2-Chloroethoxy)methane	ND	16	8.2		10	51	44-127	05/30/2019 2226
bis(2-Chloroethyl)ether	ND	16	9.3		10	58	46-120	05/30/2019 2226
2-Chloronaphthalene	ND	16	5.6	N	10	35	46-100	05/30/2019 2226
2-Chlorophenol	ND	16	6.1	N	10	38	50-117	05/30/2019 2226
4-Chlorophenyl phenyl ether	ND	16	5.2		10	32	30-121	05/30/2019 2226
Chrysene	ND	16	3.4	N	10	21	30-130	05/30/2019 2226
Dibenzo(a,h)anthracene	ND	16	2.0	N	10	13	30-130	05/30/2019 2226
Dibenzofuran	3.1	16	10		10	46	30-118	05/30/2019 2226
1,2-Dichlorobenzene	ND	16	7.2		10	45	32-111	05/30/2019 2226
1,3-Dichlorobenzene	ND	16	6.9		10	43	28-110	05/30/2019 2226
1,4-Dichlorobenzene	ND	16	6.6		10	41	29-112	05/30/2019 2226
3,3'-Dichlorobenzidine	ND	16	ND	N	10	0.00	10-126	05/30/2019 2226
2,4-Dichlorophenol	ND	16	8.0		10	50	30-121	05/30/2019 2226
Diethylphthalate	ND	16	11		10	68	40-125	05/30/2019 2226
Dimethyl phthalate	ND	16	11		10	67	40-127	05/30/2019 2226
2,4-Dimethylphenol	ND	16	12		10	78	20-125	05/30/2019 2226
Di-n-butyl phthalate	ND	16	5.8	N	10	36	40-127	05/30/2019 2226
4,6-Dinitro-2-methylphenol	ND	16	34	N	10	210	56-128	05/30/2019 2226
2,4-Dinitrophenol	ND	32	74	N	10	230	30-130	05/30/2019 2226
2,4-Dinitrotoluene	ND	16	14		10	88	59-127	05/30/2019 2226
2,6-Dinitrotoluene	ND	16	8.5	N	10	53	59-126	05/30/2019 2226
Di-n-octylphthalate	ND	16	2.5	N	10	16	50-136	05/30/2019 2226
bis(2-Ethylhexyl)phthalate	ND	16	4.6	N	10	29	56-128	05/30/2019 2226
Fluoranthene	ND	16	4.5	N	10	28	40-128	05/30/2019 2226
Fluorene	4.5	16	11		10	44	30-124	05/30/2019 2226
Hexachlorobenzene	ND	16	3.2	N	10	20	30-125	05/30/2019 2226
Hexachlorobutadiene	ND	16	3.3	N	10	21	30-130	05/30/2019 2226
Hexachlorocyclopentadiene	ND	80	ND	N	10	0.00	16-96	05/30/2019 2226
Hexachloroethane	ND	16	24	N	10	151	31-110	05/30/2019 2226
Indeno(1,2,3-c,d)pyrene	ND	16	1.9	N	10	12	30-130	05/30/2019 2226
Isophorone	ND	16	10		10	65	57-123	05/30/2019 2226

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UE22029-001MS
Batch: 17674
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2019 1615

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	0.77	16	7.2		10	40	40-132	05/30/2019 2226
2-Methylphenol	ND	16	15		10	91	56-119	05/30/2019 2226
3+4-Methylphenol	ND	16	9.5		10	59	53-119	05/30/2019 2226
Naphthalene	4.7	16	12		10	49	30-130	05/30/2019 2226
2-Nitroaniline	ND	16	9.8		10	61	60-124	05/30/2019 2226
3-Nitroaniline	ND	16	9.7		10	61	43-123	05/30/2019 2226
4-Nitroaniline	ND	16	18		10	110	30-135	05/30/2019 2226
Nitrobenzene	ND	16	8.4		10	53	51-122	05/30/2019 2226
2-Nitrophenol	ND	16	5.7	N	10	36	51-118	05/30/2019 2226
4-Nitrophenol	ND	32	39		10	122	53-130	05/30/2019 2226
N-Nitrosodi-n-propylamine	ND	16	11		10	69	54-127	05/30/2019 2226
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	19		10	120	30-123	05/30/2019 2226
Pentachlorophenol	ND	32	53	N	10	166	42-131	05/30/2019 2226
Phenanthrene	1.3	16	7.7		10	40	40-123	05/30/2019 2226
Phenol	ND	16	6.5	N	10	41	49-117	05/30/2019 2226
Pyrene	0.58	16	4.7	N	10	26	40-126	05/30/2019 2226
1,2,4,5-Tetrachlorobenzene	ND	16	4.7	N	10	29	30-130	05/30/2019 2226
2,3,4,6-Tetrachlorophenol	ND	16	15		10	93	30-130	05/30/2019 2226
1,2,4-Trichlorobenzene	ND	16	5.9		10	37	20-90	05/30/2019 2226
2,4,5-Trichlorophenol	ND	16	9.7		10	60	30-123	05/30/2019 2226
2,4,6-Trichlorophenol	ND	16	8.5		10	53	30-125	05/30/2019 2226

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		39	37-129
2-Fluorophenol		27	24-127
Nitrobenzene-d5		63	38-127
Phenol-d5		39	28-128
Terphenyl-d14		18	10-148
2,4,6-Tribromophenol		64	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UE22029-001MD
Batch: 17674
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2019 1615

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acenaphthene	6.9	16	16		10	60	14	30-122	40	05/30/2019 2250
Acenaphthylene	ND	16	9.7		10	60	10	30-130	40	05/30/2019 2250
Anthracene	0.92	16	7.0		10	38	8.3	30-123	40	05/30/2019 2250
Benzo(a)anthracene	ND	16	4.4	N	10	28	5.8	40-125	40	05/30/2019 2250
Benzo(a)pyrene	ND	16	3.2	N	10	20	13	40-128	40	05/30/2019 2250
Benzo(b)fluoranthene	ND	16	3.4	N	10	21	3.3	30-130	40	05/30/2019 2250
Benzo(g,h,i)perylene	ND	16	1.8	N	10	11	11	30-130	40	05/30/2019 2250
Benzo(k)fluoranthene	ND	16	3.0	N	10	19	3.7	30-130	40	05/30/2019 2250
4-Bromophenyl phenyl ether	ND	16	6.3		10	39	24	30-124	40	05/30/2019 2250
Butyl benzyl phthalate	ND	16	5.9	N	10	37	6.7	54-135	40	05/30/2019 2250
Carbazole	17	16	30		10	77	7.8	45-101	40	05/30/2019 2250
bis (2-Chloro-1-methylethyl) ether	ND	16	13		10	82	16	42-124	40	05/30/2019 2250
4-Chloro-3-methyl phenol	ND	16	9.0		10	56	7.3	30-123	40	05/30/2019 2250
bis(2-Chloroethoxy)methane	ND	16	8.9		10	55	7.3	44-127	40	05/30/2019 2250
bis(2-Chloroethyl)ether	ND	16	11		10	69	17	46-120	40	05/30/2019 2250
2-Chloronaphthalene	ND	16	6.9	N	10	43	21	46-100	40	05/30/2019 2250
2-Chlorophenol	ND	16	7.0	N	10	43	13	50-117	40	05/30/2019 2250
4-Chlorophenyl phenyl ether	ND	16	5.8		10	36	11	30-121	40	05/30/2019 2250
Chrysene	ND	16	3.9	N	10	24	12	30-130	40	05/30/2019 2250
Dibenzo(a,h)anthracene	ND	16	2.0	N	10	13	0.91	30-130	40	05/30/2019 2250
Dibenzofuran	3.1	16	12		10	59	19	30-118	40	05/30/2019 2250
1,2-Dichlorobenzene	ND	16	7.4		10	46	3.2	32-111	20	05/30/2019 2250
1,3-Dichlorobenzene	ND	16	6.6		10	41	4.2	28-110	20	05/30/2019 2250
1,4-Dichlorobenzene	ND	16	6.8		10	43	3.2	29-112	20	05/30/2019 2250
3,3'-Dichlorobenzidine	ND	16	ND	N	10	0.00	0.00	10-126	40	05/30/2019 2250
2,4-Dichlorophenol	ND	16	11		10	67	30	30-121	40	05/30/2019 2250
Diethylphthalate	ND	16	12		10	75	9.9	40-125	40	05/30/2019 2250
Dimethyl phthalate	ND	16	10		10	65	4.0	40-127	40	05/30/2019 2250
2,4-Dimethylphenol	ND	16	12		10	74	5.3	20-125	40	05/30/2019 2250
Di-n-butyl phthalate	ND	16	7.0		10	44	19	40-127	40	05/30/2019 2250
4,6-Dinitro-2-methylphenol	ND	16	35	N	10	216	3.0	56-128	40	05/30/2019 2250
2,4-Dinitrophenol	ND	32	77	N	10	240	4.2	30-130	40	05/30/2019 2250
2,4-Dinitrotoluene	ND	16	18		10	116	27	59-127	40	05/30/2019 2250
2,6-Dinitrotoluene	ND	16	8.7	N	10	55	2.2	59-126	40	05/30/2019 2250
Di-n-octylphthalate	ND	16	2.6	N	10	16	4.8	50-136	40	05/30/2019 2250
bis(2-Ethylhexyl)phthalate	ND	16	4.0	N	10	25	14	56-128	40	05/30/2019 2250
Fluoranthene	ND	16	5.2	N	10	33	15	40-128	40	05/30/2019 2250
Fluorene	4.5	16	13		10	56	16	30-124	40	05/30/2019 2250
Hexachlorobenzene	ND	16	3.8	N	10	24	15	30-125	40	05/30/2019 2250
Hexachlorobutadiene	ND	16	3.9	N	10	25	18	30-130	40	05/30/2019 2250
Hexachlorocyclopentadiene	ND	80	ND	N	10	0.00	0.00	16-96	40	05/30/2019 2250
Hexachloroethane	ND	16	29	N	10	181	18	31-110	40	05/30/2019 2250
Indeno(1,2,3-c,d)pyrene	ND	16	2.1	N	10	13	9.3	30-130	40	05/30/2019 2250
Isophorone	ND	16	11		10	70	7.3	57-123	40	05/30/2019 2250

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UE22029-001MD
Batch: 17674
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/23/2019 1615

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
2-Methylnaphthalene	0.77	16	8.2		10	46	13	40-132	40	05/30/2019 2250
2-Methylphenol	ND	16	18		10	111	20	56-119	40	05/30/2019 2250
3+4-Methylphenol	ND	16	11		10	68	15	53-119	40	05/30/2019 2250
Naphthalene	4.7	16	14		10	56	8.8	30-130	40	05/30/2019 2250
2-Nitroaniline	ND	16	10		10	63	3.9	60-124	40	05/30/2019 2250
3-Nitroaniline	ND	16	11		10	66	7.7	43-123	40	05/30/2019 2250
4-Nitroaniline	ND	16	14		10	90	20	30-135	40	05/30/2019 2250
Nitrobenzene	ND	16	9.6		10	60	13	51-122	40	05/30/2019 2250
2-Nitrophenol	ND	16	7.4	N	10	46	27	51-118	40	05/30/2019 2250
4-Nitrophenol	ND	32	40		10	126	3.8	53-130	40	05/30/2019 2250
N-Nitrosodi-n-propylamine	ND	16	13		10	80	14	54-127	40	05/30/2019 2250
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	21	N	10	131	8.4	30-123	40	05/30/2019 2250
Pentachlorophenol	ND	32	55	N	10	173	4.1	42-131	40	05/30/2019 2250
Phenanthrene	1.3	16	9.4		10	51	20	40-123	40	05/30/2019 2250
Phenol	ND	16	7.7	N	10	48	16	49-117	40	05/30/2019 2250
Pyrene	0.58	16	5.7	N	10	32	19	40-126	40	05/30/2019 2250
1,2,4,5-Tetrachlorobenzene	ND	16	5.6		10	35	19	30-130	40	05/30/2019 2250
2,3,4,6-Tetrachlorophenol	ND	16	15		10	91	2.3	30-130	40	05/30/2019 2250
1,2,4-Trichlorobenzene	ND	16	6.7		10	42	13	20-90	40	05/30/2019 2250
2,4,5-Trichlorophenol	ND	16	9.9		10	62	2.2	30-123	40	05/30/2019 2250
2,4,6-Trichlorophenol	ND	16	9.4		10	58	9.6	30-125	40	05/30/2019 2250

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		42	37-129
2-Fluorophenol		27	24-127
Nitrobenzene-d5		61	38-127
Phenol-d5		47	28-128
Terphenyl-d14		19	10-148
2,4,6-Tribromophenol		75	35-144

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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ18268-001
Batch: 18268
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/30/2019 1615

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Acenaphthylene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Anthracene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	06/03/2019 1107
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	06/03/2019 1107
Carbazole	ND		1	0.80	0.040	ug/L	06/03/2019 1107
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	06/03/2019 1107
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	06/03/2019 1107
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	06/03/2019 1107
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	06/03/2019 1107
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	06/03/2019 1107
2-Chlorophenol	ND		1	0.80	0.15	ug/L	06/03/2019 1107
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	06/03/2019 1107
Chrysene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Dibenzofuran	ND		1	0.80	0.16	ug/L	06/03/2019 1107
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	06/03/2019 1107
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	06/03/2019 1107
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	06/03/2019 1107
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	06/03/2019 1107
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	06/03/2019 1107
Diethylphthalate	ND		1	4.0	0.19	ug/L	06/03/2019 1107
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	06/03/2019 1107
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	06/03/2019 1107
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	06/03/2019 1107
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	06/03/2019 1107
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	06/03/2019 1107
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	06/03/2019 1107
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	06/03/2019 1107
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	06/03/2019 1107
bis(2-Ethylhexyl)phthalate	ND		1	4.0	0.38	ug/L	06/03/2019 1107
Fluoranthene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Fluorene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	06/03/2019 1107
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	06/03/2019 1107
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	06/03/2019 1107
Hexachloroethane	ND		1	0.80	0.17	ug/L	06/03/2019 1107
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Isophorone	ND		1	0.80	0.22	ug/L	06/03/2019 1107

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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ18268-001
Batch: 18268
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/30/2019 1615

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
2-Methylphenol	ND		1	0.80	0.21	ug/L	06/03/2019 1107
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	06/03/2019 1107
Naphthalene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
2-Nitroaniline	ND		1	1.6	0.66	ug/L	06/03/2019 1107
3-Nitroaniline	ND		1	1.6	0.15	ug/L	06/03/2019 1107
4-Nitroaniline	ND		1	1.6	1.3	ug/L	06/03/2019 1107
Nitrobenzene	ND		1	0.80	0.17	ug/L	06/03/2019 1107
2-Nitrophenol	ND		1	1.6	0.44	ug/L	06/03/2019 1107
4-Nitrophenol	ND		1	4.0	2.1	ug/L	06/03/2019 1107
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	06/03/2019 1107
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	06/03/2019 1107
Pentachlorophenol	ND		1	4.0	1.3	ug/L	06/03/2019 1107
Phenanthrene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
Phenol	ND		1	0.80	0.19	ug/L	06/03/2019 1107
Pyrene	ND		1	0.16	0.040	ug/L	06/03/2019 1107
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	06/03/2019 1107
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	06/03/2019 1107
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	06/03/2019 1107
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	06/03/2019 1107
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	06/03/2019 1107

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		54	37-129
2-Fluorophenol		34	24-127
Nitrobenzene-d5		59	38-127
Phenol-d5		47	28-128
Terphenyl-d14		86	10-148
2,4,6-Tribromophenol		54	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18268-002
Batch: 18268
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/30/2019 1615

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.4		1	55	30-122	06/03/2019 1510
Acenaphthylene	8.0	4.4		1	55	30-130	06/03/2019 1510
Anthracene	8.0	4.3		1	54	30-123	06/03/2019 1510
Benzo(a)anthracene	8.0	4.5		1	57	40-125	06/03/2019 1510
Benzo(a)pyrene	8.0	4.3		1	54	40-128	06/03/2019 1510
Benzo(b)fluoranthene	8.0	4.5		1	57	30-130	06/03/2019 1510
Benzo(g,h,i)perylene	8.0	4.5		1	56	30-130	06/03/2019 1510
Benzo(k)fluoranthene	8.0	4.4		1	55	30-130	06/03/2019 1510
4-Bromophenyl phenyl ether	8.0	4.0		1	50	30-124	06/03/2019 1510
Butyl benzyl phthalate	8.0	5.0		1	63	54-135	06/03/2019 1510
Carbazole	8.0	4.2		1	53	45-101	06/03/2019 1510
bis (2-Chloro-1-methylethyl) ether	8.0	5.2		1	65	42-124	06/03/2019 1510
4-Chloro-3-methyl phenol	8.0	4.6		1	58	30-123	06/03/2019 1510
bis(2-Chloroethoxy)methane	8.0	4.6		1	58	44-127	06/03/2019 1510
bis(2-Chloroethyl)ether	8.0	4.9		1	61	46-120	06/03/2019 1510
2-Chloronaphthalene	8.0	4.2		1	52	46-100	06/03/2019 1510
2-Chlorophenol	8.0	4.3		1	54	50-117	06/03/2019 1510
4-Chlorophenyl phenyl ether	8.0	4.0		1	50	30-121	06/03/2019 1510
Chrysene	8.0	4.6		1	57	30-130	06/03/2019 1510
Dibenzo(a,h)anthracene	8.0	4.1		1	51	30-130	06/03/2019 1510
Dibenzofuran	8.0	4.2		1	53	30-118	06/03/2019 1510
1,2-Dichlorobenzene	8.0	3.9		1	49	32-111	06/03/2019 1510
1,3-Dichlorobenzene	8.0	3.8		1	48	28-110	06/03/2019 1510
1,4-Dichlorobenzene	8.0	3.8		1	47	29-112	06/03/2019 1510
3,3'-Dichlorobenzidine	8.0	2.5		1	32	10-126	06/03/2019 1510
2,4-Dichlorophenol	8.0	4.1		1	51	30-121	06/03/2019 1510
Diethylphthalate	8.0	4.6		1	57	40-125	06/03/2019 1510
Dimethyl phthalate	8.0	4.3		1	54	40-127	06/03/2019 1510
2,4-Dimethylphenol	8.0	4.2		1	53	20-125	06/03/2019 1510
Di-n-butyl phthalate	8.0	4.7		1	59	40-127	06/03/2019 1510
4,6-Dinitro-2-methylphenol	8.0	4.7		1	58	56-128	06/03/2019 1510
2,4-Dinitrophenol	16	6.6		1	41	11-126	06/03/2019 1510
2,4-Dinitrotoluene	8.0	4.7	N	1	58	59-127	06/03/2019 1510
2,6-Dinitrotoluene	8.0	4.5	N	1	56	59-126	06/03/2019 1510
Di-n-octylphthalate	8.0	3.2	N	1	40	50-136	06/03/2019 1510
bis(2-Ethylhexyl)phthalate	8.0	3.5	N	1	44	56-128	06/03/2019 1510
Fluoranthene	8.0	4.4		1	55	40-128	06/03/2019 1510
Fluorene	8.0	4.2		1	52	30-124	06/03/2019 1510
Hexachlorobenzene	8.0	4.1		1	51	30-125	06/03/2019 1510
Hexachlorobutadiene	8.0	3.4		1	42	24-110	06/03/2019 1510
Hexachlorocyclopentadiene	40	11		1	28	16-96	06/03/2019 1510
Hexachloroethane	8.0	3.7		1	46	31-110	06/03/2019 1510
Indeno(1,2,3-c,d)pyrene	8.0	4.1		1	51	30-130	06/03/2019 1510
Isophorone	8.0	5.1		1	64	57-123	06/03/2019 1510

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LOD = Limit of Detection

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ18268-002
Batch: 18268
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 05/30/2019 1615

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.1		1	52	40-132	06/03/2019 1510
2-Methylphenol	8.0	5.2		1	65	56-119	06/03/2019 1510
3+4-Methylphenol	8.0	5.5		1	69	53-119	06/03/2019 1510
Naphthalene	8.0	4.3		1	54	30-130	06/03/2019 1510
2-Nitroaniline	8.0	4.8		1	60	60-124	06/03/2019 1510
3-Nitroaniline	8.0	3.5		1	44	43-123	06/03/2019 1510
4-Nitroaniline	8.0	3.9		1	48	30-135	06/03/2019 1510
Nitrobenzene	8.0	5.3		1	66	51-122	06/03/2019 1510
2-Nitrophenol	8.0	4.5		1	57	51-118	06/03/2019 1510
4-Nitrophenol	16	9.3		1	58	53-130	06/03/2019 1510
N-Nitrosodi-n-propylamine	8.0	5.2		1	65	54-127	06/03/2019 1510
N-Nitrosodiphenylamine (Diphenylamine)	8.0	4.4		1	56	30-123	06/03/2019 1510
Pentachlorophenol	16	7.1		1	44	42-131	06/03/2019 1510
Phenanthrene	8.0	4.4		1	55	40-123	06/03/2019 1510
Phenol	8.0	4.6		1	57	49-117	06/03/2019 1510
Pyrene	8.0	4.8		1	61	40-126	06/03/2019 1510
1,2,4,5-Tetrachlorobenzene	8.0	3.9		1	49	30-130	06/03/2019 1510
2,3,4,6-Tetrachlorophenol	8.0	3.6		1	45	30-130	06/03/2019 1510
1,2,4-Trichlorobenzene	8.0	3.8		1	48	20-90	06/03/2019 1510
2,4,5-Trichlorophenol	8.0	4.1		1	51	30-123	06/03/2019 1510
2,4,6-Trichlorophenol	8.0	4.2		1	52	30-125	06/03/2019 1510

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		52	37-129
2-Fluorophenol		51	24-127
Nitrobenzene-d5		65	38-127
Phenol-d5		58	28-128
Terphenyl-d14		65	10-148
2,4,6-Tribromophenol		54	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (screening) - MB

Sample ID: UQ17684-001
Batch: 17684
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 05/23/2019 2138

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TEH	ND		1	200	200	ug/L	05/25/2019 0245

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		110	40-140
1-Chloro-octadecane (aliphatic)		111	40-140
2-Fluorobiphenyl (fractionation 1)		118	40-140
o - Terphenyl (aromatic)		95	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana EPH (screening) - LCS

Sample ID: UQ17684-002
Batch: 17684
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 05/23/2019 2138

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TEH	1600	1700		1	109	40-140	05/25/2019 0314

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		114	40-140
1-Chloro-octadecane (aliphatic)		114	40-140
2-Fluorobiphenyl (fractionation 1)		121	40-140
o - Terphenyl (aromatic)		108	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana EPH (screening) - LCSD

Sample ID: UQ17684-003
Batch: 17684
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 05/23/2019 2138

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TEH	1600	1900		1	120	9.6	40-140	25	05/25/2019 0343

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		120	40-140
1-Chloro-octadecane (aliphatic)		122	40-140
2-Fluorobiphenyl (fractionation 1)		128	40-140
o - Terphenyl (aromatic)		117	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ18169-001
Batch: 18169
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 05/23/2019 2138

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	06/03/2019 1032
C9 - C18 Aliphatics	ND		1	100	100	ug/L	06/03/2019 1032

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		98	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ18169-002
Batch: 18169
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 05/23/2019 2138

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	440		1	110	40-140	06/03/2019 1102
C9 - C18 Aliphatics	300	150		1	48	40-140	06/03/2019 1102

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		101	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ18169-003
Batch: 18169
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 05/23/2019 2138

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	470		1	118	6.8	40-140	25	06/03/2019 1131
C9 - C18 Aliphatics	300	140		1	46	4.6	40-140	25	06/03/2019 1131

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		104	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ18170-001
Batch: 18170
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 05/23/2019 2138

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	06/03/2019 1328

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		82	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		76	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ18170-002
Batch: 18170
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 05/23/2019 2138

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	790		1	92	40-140	06/03/2019 1358

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		96	40-140
o - Terphenyl (aromatic)		97	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ18170-003
Batch: 18170
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 05/23/2019 2138

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	780		1	92	0.27	40-140	25	06/03/2019 1427

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		84	40-140
2-Fluorobiphenyl (fractionation 1)		89	40-140
o - Terphenyl (aromatic)		97	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ17877-001
Batch: 17877
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	05/23/2019 2255
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	05/23/2019 2255
Ethylbenzene	ND		1	5.0	0.62	ug/L	05/23/2019 2255
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	05/23/2019 2255
Naphthalene	ND		1	5.0	0.70	ug/L	05/23/2019 2255
Toluene	ND		1	5.0	0.53	ug/L	05/23/2019 2255
m+p - Xylenes	ND		1	5.0	1.2	ug/L	05/23/2019 2255
o - Xylenes	ND		1	5.0	0.58	ug/L	05/23/2019 2255

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		98	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ17877-002
Batch: 17877
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	19		1	76	70-130	05/23/2019 2137
C9 - C10 Aromatics	25	22		1	89	70-130	05/23/2019 2137
Ethylbenzene	25	20		1	80	70-130	05/23/2019 2137
Methyl tertiary butyl ether (MTBE)	25	18		1	70	70-130	05/23/2019 2137
Naphthalene	25	23		1	93	70-130	05/23/2019 2137
Toluene	25	19		1	78	70-130	05/23/2019 2137
m+p - Xylenes	50	41		1	81	70-130	05/23/2019 2137
o - Xylenes	25	20		1	80	70-130	05/23/2019 2137

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ17877-003
Batch: 17877
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	23		1	91	17	70-130	25	05/23/2019 2205
C9 - C10 Aromatics	25	26		1	104	16	70-130	25	05/23/2019 2205
Ethylbenzene	25	23		1	92	14	70-130	25	05/23/2019 2205
Methyl tertiary butyl ether (MTBE)	25	23	+	1	93	27	70-130	25	05/23/2019 2205
Naphthalene	25	26		1	104	11	70-130	25	05/23/2019 2205
Toluene	25	22		1	89	13	70-130	25	05/23/2019 2205
m+p - Xylenes	50	46		1	92	13	70-130	25	05/23/2019 2205
o - Xylenes	25	23		1	92	14	70-130	25	05/23/2019 2205

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		106	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ17878-001
Batch: 17878
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	05/23/2019 2255
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	05/23/2019 2255

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ17878-002
Batch: 17878
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	73		1	73	70-130	05/23/2019 2137
C9 - C12 Aliphatics, Adjusted	75	61		1	81	70-130	05/23/2019 2137

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ17878-003
Batch: 17878
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	95	+	1	95	26	70-130	25	05/23/2019 2205
C9 - C12 Aliphatics, Adjusted	75	71		1	95	16	70-130	25	05/23/2019 2205

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		108	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - MB

Sample ID: UQ17879-001
Batch: 17879
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	05/23/2019 2255

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ17879-002
Batch: 17879
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	300		1	81	70-130	05/23/2019 2137

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - LCSD

Sample ID: UQ17879-003
Batch: 17879
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	360		1	95	17	70-130	25	05/23/2019 2205

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		109	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ17892-001
Batch: 17892
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	05/26/2019 1405
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	05/26/2019 1405
Ethylbenzene	ND		1	5.0	0.62	ug/L	05/26/2019 1405
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	05/26/2019 1405
Naphthalene	ND		1	5.0	0.70	ug/L	05/26/2019 1405
Toluene	ND		1	5.0	0.53	ug/L	05/26/2019 1405
m+p - Xylenes	ND		1	5.0	1.2	ug/L	05/26/2019 1405
o - Xylenes	ND		1	5.0	0.58	ug/L	05/26/2019 1405

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		101	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ17892-002
Batch: 17892
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	26		1	102	70-130	05/26/2019 1308
C9 - C10 Aromatics	25	29		1	116	70-130	05/26/2019 1308
Ethylbenzene	25	26		1	104	70-130	05/26/2019 1308
Methyl tertiary butyl ether (MTBE)	25	25		1	100	70-130	05/26/2019 1308
Naphthalene	25	26		1	104	70-130	05/26/2019 1308
Toluene	25	26		1	102	70-130	05/26/2019 1308
m+p - Xylenes	50	53		1	105	70-130	05/26/2019 1308
o - Xylenes	25	26		1	104	70-130	05/26/2019 1308

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		104	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ17892-003
Batch: 17892
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	25		1	101	1.2	70-130	25	05/26/2019 1337
C9 - C10 Aromatics	25	28		1	111	4.6	70-130	25	05/26/2019 1337
Ethylbenzene	25	26		1	103	1.2	70-130	25	05/26/2019 1337
Methyl tertiary butyl ether (MTBE)	25	25		1	99	1.6	70-130	25	05/26/2019 1337
Naphthalene	25	25		1	101	2.3	70-130	25	05/26/2019 1337
Toluene	25	26		1	103	0.78	70-130	25	05/26/2019 1337
m+p - Xylenes	50	52		1	104	0.76	70-130	25	05/26/2019 1337
o - Xylenes	25	26		1	103	1.5	70-130	25	05/26/2019 1337

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		101	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ17893-001
Batch: 17893
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	05/26/2019 1405
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	05/26/2019 1405

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		101	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ17893-002
Batch: 17893
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	112	70-130	05/26/2019 1308
C9 - C12 Aliphatics, Adjusted	75	81		1	108	70-130	05/26/2019 1308

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		102	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ17893-003
Batch: 17893
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	111	0.90	70-130	25	05/26/2019 1337
C9 - C12 Aliphatics, Adjusted	75	79		1	106	2.1	70-130	25	05/26/2019 1337

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		101	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ17894-001
Batch: 17894
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	05/26/2019 1405

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		101	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ17894-002
Batch: 17894
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	400		1	107	70-130	05/26/2019 1308

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		102	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ17894-003
Batch: 17894
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	400		1	106	1.0	70-130	25	05/26/2019 1337

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		99	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ18517-001
Batch: 18517
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	05/30/2019 1542
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	05/30/2019 1542
Ethylbenzene	ND		1	5.0	0.62	ug/L	05/30/2019 1542
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	05/30/2019 1542
Naphthalene	ND		1	5.0	0.70	ug/L	05/30/2019 1542
Toluene	ND		1	5.0	0.53	ug/L	05/30/2019 1542
m+p - Xylenes	ND		1	5.0	1.2	ug/L	05/30/2019 1542
o - Xylenes	ND		1	5.0	0.58	ug/L	05/30/2019 1542

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ18517-002
Batch: 18517
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	25		1	98	70-130	05/30/2019 1445
C9 - C10 Aromatics	25	27		1	108	70-130	05/30/2019 1445
Ethylbenzene	25	25		1	99	70-130	05/30/2019 1445
Methyl tertiary butyl ether (MTBE)	25	24		1	94	70-130	05/30/2019 1445
Naphthalene	25	26		1	105	70-130	05/30/2019 1445
Toluene	25	25		1	99	70-130	05/30/2019 1445
m+p - Xylenes	50	51		1	101	70-130	05/30/2019 1445
o - Xylenes	25	25		1	100	70-130	05/30/2019 1445

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ18517-003
Batch: 18517
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	24		1	95	3.3	70-130	25	05/30/2019 1514
C9 - C10 Aromatics	25	27		1	106	1.5	70-130	25	05/30/2019 1514
Ethylbenzene	25	24		1	96	3.7	70-130	25	05/30/2019 1514
Methyl tertiary butyl ether (MTBE)	25	25		1	99	5.0	70-130	25	05/30/2019 1514
Naphthalene	25	25		1	100	5.1	70-130	25	05/30/2019 1514
Toluene	25	24		1	94	5.0	70-130	25	05/30/2019 1514
m+p - Xylenes	50	49		1	98	3.4	70-130	25	05/30/2019 1514
o - Xylenes	25	25		1	98	2.0	70-130	25	05/30/2019 1514

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ17690-001
Batch: 17690
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 05/23/2019 1754

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	05/27/2019 0515
Arsenic	ND		1	2.0	1.3	ug/L	05/27/2019 0515
Barium	ND		1	5.0	1.3	ug/L	05/27/2019 0515
Beryllium	ND		1	0.40	0.15	ug/L	05/27/2019 0515
Cadmium	ND		1	0.50	0.13	ug/L	05/27/2019 0515
Chromium	ND		1	5.0	1.3	ug/L	05/27/2019 0515
Cobalt	ND		1	5.0	1.3	ug/L	05/27/2019 0515
Copper	ND		1	5.0	1.3	ug/L	05/27/2019 0515
Lead	ND		1	1.0	0.25	ug/L	05/27/2019 0515
Nickel	ND		1	5.0	1.3	ug/L	05/27/2019 0515
Selenium	ND		1	5.0	1.3	ug/L	05/27/2019 0515
Silver	ND		1	1.0	0.25	ug/L	05/27/2019 0515
Vanadium	ND		1	5.0	2.5	ug/L	05/27/2019 0515
Zinc	ND		1	10	2.5	ug/L	05/27/2019 0515

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ17690-002
Batch: 17690
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 05/23/2019 1754

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	97		1	97	80-120	05/27/2019 0520
Arsenic	100	99		1	99	80-120	05/27/2019 0520
Barium	100	97		1	97	80-120	05/27/2019 0520
Beryllium	100	99		1	99	80-120	05/27/2019 0520
Cadmium	100	99		1	99	80-120	05/27/2019 0520
Chromium	100	99		1	99	80-120	05/27/2019 0520
Cobalt	100	98		1	98	80-120	05/27/2019 0520
Copper	100	100		1	100	80-120	05/27/2019 0520
Lead	100	100		1	103	80-120	05/27/2019 0520
Nickel	100	98		1	98	80-120	05/27/2019 0520
Selenium	100	100		1	100	80-120	05/27/2019 0520
Silver	100	98		1	98	80-120	05/27/2019 0520
Vanadium	100	100		1	103	80-120	05/27/2019 0520
Zinc	100	100		1	101	80-120	05/27/2019 0520

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UE22029-002MS
Batch: 17690
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 05/23/2019 1754

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	4.7	100	100		1	98	70-130	05/27/2019 0538
Arsenic	3.4	100	97		1	94	70-130	05/27/2019 0538
Barium	180	100	270		1	92	70-130	05/27/2019 0538
Beryllium	ND	100	25	N	1	25	70-130	05/27/2019 0538
Cadmium	ND	100	93		1	93	70-130	05/27/2019 0538
Chromium	ND	100	94		1	94	70-130	05/27/2019 0538
Cobalt	ND	100	90		1	90	70-130	05/27/2019 0538
Copper	5.5	100	96		1	91	70-130	05/27/2019 0538
Lead	ND	100	94		1	94	70-130	05/27/2019 0538
Nickel	7.0	100	92		1	85	70-130	05/27/2019 0538
Selenium	ND	100	100		1	100	70-130	05/27/2019 0538
Silver	ND	100	89		1	89	70-130	05/27/2019 0538
Vanadium	5.9	100	110		1	101	70-130	05/27/2019 0538
Zinc	5.5	100	92		1	86	70-130	05/27/2019 0538

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UE22029-002MD
Batch: 17690
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 05/23/2019 1754

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Antimony	4.7	100	100		1	100	1.9	70-130	20	05/27/2019 0544
Arsenic	3.4	100	96		1	92	1.4	70-130	20	05/27/2019 0544
Barium	180	100	280		1	99	2.7	70-130	20	05/27/2019 0544
Beryllium	ND	100	24	N	1	24	1.2	70-130	20	05/27/2019 0544
Cadmium	ND	100	95		1	95	2.2	70-130	20	05/27/2019 0544
Chromium	ND	100	94		1	94	0.12	70-130	20	05/27/2019 0544
Cobalt	ND	100	90		1	90	0.30	70-130	20	05/27/2019 0544
Copper	5.5	100	97		1	91	0.69	70-130	20	05/27/2019 0544
Lead	ND	100	96		1	96	1.2	70-130	20	05/27/2019 0544
Nickel	7.0	100	91		1	84	0.46	70-130	20	05/27/2019 0544
Selenium	ND	100	99		1	99	0.95	70-130	20	05/27/2019 0544
Silver	ND	100	90		1	90	0.97	70-130	20	05/27/2019 0544
Vanadium	5.9	100	110		1	101	0.28	70-130	20	05/27/2019 0544
Zinc	5.5	100	92		1	87	0.29	70-130	20	05/27/2019 0544

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ17938-001
Batch: 17938
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 05/28/2019 1151

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	05/29/2019 1333

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ17938-002
Batch: 17938
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 05/28/2019 1151

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0020		1	98	80-120	05/29/2019 1335

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Chain of Custody
and
Miscellaneous Documents

Shealy Environmental Services, Inc.
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SHEALY ENVIRONMENTAL SERVICES, INC.

Chain of Custody Record

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

Number 91645

Client: Ramboll US Corporation	Report to Contact: Michael Wilson
Address: 7500 College Boulevard Suite #925	Sampler's Signature: x
City: Overland Park	State: KS Zip Code: 66210
Project Name: CMR RIAM East Rail	Printed Name: Josh Myers
Project No.: 1690012314-003 Task 221	P.O. No.:
Telephone No. / E-mail: 316-644-2303/mwilson@ramboll.com	Quote No.
Analysis (Attach list if more space is needed)	Page 1 of 1

UE22029

KMN2

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	# of Composite	Matrix: Aqueous	Soil	Wipe/Solid	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnOAc/NaOH	VOC	EPH	Metals	EPH with UPH	SVOC				Remarks / Cooler I.D.
CMR-EB06-190516	5/16/19	1650	6	X			2		1	9			X	X	X	X	X				Cooler 001
CMR-EB07-190516	↓	1730	6	X			2		1	9			X	X	X	X	X				Cooler 001
CMR-EB11-190520	5/20/19	1700	6	X			2		1	9			X	X	X	X	X				Cooler 001
CMR-EB14-190520	↓	1605	6	X			2		1	9			X	X	X	X	X				Cooler 001
CMR-EB05-190521	5/21/19	1605	6	X						5			X			X					Cooler 002
CMR-EB-01	↓	1440	6	X			2		1	9			X	X	X	X	X				Cooler 002
CMR-EB-02	↓	1445	6	X			2		1	9			X	X	X	X	X				Cooler 002
TB-05	N/A	N/A	6	X						2			X								Trip Blank / Cooler 002
TB-06	N/A	N/A	6	X						2			X								Trip Blank / Cooler 001

Turn Around Time Required (Prior lab approval required for expedited TAT.): (X) Standard ( ) Rush (Specify)

Sample Disposal: ( ) Return to Client (X) Disposal by Lab

Possible Hazard Identification: ( ) Non-Hazard ( ) Flammable ( ) Skin Irritant ( ) Poison (X) Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by: Josh Myers	5/21/19	1730	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: FedEx	5-22-19	1014	4. Laboratory received by: Erin Brown	5-22-19	1014

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) (Yes) No Ice Pack
Receipt Temp. 2.8, 3.1 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 08-01-2014

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: Ramboll Cooler Inspected by/date: ETB / 5/22/19 Lot #: UE22029

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: ETB

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

3.1 / 3.1 °C 2.8 / 2.8 °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☐ Yes	☑ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☐ Yes	☑ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☑ Yes	☐ No		21. Was the quote number listed on the container label? If yes, Quote # 21552

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: ETB Date: 5/22/19

Comments: -007 received two broken, 1L amber HCl bottles

MEMO

Date: **July 17, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF07044, 3 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF07044 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB10-0.5-1.0-190606	UF07044-001
CMR-EB10-2.5-5.0-190606	UF07044-002
CMR-EB10-7.5-8.5-190606	UF07044-003
TB-07-20190606	UF07044-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

MS/MSD Recoveries
For the SVOC analysis suite MS/MSD results were reported to be almost universally out of criteria with extremely low recoveries. However, this is largely due to high native sample concentrations.. Due to this, the low recoveries do not represent a systematic matrix issue. No validation action warranted.

For metals analysis suites MS/MSD results were reported. Recoveries were largely within criteria with the exception of beryllium. These out of criteria recoveries indicate a possible low bias to results. Therefore, all beryllium results were flagged as estimated (J, UJ).

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of methylcyclohexane. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methylcyclohexane detected results have been validated as estimated.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF07044

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 12, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	MS/MSD recoveries out for multiple analytes mostly due to high native sample concentrations. Beryyllium recovery low. All beryllium results validated as estimated (J, UJ).
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted.
Overall Assessment of Data	All beryllium results validated as estimated (J, UJ).

SDG No. UF07044

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 12, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	Phenol detected in method blank. No project detections, no action taken.	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to sample dilutions. No action taken.	Surrogates out due to sample dilutions. No action taken.
Matrix Spike/Matrix Spike Duplicate	Multiple SVOCs out of criteria. COCs of concern out likely due to high native sample concentrations. Non-project COCs left as is. No action taken.	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	Methylcyclohexane out of criteria high with detections. All methylcyclohexane detected results validated as estimated (J).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab	N/A
Other Non-conformances	No other non-conformances noted during review.	No other non-conformances noted during review.
Overall Assessment of Data	All methylcyclohexane detected results validated as estimated (J).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF07044**

Date Completed:06/21/2019

06/21/2019 12:27 PM
Approved and released by:
Project Manager: Kelly M. Nance

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF07044

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batches 19342 and 19821 had methylcyclohexane recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Sample -002 had surrogates recovered outside of the acceptance limits due to sample dilution. No corrective action was required, as dilutions may impact recovery accuracy.

Semivolatiles
The method blank associated with batch 19028 had phenol detected at a concentration that was above the LOQ. There were no detections for this compound in the samples associated with this method blank, negating the possibility of false positives or sample contamination. The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -001 had multiple compounds recovered outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample -002 was diluted 200X due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
Samples -001, -002, and -003 had multiple compounds detected in the VPH analysis above the LOQ. Naphthalene was detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same time as MTBE and naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not

compared to or adjusted based on results via 8260B GC/MS.

Sample -002 had surrogates recovered outside of the acceptance limits due to sample dilution. No corrective action was required, as dilutions may impact recovery accuracy.

Metals
The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -001 had multiple metals recovered outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample Summary
Ramboll US Corporation
Lot Number: UF07044

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB10-0.5-1.0-190606	Solid	06/06/2019 1435	06/07/2019
002	CMR-EB10-2.5-5.0-190606	Solid	06/06/2019 1500	06/07/2019
003	CMR-EB10-7.5-8.5-190606	Solid	06/06/2019 1515	06/07/2019
004	TB-07-20190606	Aqueous	06/06/2019	06/07/2019

(4 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF07044

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB10-0.5-1.0-190606	Solid	Methylcyclohexane	8260B	350	J	ug/kg	8
001	CMR-EB10-0.5-1.0-190606	Solid	Xylenes (total)	8260B	810	J	ug/kg	9
001	CMR-EB10-0.5-1.0-190606	Solid	m+p - Xylenes	8260B	580		ug/kg	9
001	CMR-EB10-0.5-1.0-190606	Solid	o - Xylenes	8260B	230	J	ug/kg	9
001	CMR-EB10-0.5-1.0-190606	Solid	Anthracene	8270D	41	J	ug/kg	10
001	CMR-EB10-0.5-1.0-190606	Solid	Benzo(a)anthracene	8270D	140		ug/kg	10
001	CMR-EB10-0.5-1.0-190606	Solid	Benzo(a)pyrene	8270D	70		ug/kg	10
001	CMR-EB10-0.5-1.0-190606	Solid	Benzo(b)fluoranthene	8270D	180		ug/kg	10
001	CMR-EB10-0.5-1.0-190606	Solid	Benzo(g,h,i)perylene	8270D	72		ug/kg	10
001	CMR-EB10-0.5-1.0-190606	Solid	Benzo(k)fluoranthene	8270D	47	J	ug/kg	10
001	CMR-EB10-0.5-1.0-190606	Solid	Chrysene	8270D	110		ug/kg	10
001	CMR-EB10-0.5-1.0-190606	Solid	Fluoranthene	8270D	170		ug/kg	10
001	CMR-EB10-0.5-1.0-190606	Solid	Indeno(1,2,3-c,d)pyrene	8270D	51	J	ug/kg	10
001	CMR-EB10-0.5-1.0-190606	Solid	2-Methylnaphthalene	8270D	520		ug/kg	11
001	CMR-EB10-0.5-1.0-190606	Solid	Naphthalene	8270D	270		ug/kg	11
001	CMR-EB10-0.5-1.0-190606	Solid	Phenanthrene	8270D	200		ug/kg	11
001	CMR-EB10-0.5-1.0-190606	Solid	Pyrene	8270D	210		ug/kg	11
001	CMR-EB10-0.5-1.0-190606	Solid	C9 - C18 Aliphatics	Montana EPH	11		mg/kg	12
001	CMR-EB10-0.5-1.0-190606	Solid	C5 - C8 Aliphatics,	Montana VPH	42		mg/kg	14
001	CMR-EB10-0.5-1.0-190606	Solid	C9 - C12 Aliphatics,	Montana VPH	28		mg/kg	14
001	CMR-EB10-0.5-1.0-190606	Solid	Benzene	Montana VPH	0.30	J	mg/kg	15
001	CMR-EB10-0.5-1.0-190606	Solid	C9 - C10 Aromatics	Montana VPH	22		mg/kg	15
001	CMR-EB10-0.5-1.0-190606	Solid	Ethylbenzene	Montana VPH	0.68		mg/kg	15
001	CMR-EB10-0.5-1.0-190606	Solid	Naphthalene	Montana VPH	0.63		mg/kg	15
001	CMR-EB10-0.5-1.0-190606	Solid	Toluene	Montana VPH	0.37		mg/kg	15
001	CMR-EB10-0.5-1.0-190606	Solid	m+p - Xylenes	Montana VPH	1.6		mg/kg	15
001	CMR-EB10-0.5-1.0-190606	Solid	o - Xylenes	Montana VPH	0.89		mg/kg	15
001	CMR-EB10-0.5-1.0-190606	Solid	TPH	Montana VPH	84		mg/kg	16
001	CMR-EB10-0.5-1.0-190606	Solid	Antimony	6020B	7.1		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Arsenic	6020B	490		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Barium	6020B	190		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Beryllium	6020B	0.36		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Cadmium	6020B	4.0		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Chromium	6020B	10		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Cobalt	6020B	37		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Copper	6020B	1200		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Lead	6020B	57		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Mercury	7471B	0.24		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Nickel	6020B	42		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Selenium	6020B	1.5	J	mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Silver	6020B	9.7		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Vanadium	6020B	37		mg/kg	17
001	CMR-EB10-0.5-1.0-190606	Solid	Zinc	6020B	670		mg/kg	17
002	CMR-EB10-2.5-5.0-190606	Solid	Cyclohexane	8260B	110000		ug/kg	18
002	CMR-EB10-2.5-5.0-190606	Solid	Ethylbenzene	8260B	83000		ug/kg	18

Detection Summary (Continued)

Lot Number: UF07044

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-EB10-2.5-5.0-190606	Solid	Methylcyclohexane	8260B	230000		ug/kg	18
002	CMR-EB10-2.5-5.0-190606	Solid	Naphthalene	8260B	43000		ug/kg	18
002	CMR-EB10-2.5-5.0-190606	Solid	Toluene	8260B	23000	J	ug/kg	18
002	CMR-EB10-2.5-5.0-190606	Solid	Xylenes (total)	8260B	500000		ug/kg	19
002	CMR-EB10-2.5-5.0-190606	Solid	m+p - Xylenes	8260B	380000		ug/kg	19
002	CMR-EB10-2.5-5.0-190606	Solid	o - Xylenes	8260B	120000		ug/kg	19
002	CMR-EB10-2.5-5.0-190606	Solid	Acenaphthene	8270D	280	J	ug/kg	20
002	CMR-EB10-2.5-5.0-190606	Solid	Anthracene	8270D	270	J	ug/kg	20
002	CMR-EB10-2.5-5.0-190606	Solid	2-Methylnaphthalene	8270D	54000		ug/kg	21
002	CMR-EB10-2.5-5.0-190606	Solid	Naphthalene	8270D	32000		ug/kg	21
002	CMR-EB10-2.5-5.0-190606	Solid	Phenanthrene	8270D	820		ug/kg	21
002	CMR-EB10-2.5-5.0-190606	Solid	C19 - C36 Aliphatics	Montana EPH	81		mg/kg	22
002	CMR-EB10-2.5-5.0-190606	Solid	C9 - C18 Aliphatics	Montana EPH	1400		mg/kg	22
002	CMR-EB10-2.5-5.0-190606	Solid	C11 - C22 Aromatics	Montana EPH	560		mg/kg	23
002	CMR-EB10-2.5-5.0-190606	Solid	C5 - C8 Aliphatics,	Montana VPH	3700		mg/kg	24
002	CMR-EB10-2.5-5.0-190606	Solid	C9 - C12 Aliphatics,	Montana VPH	2400		mg/kg	24
002	CMR-EB10-2.5-5.0-190606	Solid	Benzene	Montana VPH	31	J	mg/kg	25
002	CMR-EB10-2.5-5.0-190606	Solid	C9 - C10 Aromatics	Montana VPH	1700		mg/kg	25
002	CMR-EB10-2.5-5.0-190606	Solid	Ethylbenzene	Montana VPH	88		mg/kg	25
002	CMR-EB10-2.5-5.0-190606	Solid	Naphthalene	Montana VPH	69		mg/kg	25
002	CMR-EB10-2.5-5.0-190606	Solid	Toluene	Montana VPH	29	J	mg/kg	25
002	CMR-EB10-2.5-5.0-190606	Solid	m+p - Xylenes	Montana VPH	280		mg/kg	25
002	CMR-EB10-2.5-5.0-190606	Solid	o - Xylenes	Montana VPH	100		mg/kg	25
002	CMR-EB10-2.5-5.0-190606	Solid	TPH	Montana VPH	8000		mg/kg	26
002	CMR-EB10-2.5-5.0-190606	Solid	Arsenic	6020B	10		mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Barium	6020B	240		mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Beryllium	6020B	0.98		mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Cadmium	6020B	0.21		mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Chromium	6020B	23		mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Cobalt	6020B	7.4		mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Copper	6020B	17		mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Lead	6020B	31		mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Nickel	6020B	17		mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Silver	6020B	0.11	J	mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Vanadium	6020B	53		mg/kg	27
002	CMR-EB10-2.5-5.0-190606	Solid	Zinc	6020B	52		mg/kg	27
003	CMR-EB10-7.5-8.5-190606	Solid	Cyclohexane	8260B	7500		ug/kg	28
003	CMR-EB10-7.5-8.5-190606	Solid	Ethylbenzene	8260B	5000		ug/kg	28
003	CMR-EB10-7.5-8.5-190606	Solid	Isopropylbenzene	8260B	1300		ug/kg	28
003	CMR-EB10-7.5-8.5-190606	Solid	Methylcyclohexane	8260B	21000		ug/kg	28
003	CMR-EB10-7.5-8.5-190606	Solid	Naphthalene	8260B	1100		ug/kg	28
003	CMR-EB10-7.5-8.5-190606	Solid	Xylenes (total)	8260B	7400		ug/kg	29
003	CMR-EB10-7.5-8.5-190606	Solid	m+p - Xylenes	8260B	6700		ug/kg	29
003	CMR-EB10-7.5-8.5-190606	Solid	o - Xylenes	8260B	610	J	ug/kg	29
003	CMR-EB10-7.5-8.5-190606	Solid	2-Methylnaphthalene	8270D	170		ug/kg	31
003	CMR-EB10-7.5-8.5-190606	Solid	Naphthalene	8270D	310		ug/kg	31
003	CMR-EB10-7.5-8.5-190606	Solid	C9 - C18 Aliphatics	Montana EPH	17		mg/kg	32
003	CMR-EB10-7.5-8.5-190606	Solid	C5 - C8 Aliphatics,	Montana VPH	230		mg/kg	34

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-EB10-7.5-8.5-190606	Solid	C9 - C12 Aliphatics,	Montana VPH	150		mg/kg	34
003	CMR-EB10-7.5-8.5-190606	Solid	C9 - C10 Aromatics	Montana VPH	76		mg/kg	35
003	CMR-EB10-7.5-8.5-190606	Solid	Ethylbenzene	Montana VPH	4.4		mg/kg	35
003	CMR-EB10-7.5-8.5-190606	Solid	Naphthalene	Montana VPH	1.3		mg/kg	35
003	CMR-EB10-7.5-8.5-190606	Solid	m+p - Xylenes	Montana VPH	2.8		mg/kg	35
003	CMR-EB10-7.5-8.5-190606	Solid	o - Xylenes	Montana VPH	5.0		mg/kg	35
003	CMR-EB10-7.5-8.5-190606	Solid	TPH	Montana VPH	430		mg/kg	36
003	CMR-EB10-7.5-8.5-190606	Solid	Arsenic	6020B	2.2		mg/kg	37
003	CMR-EB10-7.5-8.5-190606	Solid	Barium	6020B	57		mg/kg	37
003	CMR-EB10-7.5-8.5-190606	Solid	Beryllium	6020B	0.64		mg/kg	37
003	CMR-EB10-7.5-8.5-190606	Solid	Chromium	6020B	29		mg/kg	37
003	CMR-EB10-7.5-8.5-190606	Solid	Cobalt	6020B	3.1		mg/kg	37
003	CMR-EB10-7.5-8.5-190606	Solid	Copper	6020B	32		mg/kg	37
003	CMR-EB10-7.5-8.5-190606	Solid	Lead	6020B	9.7		mg/kg	37
003	CMR-EB10-7.5-8.5-190606	Solid	Nickel	6020B	9.1		mg/kg	37
003	CMR-EB10-7.5-8.5-190606	Solid	Vanadium	6020B	60		mg/kg	37
003	CMR-EB10-7.5-8.5-190606	Solid	Zinc	6020B	39		mg/kg	37

(110 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-001
Description: CMR-EB10-0.5-1.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1435
% Solids: 83.1 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/12/2019 1755	JM1		19342	3.94

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1700	350	ug/kg	1
Benzene	71-43-2	8260B	ND		430	170	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		430	170	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		430	170	ug/kg	1
Bromoform	75-25-2	8260B	ND		430	170	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		430	170	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1700	350	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		430	170	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		430	170	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		430	170	ug/kg	1
Chloroethane	75-00-3	8260B	ND		430	170	ug/kg	1
Chloroform	67-66-3	8260B	ND		430	170	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		430	170	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		430	170	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		430	170	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		430	170	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		430	170	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		430	170	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		430	170	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		430	170	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		430	170	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		430	170	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		430	170	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		430	170	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		430	170	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		430	170	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		430	170	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		430	170	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		430	170	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		22000	2200	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		430	170	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		860	350	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		430	170	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		430	170	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		430	170	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		860	350	ug/kg	1
Methylcyclohexane	108-87-2	8260B	350	J	430	170	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		430	170	ug/kg	1
Naphthalene	91-20-3	8260B	ND		430	170	ug/kg	1
Styrene	100-42-5	8260B	ND		430	170	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		430	170	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		430	170	ug/kg	1
Toluene	108-88-3	8260B	ND		430	170	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		430	170	ug/kg	1

LOQ = Limit of Quantitation
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DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-001
Description: CMR-EB10-0.5-1.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1435
% Solids: 83.1 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/12/2019 1755	JM1		19342	3.94

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		430	170	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		430	170	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		430	170	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		430	170	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		430	170	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		430	170	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		430	170	ug/kg	1
Xylenes (total)	1330-20-7	8260B	810	J	860	350	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	580		430	170	ug/kg	1
o - Xylenes	95-47-6	8260B	230	J	430	170	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		104	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		112	68-124

LOQ = Limit of Quantitation
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Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-001
Description: CMR-EB10-0.5-1.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1435
% Solids: 83.1 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	20	06/14/2019 2035	JCG	06/09/2019 2023	19028

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		65	20	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		65	23	ug/kg	1
Anthracene	120-12-7	8270D	41	J	65	12	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	140		65	14	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	70		65	16	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	180		65	12	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	72		65	16	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	47	J	65	12	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		310	120	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		310	120	ug/kg	1
Carbazole	86-74-8	8270D	ND		310	120	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		310	120	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		310	120	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		310	120	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		310	120	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		310	120	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		310	120	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		310	120	ug/kg	1
Chrysene	218-01-9	8270D	110		65	11	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		65	12	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		310	120	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		1600	600	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		1600	600	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		1600	600	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		310	120	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		310	120	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		310	120	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		310	180	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		310	120	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		310	120	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		1600	600	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		1600	600	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		650	240	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		650	240	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		310	120	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		1600	600	ug/kg	1
Fluoranthene	206-44-0	8270D	170		65	10	ug/kg	1
Fluorene	86-73-7	8270D	ND		65	14	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		310	120	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		310	120	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		1600	600	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		310	120	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	51	J	65	24	ug/kg	1
Isophorone	78-59-1	8270D	ND		310	120	ug/kg	1

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-001
Description: CMR-EB10-0.5-1.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1435
% Solids: 83.1 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	20	06/14/2019 2035	JCG	06/09/2019 2023	19028

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	520		65	24	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		310	120	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		650	240	ug/kg	1
Naphthalene	91-20-3	8270D	270		65	23	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		650	240	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		650	240	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		650	240	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		310	120	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		650	240	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		1600	600	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		310	120	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		310	120	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		1600	600	ug/kg	1
Phenanthrene	85-01-8	8270D	200		65	17	ug/kg	1
Phenol	108-95-2	8270D	ND		310	120	ug/kg	1
Pyrene	129-00-0	8270D	210		65	12	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		790	240	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		1600	240	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		1600	600	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		310	120	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		310	120	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		67	33-102
2-Fluorophenol		53	35-115
Nitrobenzene-d5		67	22-109
Phenol-d5		63	33-122
Terphenyl-d14		83	41-120
2,4,6-Tribromophenol		78	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-001
Description: CMR-EB10-0.5-1.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1435
% Solids: 83.1 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0140	CHG	06/12/2019 1939	19365

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	11		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		90	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-001
Description: CMR-EB10-0.5-1.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1435
% Solids: 83.1 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0600	CHG	06/12/2019 1939	19366

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		90	40-140
2-Fluorobiphenyl (fractionation 1)		98	40-140
o - Terphenyl (aromatic)		95	40-140

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-001
Description: CMR-EB10-0.5-1.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1435
% Solids: 83.1 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/14/2019 1407	JJG		19751

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	42		5.1	1.0	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	28		5.1	1.0	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		72	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-001
Description: CMR-EB10-0.5-1.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1435
% Solids: 83.1 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/14/2019 1407	JJG		19750

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.30	J	0.34	0.046	mg/kg	1
C9 - C10 Aromatics		Montana VPH	22		1.7	0.68	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	0.68		0.34	0.042	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.34	0.073	mg/kg	1
Naphthalene	91-20-3	Montana VPH	0.63		0.34	0.18	mg/kg	1
Toluene	108-88-3	Montana VPH	0.37		0.34	0.054	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	1.6		0.34	0.076	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.89		0.34	0.038	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		79	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
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J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF07044-001
Description: CMR-EB10-0.5-1.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1435
% Solids: 83.1 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/14/2019 1407	JJG		19748

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	84		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		73	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-001
Description: CMR-EB10-0.5-1.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1435
% Solids: 83.1 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/20/2019 2030	BNW	06/19/2019 1411	19999
1	7471B	7471B	1	06/12/2019 1933	JMH	06/12/2019 1428	19109
2	3050B	6020B	3	06/21/2019 0258	BNW	06/19/2019 1411	19999

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	7.1		0.60	0.24	mg/kg	1
Arsenic	7440-38-2	6020B	490		0.60	0.24	mg/kg	1
Barium	7440-39-3	6020B	190		1.6	0.37	mg/kg	1
Beryllium	7440-41-7	6020B	0.36		0.12	0.041	mg/kg	1
Cadmium	7440-43-9	6020B	4.0		0.16	0.030	mg/kg	1
Chromium	7440-47-3	6020B	10		1.6	0.66	mg/kg	1
Cobalt	7440-48-4	6020B	37		1.6	0.36	mg/kg	1
Copper	7440-50-8	6020B	1200		4.7	1.2	mg/kg	2
Lead	7439-92-1	6020B	57		0.30	0.081	mg/kg	1
Mercury	7439-97-6	7471B	0.24		0.091	0.022	mg/kg	1
Nickel	7440-02-0	6020B	42		1.6	0.36	mg/kg	1
Selenium	7782-49-2	6020B	1.5	J	1.6	0.57	mg/kg	1
Silver	7440-22-4	6020B	9.7		0.30	0.072	mg/kg	1
Vanadium	7440-62-2	6020B	37		1.6	0.30	mg/kg	1
Zinc	7440-66-6	6020B	670		9.0	1.8	mg/kg	2

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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-002
Description: CMR-EB10-2.5-5.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1500
% Solids: 81.7 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	100	06/12/2019 1817	JM1		19342	5.10

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		140000	29000	ug/kg	1
Benzene	71-43-2	8260B	ND		36000	14000	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		36000	14000	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		36000	14000	ug/kg	1
Bromoform	75-25-2	8260B	ND		36000	14000	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		36000	14000	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		140000	29000	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		36000	14000	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		36000	14000	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		36000	14000	ug/kg	1
Chloroethane	75-00-3	8260B	ND		36000	14000	ug/kg	1
Chloroform	67-66-3	8260B	ND		36000	14000	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		36000	14000	ug/kg	1
Cyclohexane	110-82-7	8260B	110000		36000	14000	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		36000	14000	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		36000	14000	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		36000	14000	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		36000	14000	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		36000	14000	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		36000	14000	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		36000	14000	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		36000	14000	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		36000	14000	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		36000	14000	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		36000	14000	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		36000	14000	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		36000	14000	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		36000	14000	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		36000	14000	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		1800000	180000	ug/kg	1
Ethylbenzene	100-41-4	8260B	83000		36000	14000	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		71000	29000	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		36000	14000	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		36000	14000	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		36000	14000	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		71000	29000	ug/kg	1
Methylcyclohexane	108-87-2	8260B	230000		36000	14000	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		36000	14000	ug/kg	1
Naphthalene	91-20-3	8260B	43000		36000	14000	ug/kg	1
Styrene	100-42-5	8260B	ND		36000	14000	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		36000	14000	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		36000	14000	ug/kg	1
Toluene	108-88-3	8260B	23000	J	36000	14000	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		36000	14000	ug/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-002
Description: CMR-EB10-2.5-5.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1500
% Solids: 81.7 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	100	06/12/2019 1817	JM1		19342	5.10

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		36000	14000	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		36000	14000	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		36000	14000	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		36000	14000	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		36000	14000	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		36000	14000	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		36000	14000	ug/kg	1
Xylenes (total)	1330-20-7	8260B	500000		71000	29000	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	380000		36000	14000	ug/kg	1
o - Xylenes	95-47-6	8260B	120000		36000	14000	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4	N	166	53-142
Bromofluorobenzene	N	273	47-138
Toluene-d8	N	214	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-002
Description: CMR-EB10-2.5-5.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1500
% Solids: 81.7 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	200	06/14/2019 1650	JCG	06/09/2019 2023	19028

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	280	J	640	200	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		640	230	ug/kg	1
Anthracene	120-12-7	8270D	270	J	640	120	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		640	140	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		640	160	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		640	120	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		640	160	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		640	110	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		3100	1200	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		3100	1200	ug/kg	1
Carbazole	86-74-8	8270D	ND		3100	1200	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		3100	1200	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		3100	1200	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		3100	1200	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		3100	1200	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		3100	1200	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		3100	1200	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		3100	1200	ug/kg	1
Chrysene	218-01-9	8270D	ND		640	110	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		640	120	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		3100	1200	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		16000	6000	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		16000	6000	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		16000	6000	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		3100	1200	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		3100	1200	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		3100	1200	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		3100	1800	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		3100	1200	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		3100	1200	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		16000	6000	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		16000	6000	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		6400	2400	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		6400	2400	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		3100	1200	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		16000	6000	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		640	100	ug/kg	1
Fluorene	86-73-7	8270D	ND		640	140	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		3100	1200	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		3100	1200	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		16000	6000	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		3100	1200	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		640	240	ug/kg	1
Isophorone	78-59-1	8270D	ND		3100	1200	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-002
Description: CMR-EB10-2.5-5.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1500
% Solids: 81.7 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	200	06/14/2019 1650	JCG	06/09/2019 2023	19028

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	54000		640	240	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		3100	1200	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		6400	2400	ug/kg	1
Naphthalene	91-20-3	8270D	32000		640	230	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		6400	2400	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		6400	2400	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		6400	2400	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		3100	1200	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		6400	2400	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		16000	6000	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		3100	1200	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		3100	1200	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		16000	6000	ug/kg	1
Phenanthrene	85-01-8	8270D	820		640	170	ug/kg	1
Phenol	108-95-2	8270D	ND		3100	1200	ug/kg	1
Pyrene	129-00-0	8270D	ND		640	120	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		7900	2400	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		16000	2400	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		16000	6000	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		3100	1200	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		3100	1200	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl	N	109	33-102
2-Fluorophenol	N	182	35-115
Nitrobenzene-d5	N	413	22-109
Phenol-d5	N	277	33-122
Terphenyl-d14		103	41-120
2,4,6-Tribromophenol	N	22	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-002
Description: CMR-EB10-2.5-5.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1500
% Solids: 81.7 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0209	CHG	06/12/2019 1939	19365

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	81		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	1400		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		84	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-002
Description: CMR-EB10-2.5-5.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1500
% Solids: 81.7 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0629	CHG	06/12/2019 1939	19366

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	560		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		139	40-140
o - Terphenyl (aromatic)		120	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-002
Description: CMR-EB10-2.5-5.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1500
% Solids: 81.7 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	100	06/14/2019 1435	JJG		19751

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	3700		520	100	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	2400		520	100	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	305	70-130

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-002
Description: CMR-EB10-2.5-5.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1500
% Solids: 81.7 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	100	06/14/2019 1435	JJG		19750

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	31	J	35	4.7	mg/kg	1
C9 - C10 Aromatics		Montana VPH	1700		170	70	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	88		35	4.3	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		35	7.5	mg/kg	1
Naphthalene	91-20-3	Montana VPH	69		35	18	mg/kg	1
Toluene	108-88-3	Montana VPH	29	J	35	5.6	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	280		35	7.8	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	100		35	3.9	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	473	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF07044-002
Description: CMR-EB10-2.5-5.0-190606
Matrix: Solid
Date Sampled: 06/06/2019 1500
% Solids: 81.7 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	100	06/14/2019 1435	JJG		19748

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	8000		890	180	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB10-2.5-5.0-190606
Date Sampled: 06/06/2019 1500
Date Received: 06/07/2019

Laboratory ID: UF07044-002
Matrix: Solid
% Solids: 81.7 06/08/2019 0139

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/14/2019 0027	BNW	06/11/2019 1033	19113
1	7471B	7471B	1	06/12/2019 1935	JMH	06/12/2019 1428	19109

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.46	0.19	mg/kg	1
Arsenic	7440-38-2	6020B	10		0.46	0.19	mg/kg	1
Barium	7440-39-3	6020B	240		1.2	0.29	mg/kg	1
Beryllium	7440-41-7	6020B	0.98		0.093	0.032	mg/kg	1
Cadmium	7440-43-9	6020B	0.21		0.12	0.023	mg/kg	1
Chromium	7440-47-3	6020B	23		1.2	0.51	mg/kg	1
Cobalt	7440-48-4	6020B	7.4		1.2	0.28	mg/kg	1
Copper	7440-50-8	6020B	17		1.2	0.30	mg/kg	1
Lead	7439-92-1	6020B	31		0.23	0.063	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.099	0.024	mg/kg	1
Nickel	7440-02-0	6020B	17		1.2	0.28	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.2	0.44	mg/kg	1
Silver	7440-22-4	6020B	0.11	J	0.23	0.056	mg/kg	1
Vanadium	7440-62-2	6020B	53		1.2	0.23	mg/kg	1
Zinc	7440-66-6	6020B	52		2.3	0.46	mg/kg	1

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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-003
Description: CMR-EB10-7.5-8.5-190606
Matrix: Solid
Date Sampled: 06/06/2019 1515
% Solids: 92.6 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	4	06/17/2019 1532	JM1		19821	5.89

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		4000	800	ug/kg	2
Benzene	71-43-2	8260B	ND		1000	400	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		1000	400	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		1000	400	ug/kg	2
Bromoform	75-25-2	8260B	ND		1000	400	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		1000	400	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		4000	800	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		1000	400	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		1000	400	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		1000	400	ug/kg	2
Chloroethane	75-00-3	8260B	ND		1000	400	ug/kg	2
Chloroform	67-66-3	8260B	ND		1000	400	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1000	400	ug/kg	2
Cyclohexane	110-82-7	8260B	7500		1000	400	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1000	400	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		1000	400	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1000	400	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		1000	400	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		1000	400	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		1000	400	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		1000	400	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		1000	400	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		1000	400	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		1000	400	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1000	400	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1000	400	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		1000	400	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1000	400	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1000	400	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		50000	5000	ug/kg	2
Ethylbenzene	100-41-4	8260B	5000		1000	400	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		2000	800	ug/kg	2
Isopropylbenzene	98-82-8	8260B	1300		1000	400	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		1000	400	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1000	400	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		2000	800	ug/kg	2
Methylcyclohexane	108-87-2	8260B	21000		1000	400	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		1000	400	ug/kg	2
Naphthalene	91-20-3	8260B	1100		1000	400	ug/kg	2
Styrene	100-42-5	8260B	ND		1000	400	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1000	400	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		1000	400	ug/kg	2
Toluene	108-88-3	8260B	ND		1000	400	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1000	400	ug/kg	2

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-003
Description: CMR-EB10-7.5-8.5-190606
Matrix: Solid
Date Sampled: 06/06/2019 1515
% Solids: 92.6 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	4	06/17/2019 1532	JM1		19821	5.89

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		1000	400	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1000	400	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		1000	400	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		1000	400	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		1000	400	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		1000	400	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		1000	400	ug/kg	2
Xylenes (total)	1330-20-7	8260B	7400		2000	800	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	6700		1000	400	ug/kg	2
o - Xylenes	95-47-6	8260B	610	J	1000	400	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		101	53-142
Bromofluorobenzene		119	47-138
Toluene-d8		116	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-003
Description: CMR-EB10-7.5-8.5-190606
Matrix: Solid
Date Sampled: 06/06/2019 1515
% Solids: 92.6 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	06/14/2019 1715	JCG	06/09/2019 2023	19028

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		28	8.6	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		28	9.8	ug/kg	1
Anthracene	120-12-7	8270D	ND		28	5.3	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		28	6.1	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		28	6.8	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		28	5.2	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		28	6.7	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		28	5.0	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		130	52	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		130	52	ug/kg	1
Carbazole	86-74-8	8270D	ND		130	52	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		130	52	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		130	52	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		130	52	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		130	52	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		130	52	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		130	52	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		130	52	ug/kg	1
Chrysene	218-01-9	8270D	ND		28	4.6	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		28	5.3	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		130	52	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		690	260	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		690	260	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		690	260	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		130	52	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		130	52	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		130	52	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		130	76	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		130	52	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		130	52	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		690	260	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		690	260	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		280	100	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		280	100	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		130	52	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		690	260	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		28	4.3	ug/kg	1
Fluorene	86-73-7	8270D	ND		28	5.9	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		130	52	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		130	52	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		690	260	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		130	52	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		28	10	ug/kg	1
Isophorone	78-59-1	8270D	ND		130	52	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-003
Description: CMR-EB10-7.5-8.5-190606
Matrix: Solid
Date Sampled: 06/06/2019 1515
% Solids: 92.6 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	06/14/2019 1715	JCG	06/09/2019 2023	19028

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	170		28	10	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		130	52	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		280	100	ug/kg	1
Naphthalene	91-20-3	8270D	310		28	10	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		280	100	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		280	100	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		280	100	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		130	52	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		280	100	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		690	260	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		130	52	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		130	52	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		690	260	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		28	7.4	ug/kg	1
Phenol	108-95-2	8270D	ND		130	52	ug/kg	1
Pyrene	129-00-0	8270D	ND		28	5.2	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		340	100	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		690	100	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		690	260	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		130	52	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		130	52	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		58	33-102
2-Fluorophenol		60	35-115
Nitrobenzene-d5		82	22-109
Phenol-d5		67	33-122
Terphenyl-d14		83	41-120
2,4,6-Tribromophenol		63	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-003
Description: CMR-EB10-7.5-8.5-190606
Matrix: Solid
Date Sampled: 06/06/2019 1515
% Solids: 92.6 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0238	CHG	06/12/2019 1939	19365

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		10	10	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	17		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		88	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-003
Description: CMR-EB10-7.5-8.5-190606
Matrix: Solid
Date Sampled: 06/06/2019 1515
% Solids: 92.6 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0658	CHG	06/12/2019 1939	19366

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		41	40-140
2-Fluorobiphenyl (fractionation 1)		92	40-140
o - Terphenyl (aromatic)		82	40-140

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-003
Description: CMR-EB10-7.5-8.5-190606
Matrix: Solid
Date Sampled: 06/06/2019 1515
% Solids: 92.6 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	06/14/2019 1504	JJG		19751

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	230		19	3.8	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	150		19	3.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		102	70-130

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF07044-003
Description: CMR-EB10-7.5-8.5-190606
Matrix: Solid
Date Sampled: 06/06/2019 1515
% Solids: 92.6 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	06/14/2019 1504	JJG		19750

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		1.3	0.17	mg/kg	1
C9 - C10 Aromatics		Montana VPH	76		6.3	2.5	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	4.4		1.3	0.16	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		1.3	0.27	mg/kg	1
Naphthalene	91-20-3	Montana VPH	1.3		1.3	0.65	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		1.3	0.20	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	2.8		1.3	0.28	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	5.0		1.3	0.14	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF07044-003
Description: CMR-EB10-7.5-8.5-190606
Matrix: Solid
Date Sampled: 06/06/2019 1515
% Solids: 92.6 06/08/2019 0139
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	06/14/2019 1504	JJG		19748

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	430		45	8.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB10-7.5-8.5-190606
Date Sampled: 06/06/2019 1515
Date Received: 06/07/2019

Laboratory ID: UF07044-003
Matrix: Solid
% Solids: 92.6 06/08/2019 0139

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/14/2019 0033	BNW	06/11/2019 1033	19113
1	7471B	7471B	1	06/12/2019 1943	JMH	06/12/2019 1428	19109

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.44	0.18	mg/kg	1
Arsenic	7440-38-2	6020B	2.2		0.44	0.18	mg/kg	1
Barium	7440-39-3	6020B	57		1.1	0.27	mg/kg	1
Beryllium	7440-41-7	6020B	0.64		0.088	0.030	mg/kg	1
Cadmium	7440-43-9	6020B	ND		0.11	0.022	mg/kg	1
Chromium	7440-47-3	6020B	29		1.1	0.48	mg/kg	1
Cobalt	7440-48-4	6020B	3.1		1.1	0.26	mg/kg	1
Copper	7440-50-8	6020B	32		1.1	0.28	mg/kg	1
Lead	7439-92-1	6020B	9.7		0.22	0.060	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.085	0.020	mg/kg	1
Nickel	7440-02-0	6020B	9.1		1.1	0.26	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.1	0.41	mg/kg	1
Silver	7440-22-4	6020B	ND		0.22	0.053	mg/kg	1
Vanadium	7440-62-2	6020B	60		1.1	0.22	mg/kg	1
Zinc	7440-66-6	6020B	39		2.2	0.44	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-004
Description: TB-07-20190606
Matrix: Aqueous
Date Sampled: 06/06/2019
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/13/2019 1341	BWS		19466

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF07044-004
Description: TB-07-20190606
Matrix: Aqueous
Date Sampled: 06/06/2019
Date Received: 06/07/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/13/2019 1341	BWS		19466

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		102	70-130
Bromofluorobenzene		107	70-130
Toluene-d8		109	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19342-001
Batch: 19342
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	06/10/2019 1712
Benzene	ND		1	250	100	ug/kg	06/10/2019 1712
Bromochloromethane	ND		1	250	100	ug/kg	06/10/2019 1712
Bromodichloromethane	ND		1	250	100	ug/kg	06/10/2019 1712
Bromoform	ND		1	250	100	ug/kg	06/10/2019 1712
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	06/10/2019 1712
2-Butanone (MEK)	ND		1	1000	200	ug/kg	06/10/2019 1712
Carbon disulfide	ND		1	250	100	ug/kg	06/10/2019 1712
Carbon tetrachloride	ND		1	250	100	ug/kg	06/10/2019 1712
Chlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
Chloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
Chloroform	ND		1	250	100	ug/kg	06/10/2019 1712
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	06/10/2019 1712
Cyclohexane	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	06/10/2019 1712
Dibromochloromethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
Dichlorodifluoromethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,1-Dichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,1-Dichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dichloropropane	ND		1	250	100	ug/kg	06/10/2019 1712
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/10/2019 1712
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/10/2019 1712
1,4-Dioxane	ND		1	13000	1300	ug/kg	06/10/2019 1712
Ethylbenzene	ND		1	250	100	ug/kg	06/10/2019 1712
2-Hexanone	ND		1	500	200	ug/kg	06/10/2019 1712
Isopropylbenzene	ND		1	250	100	ug/kg	06/10/2019 1712
Methyl acetate	ND		1	250	100	ug/kg	06/10/2019 1712
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	06/10/2019 1712
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	06/10/2019 1712
Methylcyclohexane	ND		1	250	100	ug/kg	06/10/2019 1712
Methylene chloride	ND		1	250	100	ug/kg	06/10/2019 1712
Naphthalene	ND		1	250	100	ug/kg	06/10/2019 1712
Styrene	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
Tetrachloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
Toluene	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	06/10/2019 1712

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19342-001
Batch: 19342
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
Trichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
Trichlorofluoromethane	ND		1	250	100	ug/kg	06/10/2019 1712
Vinyl chloride	ND		1	250	100	ug/kg	06/10/2019 1712
Xylenes (total)	ND		1	500	200	ug/kg	06/10/2019 1712
m+p - Xylenes	ND		1	250	100	ug/kg	06/10/2019 1712
o - Xylenes	ND		1	250	100	ug/kg	06/10/2019 1712

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		98	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		102	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19342-002
Batch: 19342
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	4500		1	89	60-140	06/10/2019 1650
Benzene	2500	2800		1	112	70-130	06/10/2019 1650
Bromochloromethane	2500	2600		1	106	70-130	06/10/2019 1650
Bromodichloromethane	2500	2700		1	107	70-130	06/10/2019 1650
Bromoform	2500	2400		1	97	70-130	06/10/2019 1650
Bromomethane (Methyl bromide)	2500	2200		1	87	70-130	06/10/2019 1650
2-Butanone (MEK)	5000	5000		1	101	60-140	06/10/2019 1650
Carbon disulfide	2500	2600		1	105	70-130	06/10/2019 1650
Carbon tetrachloride	2500	3000		1	119	70-130	06/10/2019 1650
Chlorobenzene	2500	2800		1	110	70-130	06/10/2019 1650
Chloroethane	2500	2600		1	106	70-130	06/10/2019 1650
Chloroform	2500	2800		1	111	70-130	06/10/2019 1650
Chloromethane (Methyl chloride)	2500	2200		1	86	60-140	06/10/2019 1650
Cyclohexane	2500	3100		1	123	70-130	06/10/2019 1650
1,2-Dibromo-3-chloropropane (DBCP)	2500	2200		1	89	70-130	06/10/2019 1650
Dibromochloromethane	2500	2700		1	109	70-130	06/10/2019 1650
1,2-Dibromoethane (EDB)	2500	2700		1	106	70-130	06/10/2019 1650
1,2-Dichlorobenzene	2500	2700		1	106	70-130	06/10/2019 1650
1,3-Dichlorobenzene	2500	2800		1	112	70-130	06/10/2019 1650
1,4-Dichlorobenzene	2500	2800		1	111	70-130	06/10/2019 1650
Dichlorodifluoromethane	2500	1800		1	72	60-140	06/10/2019 1650
1,1-Dichloroethane	2500	2800		1	110	70-130	06/10/2019 1650
1,2-Dichloroethane	2500	2600		1	105	70-130	06/10/2019 1650
1,1-Dichloroethene	2500	3000		1	120	70-130	06/10/2019 1650
cis-1,2-Dichloroethene	2500	2800		1	111	70-130	06/10/2019 1650
trans-1,2-Dichloroethene	2500	3000		1	120	70-130	06/10/2019 1650
1,2-Dichloropropane	2500	2700		1	107	70-130	06/10/2019 1650
cis-1,3-Dichloropropene	2500	2700		1	109	70-130	06/10/2019 1650
trans-1,3-Dichloropropene	2500	2800		1	111	70-130	06/10/2019 1650
1,4-Dioxane	25000	24000		1	95	60-140	06/10/2019 1650
Ethylbenzene	2500	2900		1	116	70-130	06/10/2019 1650
2-Hexanone	5000	5300		1	105	70-130	06/10/2019 1650
Isopropylbenzene	2500	2900		1	116	70-130	06/10/2019 1650
Methyl acetate	2500	2000		1	81	70-130	06/10/2019 1650
Methyl tertiary butyl ether (MTBE)	2500	2400		1	96	70-130	06/10/2019 1650
4-Methyl-2-pentanone	5000	4800		1	96	70-130	06/10/2019 1650
Methylcyclohexane	2500	3400	N	1	136	70-130	06/10/2019 1650
Methylene chloride	2500	2500		1	101	70-130	06/10/2019 1650
Naphthalene	2500	2300		1	90	70-130	06/10/2019 1650
Styrene	2500	2800		1	113	70-130	06/10/2019 1650
1,1,2,2-Tetrachloroethane	2500	2700		1	106	70-130	06/10/2019 1650
Tetrachloroethene	2500	3100		1	124	70-130	06/10/2019 1650
Toluene	2500	2900		1	115	70-130	06/10/2019 1650
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3000		1	119	70-130	06/10/2019 1650

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19342-002
Batch: 19342
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2600		1	103	70-130	06/10/2019 1650
1,2,4-Trichlorobenzene	2500	2700		1	106	70-130	06/10/2019 1650
1,1,1-Trichloroethane	2500	2800		1	111	70-130	06/10/2019 1650
1,1,2-Trichloroethane	2500	2700		1	107	70-130	06/10/2019 1650
Trichloroethene	2500	2800		1	112	70-130	06/10/2019 1650
Trichlorofluoromethane	2500	2900		1	117	70-130	06/10/2019 1650
Vinyl chloride	2500	2300		1	91	70-130	06/10/2019 1650
Xylenes (total)	5000	5800		1	115	70-130	06/10/2019 1650
m+p - Xylenes	2500	2900		1	117	70-130	06/10/2019 1650
o - Xylenes	2500	2800		1	113	70-130	06/10/2019 1650

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		106	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19466-001
Batch: 19466
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/13/2019 1107
Benzene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Bromoform	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/13/2019 1107
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/13/2019 1107
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Chloroethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Chloroform	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Cyclohexane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/13/2019 1107
1,4-Dioxane	ND		1	20	13	ug/L	06/13/2019 1107
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
2-Hexanone	ND		1	10	2.0	ug/L	06/13/2019 1107
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Methyl acetate	ND		1	1.0	0.40	ug/L	06/13/2019 1107
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/13/2019 1107
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/13/2019 1107
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/13/2019 1107
Methylene chloride	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Naphthalene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Styrene	ND		1	0.50	0.41	ug/L	06/13/2019 1107
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Toluene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/13/2019 1107

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19466-001
Batch: 19466
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Trichloroethene	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/13/2019 1107
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/13/2019 1107
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/13/2019 1107
o - Xylenes	ND		1	0.50	0.40	ug/L	06/13/2019 1107

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		101	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		106	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19466-002
Batch: 19466
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	69		1	69	60-140	06/13/2019 1004
Benzene	50	45		1	90	70-130	06/13/2019 1004
Bromochloromethane	50	44		1	89	70-130	06/13/2019 1004
Bromodichloromethane	50	46		1	92	70-130	06/13/2019 1004
Bromoform	50	42		1	84	70-130	06/13/2019 1004
Bromomethane (Methyl bromide)	50	52		1	105	70-130	06/13/2019 1004
2-Butanone (MEK)	100	84		1	84	70-130	06/13/2019 1004
Carbon disulfide	50	39		1	79	70-130	06/13/2019 1004
Carbon tetrachloride	50	43		1	85	70-130	06/13/2019 1004
Chlorobenzene	50	44		1	87	70-130	06/13/2019 1004
Chloroethane	50	58		1	115	70-130	06/13/2019 1004
Chloroform	50	45		1	89	70-130	06/13/2019 1004
Chloromethane (Methyl chloride)	50	49		1	99	60-140	06/13/2019 1004
Cyclohexane	50	42		1	83	70-130	06/13/2019 1004
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	94	70-130	06/13/2019 1004
Dibromochloromethane	50	49		1	99	70-130	06/13/2019 1004
1,2-Dibromoethane (EDB)	50	49		1	98	70-130	06/13/2019 1004
1,2-Dichlorobenzene	50	44		1	88	70-130	06/13/2019 1004
1,3-Dichlorobenzene	50	43		1	86	70-130	06/13/2019 1004
1,4-Dichlorobenzene	50	43		1	85	70-130	06/13/2019 1004
Dichlorodifluoromethane	50	44		1	87	60-140	06/13/2019 1004
1,1-Dichloroethane	50	44		1	89	70-130	06/13/2019 1004
1,2-Dichloroethane	50	44		1	89	70-130	06/13/2019 1004
1,1-Dichloroethene	50	44		1	89	70-130	06/13/2019 1004
cis-1,2-Dichloroethene	50	45		1	90	70-130	06/13/2019 1004
trans-1,2-Dichloroethene	50	45		1	91	70-130	06/13/2019 1004
1,2-Dichloropropane	50	45		1	90	70-130	06/13/2019 1004
cis-1,3-Dichloropropene	50	49		1	98	70-130	06/13/2019 1004
trans-1,3-Dichloropropene	50	51		1	102	70-130	06/13/2019 1004
1,4-Dioxane	500	400		1	81	60-140	06/13/2019 1004
Ethylbenzene	50	47		1	93	70-130	06/13/2019 1004
2-Hexanone	100	99		1	99	70-130	06/13/2019 1004
Isopropylbenzene	50	49		1	98	70-130	06/13/2019 1004
Methyl acetate	50	40		1	79	70-130	06/13/2019 1004
Methyl tertiary butyl ether (MTBE)	50	46		1	92	70-130	06/13/2019 1004
4-Methyl-2-pentanone	100	98		1	98	70-130	06/13/2019 1004
Methylcyclohexane	50	43		1	86	70-130	06/13/2019 1004
Methylene chloride	50	45		1	91	70-130	06/13/2019 1004
Naphthalene	50	50		1	101	70-130	06/13/2019 1004
Styrene	50	45		1	90	70-130	06/13/2019 1004
1,1,2,2-Tetrachloroethane	50	47		1	94	70-130	06/13/2019 1004
Tetrachloroethene	50	45		1	90	70-130	06/13/2019 1004
Toluene	50	46		1	93	70-130	06/13/2019 1004
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	38		1	75	70-130	06/13/2019 1004

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19466-002
Batch: 19466
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	48		1	96	70-130	06/13/2019 1004
1,2,4-Trichlorobenzene	50	45		1	90	70-130	06/13/2019 1004
1,1,1-Trichloroethane	50	43		1	86	70-130	06/13/2019 1004
1,1,2-Trichloroethane	50	48		1	96	70-130	06/13/2019 1004
Trichloroethene	50	43		1	86	70-130	06/13/2019 1004
Trichlorofluoromethane	50	50		1	100	70-130	06/13/2019 1004
Vinyl chloride	50	43		1	87	70-130	06/13/2019 1004
Xylenes (total)	100	98		1	98	70-130	06/13/2019 1004
m+p - Xylenes	50	48		1	96	70-130	06/13/2019 1004
o - Xylenes	50	50		1	99	70-130	06/13/2019 1004

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	70-130
Bromofluorobenzene		108	70-130
Toluene-d8		107	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19821-001
Batch: 19821
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	06/10/2019 1712
Benzene	ND		1	250	100	ug/kg	06/10/2019 1712
Bromochloromethane	ND		1	250	100	ug/kg	06/10/2019 1712
Bromodichloromethane	ND		1	250	100	ug/kg	06/10/2019 1712
Bromoform	ND		1	250	100	ug/kg	06/10/2019 1712
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	06/10/2019 1712
2-Butanone (MEK)	ND		1	1000	200	ug/kg	06/10/2019 1712
Carbon disulfide	ND		1	250	100	ug/kg	06/10/2019 1712
Carbon tetrachloride	ND		1	250	100	ug/kg	06/10/2019 1712
Chlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
Chloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
Chloroform	ND		1	250	100	ug/kg	06/10/2019 1712
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	06/10/2019 1712
Cyclohexane	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	06/10/2019 1712
Dibromochloromethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
Dichlorodifluoromethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,1-Dichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,1-Dichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dichloropropane	ND		1	250	100	ug/kg	06/10/2019 1712
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/10/2019 1712
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/10/2019 1712
1,4-Dioxane	ND		1	13000	1300	ug/kg	06/10/2019 1712
Ethylbenzene	ND		1	250	100	ug/kg	06/10/2019 1712
2-Hexanone	ND		1	500	200	ug/kg	06/10/2019 1712
Isopropylbenzene	ND		1	250	100	ug/kg	06/10/2019 1712
Methyl acetate	ND		1	250	100	ug/kg	06/10/2019 1712
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	06/10/2019 1712
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	06/10/2019 1712
Methylcyclohexane	ND		1	250	100	ug/kg	06/10/2019 1712
Methylene chloride	ND		1	250	100	ug/kg	06/10/2019 1712
Naphthalene	ND		1	250	100	ug/kg	06/10/2019 1712
Styrene	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
Tetrachloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
Toluene	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	06/10/2019 1712

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19821-001
Batch: 19821
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
Trichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
Trichlorofluoromethane	ND		1	250	100	ug/kg	06/10/2019 1712
Vinyl chloride	ND		1	250	100	ug/kg	06/10/2019 1712
Xylenes (total)	ND		1	500	200	ug/kg	06/10/2019 1712
m+p - Xylenes	ND		1	250	100	ug/kg	06/10/2019 1712
o - Xylenes	ND		1	250	100	ug/kg	06/10/2019 1712

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		98	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		102	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19821-002
Batch: 19821
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	4500		1	89	60-140	06/10/2019 1650
Benzene	2500	2800		1	112	70-130	06/10/2019 1650
Bromochloromethane	2500	2600		1	106	70-130	06/10/2019 1650
Bromodichloromethane	2500	2700		1	107	70-130	06/10/2019 1650
Bromoform	2500	2400		1	97	70-130	06/10/2019 1650
Bromomethane (Methyl bromide)	2500	2200		1	87	70-130	06/10/2019 1650
2-Butanone (MEK)	5000	5000		1	101	60-140	06/10/2019 1650
Carbon disulfide	2500	2600		1	105	70-130	06/10/2019 1650
Carbon tetrachloride	2500	3000		1	119	70-130	06/10/2019 1650
Chlorobenzene	2500	2800		1	110	70-130	06/10/2019 1650
Chloroethane	2500	2600		1	106	70-130	06/10/2019 1650
Chloroform	2500	2800		1	111	70-130	06/10/2019 1650
Chloromethane (Methyl chloride)	2500	2200		1	86	60-140	06/10/2019 1650
Cyclohexane	2500	3100		1	123	70-130	06/10/2019 1650
1,2-Dibromo-3-chloropropane (DBCP)	2500	2200		1	89	70-130	06/10/2019 1650
Dibromochloromethane	2500	2700		1	109	70-130	06/10/2019 1650
1,2-Dibromoethane (EDB)	2500	2700		1	106	70-130	06/10/2019 1650
1,2-Dichlorobenzene	2500	2700		1	106	70-130	06/10/2019 1650
1,3-Dichlorobenzene	2500	2800		1	112	70-130	06/10/2019 1650
1,4-Dichlorobenzene	2500	2800		1	111	70-130	06/10/2019 1650
Dichlorodifluoromethane	2500	1800		1	72	60-140	06/10/2019 1650
1,1-Dichloroethane	2500	2800		1	110	70-130	06/10/2019 1650
1,2-Dichloroethane	2500	2600		1	105	70-130	06/10/2019 1650
1,1-Dichloroethene	2500	3000		1	120	70-130	06/10/2019 1650
cis-1,2-Dichloroethene	2500	2800		1	111	70-130	06/10/2019 1650
trans-1,2-Dichloroethene	2500	3000		1	120	70-130	06/10/2019 1650
1,2-Dichloropropane	2500	2700		1	107	70-130	06/10/2019 1650
cis-1,3-Dichloropropene	2500	2700		1	109	70-130	06/10/2019 1650
trans-1,3-Dichloropropene	2500	2800		1	111	70-130	06/10/2019 1650
1,4-Dioxane	25000	24000		1	95	60-140	06/10/2019 1650
Ethylbenzene	2500	2900		1	116	70-130	06/10/2019 1650
2-Hexanone	5000	5300		1	105	70-130	06/10/2019 1650
Isopropylbenzene	2500	2900		1	116	70-130	06/10/2019 1650
Methyl acetate	2500	2000		1	81	70-130	06/10/2019 1650
Methyl tertiary butyl ether (MTBE)	2500	2400		1	96	70-130	06/10/2019 1650
4-Methyl-2-pentanone	5000	4800		1	96	70-130	06/10/2019 1650
Methylcyclohexane	2500	3400	N	1	136	70-130	06/10/2019 1650
Methylene chloride	2500	2500		1	101	70-130	06/10/2019 1650
Naphthalene	2500	2300		1	90	70-130	06/10/2019 1650
Styrene	2500	2800		1	113	70-130	06/10/2019 1650
1,1,2,2-Tetrachloroethane	2500	2700		1	106	70-130	06/10/2019 1650
Tetrachloroethene	2500	3100		1	124	70-130	06/10/2019 1650
Toluene	2500	2900		1	115	70-130	06/10/2019 1650
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3000		1	119	70-130	06/10/2019 1650

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19821-002
Batch: 19821
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2600		1	103	70-130	06/10/2019 1650
1,2,4-Trichlorobenzene	2500	2700		1	106	70-130	06/10/2019 1650
1,1,1-Trichloroethane	2500	2800		1	111	70-130	06/10/2019 1650
1,1,2-Trichloroethane	2500	2700		1	107	70-130	06/10/2019 1650
Trichloroethene	2500	2800		1	112	70-130	06/10/2019 1650
Trichlorofluoromethane	2500	2900		1	117	70-130	06/10/2019 1650
Vinyl chloride	2500	2300		1	91	70-130	06/10/2019 1650
Xylenes (total)	5000	5800		1	115	70-130	06/10/2019 1650
m+p - Xylenes	2500	2900		1	117	70-130	06/10/2019 1650
o - Xylenes	2500	2800		1	113	70-130	06/10/2019 1650

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		106	68-124

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LOD = Limit of Detection

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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19028-001
Batch: 19028
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/09/2019 2023

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	06/12/2019 1155
Acenaphthylene	ND		1	2.7	0.95	ug/kg	06/12/2019 1155
Anthracene	ND		1	2.7	0.51	ug/kg	06/12/2019 1155
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	06/12/2019 1155
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	06/12/2019 1155
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	06/12/2019 1155
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	06/12/2019 1155
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	06/12/2019 1155
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/12/2019 1155
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	06/12/2019 1155
Carbazole	ND		1	13	5.0	ug/kg	06/12/2019 1155
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	06/12/2019 1155
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	06/12/2019 1155
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	06/12/2019 1155
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	06/12/2019 1155
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	06/12/2019 1155
2-Chlorophenol	ND		1	13	5.0	ug/kg	06/12/2019 1155
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/12/2019 1155
Chrysene	ND		1	2.7	0.45	ug/kg	06/12/2019 1155
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	06/12/2019 1155
Dibenzofuran	ND		1	13	5.0	ug/kg	06/12/2019 1155
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	06/12/2019 1155
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	06/12/2019 1155
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	06/12/2019 1155
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	06/12/2019 1155
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	06/12/2019 1155
Diethylphthalate	ND		1	13	5.0	ug/kg	06/12/2019 1155
Dimethyl phthalate	ND		1	13	7.4	ug/kg	06/12/2019 1155
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	06/12/2019 1155
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	06/12/2019 1155
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	06/12/2019 1155
2,4-Dinitrophenol	ND		1	67	25	ug/kg	06/12/2019 1155
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	06/12/2019 1155
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	06/12/2019 1155
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	06/12/2019 1155
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	06/12/2019 1155
Fluoranthene	ND		1	2.7	0.42	ug/kg	06/12/2019 1155
Fluorene	ND		1	2.7	0.57	ug/kg	06/12/2019 1155
Hexachlorobenzene	ND		1	13	5.0	ug/kg	06/12/2019 1155
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	06/12/2019 1155
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	06/12/2019 1155
Hexachloroethane	ND		1	13	5.0	ug/kg	06/12/2019 1155
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	06/12/2019 1155
Isophorone	ND		1	13	5.0	ug/kg	06/12/2019 1155

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19028-001
Batch: 19028
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/09/2019 2023

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	06/12/2019 1155
2-Methylphenol	ND		1	13	5.0	ug/kg	06/12/2019 1155
3+4-Methylphenol	ND		1	27	10	ug/kg	06/12/2019 1155
Naphthalene	ND		1	2.7	0.97	ug/kg	06/12/2019 1155
2-Nitroaniline	ND		1	27	10	ug/kg	06/12/2019 1155
3-Nitroaniline	ND		1	27	10	ug/kg	06/12/2019 1155
4-Nitroaniline	ND		1	27	10	ug/kg	06/12/2019 1155
Nitrobenzene	ND		1	13	5.0	ug/kg	06/12/2019 1155
2-Nitrophenol	ND		1	27	10	ug/kg	06/12/2019 1155
4-Nitrophenol	ND		1	67	25	ug/kg	06/12/2019 1155
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	06/12/2019 1155
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	06/12/2019 1155
Pentachlorophenol	ND		1	67	25	ug/kg	06/12/2019 1155
Phenanthrene	ND		1	2.7	0.72	ug/kg	06/12/2019 1155
Phenol	38		1	13	5.0	ug/kg	06/12/2019 1155
Pyrene	ND		1	2.7	0.50	ug/kg	06/12/2019 1155
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	06/12/2019 1155
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	06/12/2019 1155
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	06/12/2019 1155
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	06/12/2019 1155
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	06/12/2019 1155

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		74	33-102
2-Fluorophenol		75	35-115
Nitrobenzene-d5		77	22-109
Phenol-d5		79	33-122
Terphenyl-d14		99	41-120
2,4,6-Tribromophenol		82	30-117

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19028-002
Batch: 19028
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/09/2019 2023

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	87		1	66	12-111	06/12/2019 1219
Acenaphthylene	130	91		1	69	44-122	06/12/2019 1219
Anthracene	130	100		1	78	16-122	06/12/2019 1219
Benzo(a)anthracene	130	110		1	82	40-121	06/12/2019 1219
Benzo(a)pyrene	130	110		1	84	36-114	06/12/2019 1219
Benzo(b)fluoranthene	130	110		1	83	38-123	06/12/2019 1219
Benzo(g,h,i)perylene	130	110		1	85	43-120	06/12/2019 1219
Benzo(k)fluoranthene	130	110		1	80	40-126	06/12/2019 1219
4-Bromophenyl phenyl ether	130	97		1	73	30-130	06/12/2019 1219
Butyl benzyl phthalate	130	120		1	93	48-124	06/12/2019 1219
Carbazole	130	110		1	81	47-125	06/12/2019 1219
bis (2-Chloro-1-methylethyl) ether	130	78		1	59	41-113	06/12/2019 1219
4-Chloro-3-methyl phenol	130	99		1	75	48-120	06/12/2019 1219
bis(2-Chloroethoxy)methane	130	85		1	64	38-115	06/12/2019 1219
bis(2-Chloroethyl)ether	130	74		1	56	46-122	06/12/2019 1219
2-Chloronaphthalene	130	83		1	62	37-106	06/12/2019 1219
2-Chlorophenol	130	78		1	58	44-122	06/12/2019 1219
4-Chlorophenyl phenyl ether	130	92		1	69	32-107	06/12/2019 1219
Chrysene	130	100		1	79	41-124	06/12/2019 1219
Dibenzo(a,h)anthracene	130	110		1	84	38-125	06/12/2019 1219
Dibenzofuran	130	90		1	68	45-128	06/12/2019 1219
1,2-Dichlorobenzene	130	77		1	58	39-94	06/12/2019 1219
1,3-Dichlorobenzene	130	74		1	55	30-130	06/12/2019 1219
1,4-Dichlorobenzene	130	75		1	56	39-92	06/12/2019 1219
3,3'-Dichlorobenzidine	130	110		1	83	10-119	06/12/2019 1219
2,4-Dichlorophenol	130	88		1	66	30-96	06/12/2019 1219
Diethylphthalate	130	100		1	77	30-130	06/12/2019 1219
Dimethyl phthalate	130	98		1	74	24-127	06/12/2019 1219
2,4-Dimethylphenol	130	120		1	92	30-130	06/12/2019 1219
Di-n-butyl phthalate	130	110		1	85	35-108	06/12/2019 1219
4,6-Dinitro-2-methylphenol	130	110		1	81	53-150	06/12/2019 1219
2,4-Dinitrophenol	270	180		1	69	32-115	06/12/2019 1219
2,4-Dinitrotoluene	130	110		1	81	40-130	06/12/2019 1219
2,6-Dinitrotoluene	130	100		1	76	46-118	06/12/2019 1219
Di-n-octylphthalate	130	120		1	89	49-118	06/12/2019 1219
bis(2-Ethylhexyl)phthalate	130	120		1	91	33-123	06/12/2019 1219
Fluoranthene	130	110		1	84	26-133	06/12/2019 1219
Fluorene	130	94		1	71	19-108	06/12/2019 1219
Hexachlorobenzene	130	98		1	74	10-125	06/12/2019 1219
Hexachlorobutadiene	130	79		1	60	47-116	06/12/2019 1219
Hexachlorocyclopentadiene	670	320		1	48	48-127	06/12/2019 1219
Hexachloroethane	130	73		1	55	18-154	06/12/2019 1219
Indeno(1,2,3-c,d)pyrene	130	110		1	85	42-123	06/12/2019 1219
Isophorone	130	89		1	67	30-130	06/12/2019 1219

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19028-002
Batch: 19028
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/09/2019 2023

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	87		1	65	10-107	06/12/2019 1219
2-Methylphenol	130	89		1	67	33-103	06/12/2019 1219
3+4-Methylphenol	130	79		1	59	18-121	06/12/2019 1219
Naphthalene	130	84		1	63	10-112	06/12/2019 1219
2-Nitroaniline	130	110		1	80	46-128	06/12/2019 1219
3-Nitroaniline	130	75		1	56	30-130	06/12/2019 1219
4-Nitroaniline	130	110		1	86	51-129	06/12/2019 1219
Nitrobenzene	130	84		1	63	49-142	06/12/2019 1219
2-Nitrophenol	130	89		1	67	33-114	06/12/2019 1219
4-Nitrophenol	270	220		1	82	27-138	06/12/2019 1219
N-Nitrosodi-n-propylamine	130	80		1	60	45-112	06/12/2019 1219
N-Nitrosodiphenylamine (Diphenylamine)	130	100		1	77	49-123	06/12/2019 1219
Pentachlorophenol	270	200		1	75	36-108	06/12/2019 1219
Phenanthrene	130	98		1	74	16-123	06/12/2019 1219
Phenol	130	88		1	66	39-108	06/12/2019 1219
Pyrene	130	100		1	77	34-121	06/12/2019 1219
1,2,4,5-Tetrachlorobenzene	130	79		1	59	30-130	06/12/2019 1219
2,3,4,6-Tetrachlorophenol	130	95		1	71	53-125	06/12/2019 1219
1,2,4-Trichlorobenzene	130	81		1	61	30-130	06/12/2019 1219
2,4,5-Trichlorophenol	130	93		1	70	32-105	06/12/2019 1219
2,4,6-Trichlorophenol	130	90		1	68	31-102	06/12/2019 1219

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		64	33-102
2-Fluorophenol		59	35-115
Nitrobenzene-d5		67	22-109
Phenol-d5		63	33-122
Terphenyl-d14		87	41-120
2,4,6-Tribromophenol		79	30-117

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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF07044-001MS
Batch: 19028
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/09/2019 2023

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	ND	160	120		20	74	12-111	06/14/2019 2100
Acenaphthylene	ND	160	110		20	68	44-122	06/14/2019 2100
Anthracene	41	160	150		20	66	16-122	06/14/2019 2100
Benzo(a)anthracene	140	160	230		20	60	40-121	06/14/2019 2100
Benzo(a)pyrene	70	160	170		20	60	36-114	06/14/2019 2100
Benzo(b)fluoranthene	180	160	240	N	20	36	38-123	06/14/2019 2100
Benzo(g,h,i)perylene	72	160	120	N	20	31	43-120	06/14/2019 2100
Benzo(k)fluoranthene	47	160	170		20	81	40-126	06/14/2019 2100
4-Bromophenyl phenyl ether	ND	160	120		20	80	30-130	06/14/2019 2100
Butyl benzyl phthalate	ND	160	150		20	96	30-130	06/14/2019 2100
Carbazole	ND	160	130		20	82	30-130	06/14/2019 2100
bis (2-Chloro-1-methylethyl) ether	ND	160	110		20	73	30-130	06/14/2019 2100
4-Chloro-3-methyl phenol	ND	160	160		20	100	30-130	06/14/2019 2100
bis(2-Chloroethoxy)methane	ND	160	130		20	82	30-130	06/14/2019 2100
bis(2-Chloroethyl)ether	ND	160	150		20	95	30-130	06/14/2019 2100
2-Chloronaphthalene	ND	160	100		20	67	30-130	06/14/2019 2100
2-Chlorophenol	ND	160	99		20	63	30-130	06/14/2019 2100
4-Chlorophenyl phenyl ether	ND	160	110		20	70	30-130	06/14/2019 2100
Chrysene	110	160	210		20	63	41-124	06/14/2019 2100
Dibenzo(a,h)anthracene	ND	160	81		20	52	38-125	06/14/2019 2100
Dibenzofuran	ND	160	140		20	87	30-130	06/14/2019 2100
1,2-Dichlorobenzene	ND	790	92	N	20	12	39-94	06/14/2019 2100
1,3-Dichlorobenzene	ND	790	92	N	20	12	30-130	06/14/2019 2100
1,4-Dichlorobenzene	ND	790	94	N	20	12	39-92	06/14/2019 2100
3,3'-Dichlorobenzidine	ND	160	230	N	20	144	10-119	06/14/2019 2100
2,4-Dichlorophenol	ND	160	93		20	60	30-130	06/14/2019 2100
Diethylphthalate	ND	160	120		20	78	30-130	06/14/2019 2100
Dimethyl phthalate	ND	160	130		20	81	30-130	06/14/2019 2100
2,4-Dimethylphenol	ND	160	240	N	20	156	30-130	06/14/2019 2100
Di-n-butyl phthalate	ND	160	140		20	89	30-130	06/14/2019 2100
4,6-Dinitro-2-methylphenol	ND	160	1000	N	20	639	30-130	06/14/2019 2100
2,4-Dinitrophenol	ND	310	1900	N	20	596	30-130	06/14/2019 2100
2,4-Dinitrotoluene	ND	160	540	N	20	343	30-130	06/14/2019 2100
2,6-Dinitrotoluene	ND	160	450	N	20	287	30-130	06/14/2019 2100
Di-n-octylphthalate	ND	160	280	N	20	176	30-130	06/14/2019 2100
bis(2-Ethylhexyl)phthalate	ND	160	150		20	98	30-130	06/14/2019 2100
Fluoranthene	170	160	280		20	65	26-133	06/14/2019 2100
Fluorene	ND	160	120		20	78	19-108	06/14/2019 2100
Hexachlorobenzene	ND	160	120		20	74	10-130	06/14/2019 2100
Hexachlorobutadiene	ND	160	96		20	61	30-130	06/14/2019 2100
Hexachlorocyclopentadiene	ND	780	85	N	20	11	30-130	06/14/2019 2100
Hexachloroethane	ND	160	780	N	20	495	30-130	06/14/2019 2100
Indeno(1,2,3-c,d)pyrene	51	160	110	N	20	39	42-123	06/14/2019 2100
Isophorone	ND	160	110		20	72	30-130	06/14/2019 2100

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF07044-001MS
Batch: 19028
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/09/2019 2023

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	520	160	480	N	20	-27	10-107	06/14/2019 2100
2-Methylphenol	ND	160	130		20	81	30-130	06/14/2019 2100
3+4-Methylphenol	ND	160	130		20	84	30-130	06/14/2019 2100
Naphthalene	270	160	290		20	11	10-112	06/14/2019 2100
2-Nitroaniline	ND	160	ND	N	20	0.00	30-130	06/14/2019 2100
3-Nitroaniline	ND	160	ND	N	20	0.00	30-130	06/14/2019 2100
4-Nitroaniline	ND	160	280	N	20	181	30-130	06/14/2019 2100
Nitrobenzene	ND	160	110		20	70	30-130	06/14/2019 2100
2-Nitrophenol	ND	160	120		20	75	30-130	06/14/2019 2100
4-Nitrophenol	ND	310	870	N	20	277	30-130	06/14/2019 2100
N-Nitrosodi-n-propylamine	ND	160	440	N	20	282	30-130	06/14/2019 2100
N-Nitrosodiphenylamine (Diphenylamine)	ND	160	160		20	104	30-130	06/14/2019 2100
Pentachlorophenol	ND	310	540	N	20	171	30-130	06/14/2019 2100
Phenanthrene	200	160	270		20	44	16-123	06/14/2019 2100
Phenol	ND	160	110		20	71	30-130	06/14/2019 2100
Pyrene	210	160	310		20	60	34-121	06/14/2019 2100
1,2,4,5-Tetrachlorobenzene	ND	160	94		20	60	30-130	06/14/2019 2100
2,3,4,6-Tetrachlorophenol	ND	160	84		20	53	53-125	06/14/2019 2100
1,2,4-Trichlorobenzene	ND	790	99	N	20	13	30-130	06/14/2019 2100
2,4,5-Trichlorophenol	ND	160	90		20	58	30-130	06/14/2019 2100
2,4,6-Trichlorophenol	ND	160	100		20	67	30-130	06/14/2019 2100

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		67	33-102
2-Fluorophenol		53	35-115
Nitrobenzene-d5		74	22-109
Phenol-d5		67	33-122
Terphenyl-d14		81	41-120
2,4,6-Tribromophenol		60	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL
N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF07044-001MD
Batch: 19028
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/09/2019 2023

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acenaphthene	ND	160	120		20	78	6.0	12-111	30	06/14/2019 2126
Acenaphthylene	ND	160	110		20	69	2.4	44-122	30	06/14/2019 2126
Anthracene	41	160	150		20	67	1.2	16-122	30	06/14/2019 2126
Benzo(a)anthracene	140	160	200	N	20	38	16	40-121	30	06/14/2019 2126
Benzo(a)pyrene	70	160	140		20	46	14	36-114	30	06/14/2019 2126
Benzo(b)fluoranthene	180	160	210	N	20	15	14	38-123	30	06/14/2019 2126
Benzo(g,h,i)perylene	72	160	110	N	20	23	11	43-120	30	06/14/2019 2126
Benzo(k)fluoranthene	47	160	160		20	72	7.3	40-126	30	06/14/2019 2126
4-Bromophenyl phenyl ether	ND	160	120		20	78	1.6	30-130	40	06/14/2019 2126
Butyl benzyl phthalate	ND	160	150		20	95	0.69	30-130	40	06/14/2019 2126
Carbazole	ND	160	130		20	82	0.76	30-130	40	06/14/2019 2126
bis (2-Chloro-1-methylethyl) ether	ND	160	110		20	67	8.2	30-130	40	06/14/2019 2126
4-Chloro-3-methyl phenol	ND	160	120		20	76	26	30-130	40	06/14/2019 2126
bis(2-Chloroethoxy)methane	ND	160	100		20	66	21	30-130	40	06/14/2019 2126
bis(2-Chloroethyl)ether	ND	160	130		20	80	17	30-130	40	06/14/2019 2126
2-Chloronaphthalene	ND	160	100		20	63	4.6	30-130	40	06/14/2019 2126
2-Chlorophenol	ND	160	87		20	55	14	30-130	40	06/14/2019 2126
4-Chlorophenyl phenyl ether	ND	160	110		20	69	0.99	30-130	40	06/14/2019 2126
Chrysene	110	160	180		20	44	14	41-124	30	06/14/2019 2126
Dibenzo(a,h)anthracene	ND	160	85		20	54	4.7	38-125	30	06/14/2019 2126
Dibenzofuran	ND	160	140		20	89	2.9	30-130	40	06/14/2019 2126
1,2-Dichlorobenzene	ND	790	87	N	20	11	5.1	39-94	40	06/14/2019 2126
1,3-Dichlorobenzene	ND	790	91	N	20	11	0.69	30-130	40	06/14/2019 2126
1,4-Dichlorobenzene	ND	790	88	N	20	11	7.1	39-92	40	06/14/2019 2126
3,3'-Dichlorobenzidine	ND	160	ND	N,+	20	0.00	200	10-119	40	06/14/2019 2126
2,4-Dichlorophenol	ND	160	86		20	54	8.4	30-130	40	06/14/2019 2126
Diethylphthalate	ND	160	120		20	74	4.9	30-130	40	06/14/2019 2126
Dimethyl phthalate	ND	160	130		20	80	0.27	30-130	40	06/14/2019 2126
2,4-Dimethylphenol	ND	160	160	+	20	100	43	30-130	40	06/14/2019 2126
Di-n-butyl phthalate	ND	160	140		20	88	0.59	30-130	40	06/14/2019 2126
4,6-Dinitro-2-methylphenol	ND	160	1000	N	20	635	0.027	30-130	40	06/14/2019 2126
2,4-Dinitrophenol	ND	320	1900	N	20	593	0.17	30-130	40	06/14/2019 2126
2,4-Dinitrotoluene	ND	160	540	N	20	342	0.35	30-130	40	06/14/2019 2126
2,6-Dinitrotoluene	ND	160	440	N	20	281	1.3	30-130	40	06/14/2019 2126
Di-n-octylphthalate	ND	160	270	N	20	174	0.60	30-130	40	06/14/2019 2126
bis(2-Ethylhexyl)phthalate	ND	160	150		20	92	5.8	30-130	40	06/14/2019 2126
Fluoranthene	170	160	230		20	38	16	26-133	30	06/14/2019 2126
Fluorene	ND	160	110		20	73	5.7	19-108	30	06/14/2019 2126
Hexachlorobenzene	ND	160	110		20	71	2.6	10-130	40	06/14/2019 2126
Hexachlorobutadiene	ND	160	90		20	57	6.5	30-130	40	06/14/2019 2126
Hexachlorocyclopentadiene	ND	790	94	N	20	12	10	30-130	40	06/14/2019 2126
Hexachloroethane	ND	160	140	+	20	89	140	30-130	40	06/14/2019 2126
Indeno(1,2,3-c,d)pyrene	51	160	100	N	20	33	9.4	42-123	30	06/14/2019 2126
Isophorone	ND	160	100		20	66	8.6	30-130	40	06/14/2019 2126

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF07044-001MD
Batch: 19028
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/09/2019 2023

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
2-Methylnaphthalene	520	160	410	N	20	-75	17	10-107	30	06/14/2019 2126
2-Methylphenol	ND	160	100		20	66	20	30-130	40	06/14/2019 2126
3+4-Methylphenol	ND	160	110		20	71	17	30-130	40	06/14/2019 2126
Naphthalene	270	160	260	N	20	-11	13	10-112	30	06/14/2019 2126
2-Nitroaniline	ND	160	ND	N	20	0.00	0.00	30-130	40	06/14/2019 2126
3-Nitroaniline	ND	160	ND	N	20	0.00	0.00	30-130	40	06/14/2019 2126
4-Nitroaniline	ND	160	280	N	20	177	1.2	30-130	40	06/14/2019 2126
Nitrobenzene	ND	160	100		20	64	8.7	30-130	40	06/14/2019 2126
2-Nitrophenol	ND	160	130		20	80	6.8	30-130	40	06/14/2019 2126
4-Nitrophenol	ND	320	740	N	20	234	16	30-130	40	06/14/2019 2126
N-Nitrosodi-n-propylamine	ND	160	110	+	20	67	120	30-130	40	06/14/2019 2126
N-Nitrosodiphenylamine (Diphenylamine)	ND	160	150		20	94	9.0	30-130	40	06/14/2019 2126
Pentachlorophenol	ND	320	530	N	20	168	1.1	30-130	40	06/14/2019 2126
Phenanthrene	200	160	250		20	28	9.9	16-123	30	06/14/2019 2126
Phenol	ND	160	92		20	59	19	30-130	40	06/14/2019 2126
Pyrene	210	160	260	N	20	30	16	34-121	30	06/14/2019 2126
1,2,4,5-Tetrachlorobenzene	ND	160	83		20	52	12	30-130	40	06/14/2019 2126
2,3,4,6-Tetrachlorophenol	ND	160	88		20	56	5.2	53-125	40	06/14/2019 2126
1,2,4-Trichlorobenzene	ND	790	94	N	20	12	5.7	30-130	40	06/14/2019 2126
2,4,5-Trichlorophenol	ND	160	100		20	64	12	30-130	40	06/14/2019 2126
2,4,6-Trichlorophenol	ND	160	100		20	64	3.0	30-130	40	06/14/2019 2126

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		65	33-102
2-Fluorophenol		47	35-115
Nitrobenzene-d5		69	22-109
Phenol-d5		59	33-122
Terphenyl-d14		86	41-120
2,4,6-Tribromophenol		79	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
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Montana EPH (aliphatics) - MB

Sample ID: UQ19365-001
Batch: 19365
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/15/2019 0012
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/15/2019 0012

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		88	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ19365-002
Batch: 19365
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	43		1	107	40-140	06/15/2019 0042
C9 - C18 Aliphatics	30	20		1	67	40-140	06/15/2019 0042

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		99	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ19365-003
Batch: 19365
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	43		1	107	0.023	40-140	25	06/15/2019 0111
C9 - C18 Aliphatics	30	19		1	64	4.7	40-140	25	06/15/2019 0111

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		98	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ19366-001
Batch: 19366
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/15/2019 0434

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		96	40-140
2-Fluorobiphenyl (fractionation 1)		93	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ19366-002
Batch: 19366
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	75		1	88	40-140	06/15/2019 0503

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		102	40-140
2-Fluorobiphenyl (fractionation 1)		100	40-140
o - Terphenyl (aromatic)		94	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ19366-003
Batch: 19366
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	74		1	87	1.3	40-140	25	06/15/2019 0531

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		99	40-140
2-Fluorobiphenyl (fractionation 1)		102	40-140
o - Terphenyl (aromatic)		92	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ19748-001
Batch: 19748
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/14/2019 1216

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ19748-002
Batch: 19748
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	21		1	110	70-130	06/14/2019 1119

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ19748-003
Batch: 19748
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	108	2.0	70-130	25	06/14/2019 1147

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ19750-001
Batch: 19750
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	06/14/2019 1216
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/14/2019 1216
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/14/2019 1216
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/14/2019 1216
Naphthalene	ND		1	0.25	0.13	mg/kg	06/14/2019 1216
Toluene	ND		1	0.25	0.040	mg/kg	06/14/2019 1216
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/14/2019 1216
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/14/2019 1216

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ19750-002
Batch: 19750
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.3		1	104	70-130	06/14/2019 1119
C9 - C10 Aromatics	1.3	1.4		1	112	70-130	06/14/2019 1119
Ethylbenzene	1.3	1.3		1	104	70-130	06/14/2019 1119
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	70-130	06/14/2019 1119
Naphthalene	1.3	1.1		1	88	70-130	06/14/2019 1119
Toluene	1.3	1.3		1	104	70-130	06/14/2019 1119
m+p - Xylenes	2.5	2.7		1	108	70-130	06/14/2019 1119
o - Xylenes	1.3	1.3		1	104	70-130	06/14/2019 1119

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ19750-003
Batch: 19750
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	0.00	70-130	25	06/14/2019 1147
C9 - C10 Aromatics	1.3	1.3		1	104	7.4	70-130	25	06/14/2019 1147
Ethylbenzene	1.3	1.3		1	104	0.00	70-130	25	06/14/2019 1147
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	0.00	70-130	25	06/14/2019 1147
Naphthalene	1.3	0.99		1	79	11	70-130	25	06/14/2019 1147
Toluene	1.3	1.3		1	104	0.00	70-130	25	06/14/2019 1147
m+p - Xylenes	2.5	2.6		1	104	3.8	70-130	25	06/14/2019 1147
o - Xylenes	1.3	1.3		1	104	0.00	70-130	25	06/14/2019 1147

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - MB

Sample ID: UQ19751-001
Batch: 19751
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/14/2019 1216
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/14/2019 1216

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - LCS

Sample ID: UQ19751-002
Batch: 19751
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.6		1	111	70-130	06/14/2019 1119
C9 - C12 Aliphatics, Adjusted	3.8	4.3		1	114	70-130	06/14/2019 1119

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - LCSD

Sample ID: UQ19751-003
Batch: 19751
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.5		1	110	1.4	70-130	25	06/14/2019 1147
C9 - C12 Aliphatics, Adjusted	3.8	4.3		1	114	0.63	70-130	25	06/14/2019 1147

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ19113-001
Batch: 19113
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/11/2019 1033

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	06/12/2019 0300
Arsenic	ND		1	0.50	0.20	mg/kg	06/12/2019 0300
Barium	ND		1	1.3	0.31	mg/kg	06/12/2019 0300
Beryllium	ND		1	0.10	0.034	mg/kg	06/12/2019 0300
Cadmium	ND		1	0.13	0.025	mg/kg	06/12/2019 0300
Chromium	ND		1	1.3	0.55	mg/kg	06/13/2019 2302
Cobalt	ND		1	1.3	0.30	mg/kg	06/12/2019 0300
Copper	ND		1	1.3	0.33	mg/kg	06/12/2019 0300
Lead	ND		1	0.25	0.068	mg/kg	06/12/2019 0300
Nickel	ND		1	1.3	0.30	mg/kg	06/12/2019 0300
Selenium	ND		1	1.3	0.47	mg/kg	06/12/2019 0300
Silver	ND		1	0.25	0.060	mg/kg	06/12/2019 0300
Vanadium	ND		1	1.3	0.25	mg/kg	06/12/2019 0300
Zinc	ND		1	2.5	0.50	mg/kg	06/12/2019 0300

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ19113-002
Batch: 19113
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/11/2019 1033

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	50		1	100	80-120	06/12/2019 0305
Arsenic	50	49		1	99	80-120	06/12/2019 0305
Barium	50	50		1	101	80-120	06/12/2019 0305
Beryllium	50	56		1	112	80-120	06/12/2019 0305
Cadmium	50	48		1	96	80-120	06/12/2019 0305
Chromium	50	53		1	106	80-120	06/13/2019 2307
Cobalt	50	51		1	102	80-120	06/12/2019 0305
Copper	50	49		1	99	80-120	06/12/2019 0305
Lead	50	51		1	102	80-120	06/12/2019 0305
Nickel	50	50		1	100	80-120	06/12/2019 0305
Selenium	50	46		1	92	80-120	06/12/2019 0305
Silver	50	52		1	105	80-120	06/12/2019 0305
Vanadium	50	52		1	105	80-120	06/12/2019 0305
Zinc	50	48		1	96	80-120	06/12/2019 0305

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ19999-001
Batch: 19999
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/19/2019 1411

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	06/20/2019 2019
Arsenic	ND		1	0.50	0.20	mg/kg	06/20/2019 2019
Barium	ND		1	1.3	0.31	mg/kg	06/20/2019 2019
Beryllium	ND		1	0.10	0.034	mg/kg	06/20/2019 2019
Cadmium	ND		1	0.13	0.025	mg/kg	06/20/2019 2019
Chromium	ND		1	1.3	0.55	mg/kg	06/20/2019 2019
Cobalt	ND		1	1.3	0.30	mg/kg	06/20/2019 2019
Copper	ND		1	1.3	0.33	mg/kg	06/20/2019 2019
Lead	ND		1	0.25	0.068	mg/kg	06/20/2019 2019
Nickel	ND		1	1.3	0.30	mg/kg	06/20/2019 2019
Selenium	ND		1	1.3	0.47	mg/kg	06/20/2019 2019
Silver	ND		1	0.25	0.060	mg/kg	06/20/2019 2019
Vanadium	ND		1	1.3	0.25	mg/kg	06/20/2019 2019
Zinc	ND		1	2.5	0.50	mg/kg	06/20/2019 2019

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ19999-002
Batch: 19999
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/19/2019 1411

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	51		1	103	80-120	06/20/2019 2024
Arsenic	50	51		1	102	80-120	06/20/2019 2024
Barium	50	51		1	103	80-120	06/20/2019 2024
Beryllium	50	49		1	99	80-120	06/20/2019 2024
Cadmium	50	51		1	103	80-120	06/20/2019 2024
Chromium	50	52		1	104	80-120	06/20/2019 2024
Cobalt	50	52		1	103	80-120	06/20/2019 2024
Copper	50	52		1	104	80-120	06/20/2019 2024
Lead	50	53		1	106	80-120	06/20/2019 2024
Nickel	50	51		1	101	80-120	06/20/2019 2024
Selenium	50	49		1	98	80-120	06/20/2019 2024
Silver	50	52		1	103	80-120	06/20/2019 2024
Vanadium	50	53		1	105	80-120	06/20/2019 2024
Zinc	50	50		1	100	80-120	06/20/2019 2024

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - MS

Sample ID: UF07044-001MS
Batch: 19999
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/19/2019 1411

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	7.1	58	54		1	81	75-125	06/20/2019 2036
Arsenic	490	58	320	N	1	-285	75-125	06/20/2019 2036
Barium	190	58	330	N	1	238	75-125	06/20/2019 2036
Beryllium	0.36	58	16	N	1	27	75-125	06/20/2019 2036
Cadmium	4.0	58	60		1	96	75-125	06/20/2019 2036
Chromium	10	58	72		1	106	75-125	06/20/2019 2036
Cobalt	37	58	62	N	1	42	75-125	06/20/2019 2036
Copper	1200	58	800	N	3	-738	75-125	06/21/2019 0304
Lead	57	58	110		1	94	75-125	06/20/2019 2036
Nickel	42	58	66	N	1	41	75-125	06/20/2019 2036
Selenium	1.5	58	58		1	97	75-125	06/20/2019 2036
Silver	9.7	58	61		1	88	75-125	06/20/2019 2036
Vanadium	37	58	100		1	116	75-125	06/20/2019 2036
Zinc	670	58	450	N	3	-375	75-125	06/21/2019 0304

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF07044-001MD
Batch: 19999
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/19/2019 1411

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Antimony	7.1	59	54		1	79	1.4	75-125	20	06/20/2019 2041
Arsenic	490	59	370	N	1	-194	15	75-125	20	06/20/2019 2041
Barium	190	59	260	+	1	123	23	75-125	20	06/20/2019 2041
Beryllium	0.36	59	16	N	1	26	2.5	75-125	20	06/20/2019 2041
Cadmium	4.0	59	59		1	93	1.6	75-125	20	06/20/2019 2041
Chromium	10	59	70		1	101	2.7	75-125	20	06/20/2019 2041
Cobalt	37	59	68	N	1	52	9.6	75-125	20	06/20/2019 2041
Copper	1200	59	1200	N,+	3	-73	39	75-125	20	06/21/2019 0310
Lead	57	59	130		1	120	14	75-125	20	06/20/2019 2041
Nickel	42	59	73	N	1	52	10	75-125	20	06/20/2019 2041
Selenium	1.5	59	58		1	95	0.76	75-125	20	06/20/2019 2041
Silver	9.7	59	61		1	87	0.31	75-125	20	06/20/2019 2041
Vanadium	37	59	100		1	107	4.4	75-125	20	06/20/2019 2041
Zinc	670	59	620	N,+	3	-88	31	75-125	20	06/21/2019 0310

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ19109-001
Batch: 19109
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/12/2019 1428

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/12/2019 1845

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ19109-002
Batch: 19109
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/12/2019 1428

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.84		1	101	80-120	06/12/2019 1847

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Chain of Custody
and
Miscellaneous Documents

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

Chain of Custody Record

Number

Client	Report to Contact	Telephone No. / E-mail	Quote No.
Ramboll US Corporation	Daniel Price/Michael Wilson	(314) 990-9975/dprice@ramboll.com (316) 440-7581/mwilson@ramboll.com	

Address	Sampler's Signature	Analysis (Attach list if more space is needed)	Page
7600 College Boulevard Suite 1905	X _____ Elizabeth Borucki		1 of 1

City	State	Zip Code	Project Name
Overland Park	KS	66210	CMR RIAM East Rail

Project Number	P.O No.
1690012344-003	

UF07044

KMN2

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	C-Grab C-Composite	Matrix: Aqueous	Solid	Non-Aqueous	No of Containers by Preservative Type: Unpres	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH				Remarks / Cooler ID.
CMR-EB10-0.5-1.0-190606	6/6/2019	14:35	G		X		2					1	2	X	X	X	X	X				Cooler 001
CMR-EB10-2.5-5.0-190606	6/6/2019	15:00	G		X		2					1	2	X	X	X	X	X				Cooler 001
CMR-EB10-7.5-8.5-190606	6/6/2019	15:15	G		X		2					1	2	X	X	X	X	X				Cooler 001
TB-07	NA	NA	G	X						2				X								Trip Blank/Cooler 001

Turn Around Time Required (Prior lab approval required for expedited TAT)	Sample Disposal	Possible Hazard Identification (List any known hazards in the remarks)	QC Requirements
☒ Standard ☐ Rush (Please Specify)	☐ Return to Client ☐ Disposal by Lab	☐ Non-Hazardous ☐ Flammable ☐ Skin Irritant ☐ SDS provided ☐ Unknown	

	Date	Time		Date	Time
1. Relinquished by	6/6/2019	17:45	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by Fed Ex	6-7-19	1040	4. Laboratory Received by L Hite	6-7-19	1040

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) ☒ Y ☐ N ☐ Ice Pack

Receipt Temp. 4.9 °C

Document Number: ME002OW-01

Shealy Environmental Services, Inc.
Document Number: ME60180-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL US CORP Cooler Inspected by/date: LKH / 06-07-2019 Lot #: UF07044

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

4.9 /4.9 °C NA /NA °C NA /NA °C NA /NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☐ Yes	☑ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? SEE COMMENTS
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☐ No	☑ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H_2SO_4, HNO_3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: LKH Date: 06-07-2019

Comments:

MEMO

Date: **July 19, 2019**

To: **File**

From: **R Huening**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF08028, 3 Soil Samples, 3 Water Samples

Data validation and usability assessment was conducted for data package UF08028 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB01-0.5-1.0-190607	UF08028-001
CMR-EB01-4.0-5.0-190607	UF08028-002
CMR-EB01-14.0-15.0-190607	UF08028-003
CMR-EB10-190606	UF08028-004
CMR-EB09-190607	UF08028-005
TB-08-20190606	UF08028-006

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

MS/MSD Recoveries
For the metals analysis suites MS/MSD results were reported. Recoveries were largely within criteria with the exception of antimony. These out of criteria recoveries indicate a possible bias to results. Therefore, all antimony results were flagged as estimated (J, UJ).

For the SVOC analysis suite MS/MSD results were reported to be almost universally in criteria with with the exception of some non-COC analytes. No validation action warranted.

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of methylcyclohexane and phenol. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methylcyclohexane and phenol results have been validated as estimated.

Blank Detections
During analysis, zinc and bis(2-ethylhexyl)phthalate were detected in method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All zinc and bis(2-ethylhexyl)phthalate results below the RL or below 5x the blank result have been validated as non-detect (U).

Sample Receipt Issues
The lab reported in the narrative that some samples arrived at the lab with pH values out of criteria. The lab adjusted the pH upon receipt and continued analysis as normal. No additional validation was warranted.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF08028

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 2 GW, 1 Water

Reviewer Name R Huening

Completion Date July 12, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Zinc detected in method blank below RL in aqueous analysis. All aqueous zinc results less than 5x the blank result validated as non-detect (U).
Matrix Spike/Matrix Spike Duplicate	MS/MSD recoveries out for multiple analytes mostly due to high native sample concentrations. Antimony recovery low. All antimony results validated as estimated (J, UJ).
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted.
Overall Assessment of Data	All antimony results validated as estimated (J, UJ). All aqueous zinc results less than 5x the blank result validated as non-detect (U).

SDG No. UF08028

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 2 GW, 1 Water

Reviewer Name R Huening

Completion Date July 12, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	Two samples received with pH out of criteria. No action warranted.
Blanks	Bis(2-ethylhexyl)phthalate detected in method blank sample. All bis(2-ethylhexyl)phthalate detections validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to sample dilution. No action taken.	Surrogates out due to sample dilution. No action taken.
Matrix Spike/Matrix Spike Duplicate	Multiple SVOCs out of criteria in aqueous phase MS/MSD. Analytes were not site COCs. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	Methylcyclohexane and phenol out of criteria. Methylcyclohexane detections validated as estimated (J).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified	N/A
Other Non-conformances	No other non-conformances noted.	No other non-conformances noted.
Overall Assessment of Data	All bis(2-ethylhexyl)phthalate detections validated as non-detect (U). Methylcyclohexane detections validated as estimated (J).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF08028**

Date Completed:06/20/2019

06/20/2019 2:11 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF08028

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 19255 had methylcyclohexane recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Sample -002 had surrogates recovered outside of the acceptance limits due to sample dilution. No corrective action was required, as dilutions may impact recovery accuracy.

Semivolatiles
The method blank associated with batch 19057 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for bis(2-ethylhexyl)phthalate have been flagged with a “B” qualifier.

The LCS associated with batch 19304 had phenol recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections for this compound in the samples associated with this batch; therefore, data quality is not impacted.

The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -005 had multiple compounds recovered outside of the acceptance limits. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Samples -002 and -004 were diluted 100X due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana EPH
Samples -004 and -005 were not preserved to a pH<2, although samples were received in the correct sample containers and preservative. The pH was adjusted in the laboratory.

Montana VPH
Samples -001, -002, -004, and -005 had multiple compounds detected in the VPH analysis above the LOQ. Naphthalene was detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same time as MTBE and naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Sample -001 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Sample -002 had surrogates recovered outside of the acceptance limits due to sample dilution. No corrective action was required, as dilutions may impact recovery accuracy.

Metals
The method blank associated with batch 19535 had zinc detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for zinc have been flagged with a “B” qualifier.

The MS/MSD associated with sample -001 had multiple metals recovered outside of the acceptance limits. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample Summary
Ramboll US Corporation
Lot Number: UF08028

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB01-0.5-1.0-190607	Solid	06/07/2019 1350	06/08/2019
002	CMR-EB01-4.0-5.0-190607	Solid	06/07/2019 1405	06/08/2019
003	CMR-EB01-14.0-15.0-190607	Solid	06/07/2019 1535	06/08/2019
004	CMR-EB10-190606	Aqueous	06/06/2019 1710	06/08/2019
005	CMR-EB09-190607	Aqueous	06/07/2019 1620	06/08/2019
006	TB-08-20190606	Aqueous	06/06/2019	06/08/2019

(6 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF08028

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB01-0.5-1.0-190607	Solid	Cyclohexane	8260B	220	J	ug/kg	10
001	CMR-EB01-0.5-1.0-190607	Solid	Ethylbenzene	8260B	210	J	ug/kg	10
001	CMR-EB01-0.5-1.0-190607	Solid	Methylcyclohexane	8260B	780		ug/kg	10
001	CMR-EB01-0.5-1.0-190607	Solid	Naphthalene	8260B	250	J	ug/kg	10
001	CMR-EB01-0.5-1.0-190607	Solid	Toluene	8260B	280		ug/kg	10
001	CMR-EB01-0.5-1.0-190607	Solid	Xylenes (total)	8260B	2100		ug/kg	11
001	CMR-EB01-0.5-1.0-190607	Solid	m+p - Xylenes	8260B	1400		ug/kg	11
001	CMR-EB01-0.5-1.0-190607	Solid	o - Xylenes	8260B	660		ug/kg	11
001	CMR-EB01-0.5-1.0-190607	Solid	Benzo(b)fluoranthene	8270D	110	J	ug/kg	12
001	CMR-EB01-0.5-1.0-190607	Solid	Fluoranthene	8270D	79	J	ug/kg	12
001	CMR-EB01-0.5-1.0-190607	Solid	2-Methylnaphthalene	8270D	430		ug/kg	13
001	CMR-EB01-0.5-1.0-190607	Solid	Naphthalene	8270D	190	J	ug/kg	13
001	CMR-EB01-0.5-1.0-190607	Solid	Phenanthrene	8270D	91	J	ug/kg	13
001	CMR-EB01-0.5-1.0-190607	Solid	Pyrene	8270D	110	J	ug/kg	13
001	CMR-EB01-0.5-1.0-190607	Solid	C19 - C36 Aliphatics	Montana EPH	24		mg/kg	14
001	CMR-EB01-0.5-1.0-190607	Solid	C9 - C18 Aliphatics	Montana EPH	67		mg/kg	14
001	CMR-EB01-0.5-1.0-190607	Solid	C5 - C8 Aliphatics,	Montana VPH	45		mg/kg	16
001	CMR-EB01-0.5-1.0-190607	Solid	C9 - C12 Aliphatics,	Montana VPH	74		mg/kg	16
001	CMR-EB01-0.5-1.0-190607	Solid	Benzene	Montana VPH	0.070	J	mg/kg	17
001	CMR-EB01-0.5-1.0-190607	Solid	C9 - C10 Aromatics	Montana VPH	45		mg/kg	17
001	CMR-EB01-0.5-1.0-190607	Solid	Ethylbenzene	Montana VPH	1.1		mg/kg	17
001	CMR-EB01-0.5-1.0-190607	Solid	Naphthalene	Montana VPH	2.5		mg/kg	17
001	CMR-EB01-0.5-1.0-190607	Solid	Toluene	Montana VPH	0.47		mg/kg	17
001	CMR-EB01-0.5-1.0-190607	Solid	m+p - Xylenes	Montana VPH	1.9		mg/kg	17
001	CMR-EB01-0.5-1.0-190607	Solid	o - Xylenes	Montana VPH	1.8		mg/kg	17
001	CMR-EB01-0.5-1.0-190607	Solid	TPH	Montana VPH	180		mg/kg	18
001	CMR-EB01-0.5-1.0-190607	Solid	Antimony	6020B	1.5		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Arsenic	6020B	90		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Barium	6020B	270		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Beryllium	6020B	0.57		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Cadmium	6020B	3.2		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Chromium	6020B	9.8		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Cobalt	6020B	6.7		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Copper	6020B	1000		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Lead	6020B	74		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Mercury	7471B	0.21		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Nickel	6020B	11		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Silver	6020B	1.3		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Vanadium	6020B	27		mg/kg	19
001	CMR-EB01-0.5-1.0-190607	Solid	Zinc	6020B	480		mg/kg	19
002	CMR-EB01-4.0-5.0-190607	Solid	Benzene	8260B	11000	J	ug/kg	20
002	CMR-EB01-4.0-5.0-190607	Solid	Cyclohexane	8260B	75000		ug/kg	20
002	CMR-EB01-4.0-5.0-190607	Solid	Ethylbenzene	8260B	75000		ug/kg	20
002	CMR-EB01-4.0-5.0-190607	Solid	Isopropylbenzene	8260B	10000	J	ug/kg	20
002	CMR-EB01-4.0-5.0-190607	Solid	Methylcyclohexane	8260B	180000		ug/kg	20

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-EB01-4.0-5.0-190607	Solid	Naphthalene	8260B	44000		ug/kg	20
002	CMR-EB01-4.0-5.0-190607	Solid	Toluene	8260B	16000		ug/kg	20
002	CMR-EB01-4.0-5.0-190607	Solid	Xylenes (total)	8260B	390000		ug/kg	21
002	CMR-EB01-4.0-5.0-190607	Solid	m+p - Xylenes	8260B	320000		ug/kg	21
002	CMR-EB01-4.0-5.0-190607	Solid	o - Xylenes	8260B	69000		ug/kg	21
002	CMR-EB01-4.0-5.0-190607	Solid	Acenaphthene	8270D	230	J	ug/kg	22
002	CMR-EB01-4.0-5.0-190607	Solid	Anthracene	8270D	180	J	ug/kg	22
002	CMR-EB01-4.0-5.0-190607	Solid	2-Methylnaphthalene	8270D	38000		ug/kg	23
002	CMR-EB01-4.0-5.0-190607	Solid	Naphthalene	8270D	21000		ug/kg	23
002	CMR-EB01-4.0-5.0-190607	Solid	Phenanthrene	8270D	650		ug/kg	23
002	CMR-EB01-4.0-5.0-190607	Solid	Pyrene	8270D	98	J	ug/kg	23
002	CMR-EB01-4.0-5.0-190607	Solid	C19 - C36 Aliphatics	Montana EPH	20		mg/kg	24
002	CMR-EB01-4.0-5.0-190607	Solid	C9 - C18 Aliphatics	Montana EPH	490		mg/kg	24
002	CMR-EB01-4.0-5.0-190607	Solid	C11 - C22 Aromatics	Montana EPH	180		mg/kg	25
002	CMR-EB01-4.0-5.0-190607	Solid	C5 - C8 Aliphatics,	Montana VPH	2400		mg/kg	26
002	CMR-EB01-4.0-5.0-190607	Solid	C9 - C12 Aliphatics,	Montana VPH	1500		mg/kg	26
002	CMR-EB01-4.0-5.0-190607	Solid	Benzene	Montana VPH	7.2	J	mg/kg	27
002	CMR-EB01-4.0-5.0-190607	Solid	C9 - C10 Aromatics	Montana VPH	1100		mg/kg	27
002	CMR-EB01-4.0-5.0-190607	Solid	Ethylbenzene	Montana VPH	62		mg/kg	27
002	CMR-EB01-4.0-5.0-190607	Solid	Naphthalene	Montana VPH	48		mg/kg	27
002	CMR-EB01-4.0-5.0-190607	Solid	Toluene	Montana VPH	17		mg/kg	27
002	CMR-EB01-4.0-5.0-190607	Solid	m+p - Xylenes	Montana VPH	190		mg/kg	27
002	CMR-EB01-4.0-5.0-190607	Solid	o - Xylenes	Montana VPH	58		mg/kg	27
002	CMR-EB01-4.0-5.0-190607	Solid	TPH	Montana VPH	4800		mg/kg	28
002	CMR-EB01-4.0-5.0-190607	Solid	Arsenic	6020B	5.5		mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Barium	6020B	300		mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Beryllium	6020B	1.1		mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Cadmium	6020B	0.18		mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Chromium	6020B	24		mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Cobalt	6020B	6.9		mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Copper	6020B	15		mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Lead	6020B	15		mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Nickel	6020B	18		mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Silver	6020B	0.080	J	mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Vanadium	6020B	49		mg/kg	29
002	CMR-EB01-4.0-5.0-190607	Solid	Zinc	6020B	53		mg/kg	29
003	CMR-EB01-14.0-15.0-190607	Solid	Benzene	8260B	450		ug/kg	30
003	CMR-EB01-14.0-15.0-190607	Solid	Cyclohexane	8260B	1500		ug/kg	30
003	CMR-EB01-14.0-15.0-190607	Solid	Ethylbenzene	8260B	810		ug/kg	30
003	CMR-EB01-14.0-15.0-190607	Solid	Isopropylbenzene	8260B	260		ug/kg	30
003	CMR-EB01-14.0-15.0-190607	Solid	Methylcyclohexane	8260B	4700		ug/kg	30
003	CMR-EB01-14.0-15.0-190607	Solid	Naphthalene	8260B	480		ug/kg	30
003	CMR-EB01-14.0-15.0-190607	Solid	Toluene	8260B	120	J	ug/kg	30
003	CMR-EB01-14.0-15.0-190607	Solid	Xylenes (total)	8260B	1800		ug/kg	31
003	CMR-EB01-14.0-15.0-190607	Solid	m+p - Xylenes	8260B	1600		ug/kg	31
003	CMR-EB01-14.0-15.0-190607	Solid	o - Xylenes	8260B	150	J	ug/kg	31
003	CMR-EB01-14.0-15.0-190607	Solid	2,4-Dimethylphenol	8270D	36	J	ug/kg	32
003	CMR-EB01-14.0-15.0-190607	Solid	2-Methylnaphthalene	8270D	56		ug/kg	33

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-EB01-14.0-15.0-190607	Solid	Naphthalene	8270D	42		ug/kg	33
003	CMR-EB01-14.0-15.0-190607	Solid	C5 - C8 Aliphatics,	Montana VPH	3.2	J	mg/kg	36
003	CMR-EB01-14.0-15.0-190607	Solid	C9 - C12 Aliphatics,	Montana VPH	0.92	J	mg/kg	36
003	CMR-EB01-14.0-15.0-190607	Solid	C9 - C10 Aromatics	Montana VPH	1.7		mg/kg	37
003	CMR-EB01-14.0-15.0-190607	Solid	Ethylbenzene	Montana VPH	0.055	J	mg/kg	37
003	CMR-EB01-14.0-15.0-190607	Solid	m+p - Xylenes	Montana VPH	0.080	J	mg/kg	37
003	CMR-EB01-14.0-15.0-190607	Solid	TPH	Montana VPH	7.1	J	mg/kg	38
003	CMR-EB01-14.0-15.0-190607	Solid	Antimony	6020B	0.23	J	mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Arsenic	6020B	2.8		mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Barium	6020B	1200		mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Beryllium	6020B	0.49		mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Cadmium	6020B	0.51		mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Chromium	6020B	29		mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Cobalt	6020B	11		mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Copper	6020B	25		mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Lead	6020B	5.7		mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Nickel	6020B	24		mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Silver	6020B	0.067	J	mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Vanadium	6020B	82		mg/kg	39
003	CMR-EB01-14.0-15.0-190607	Solid	Zinc	6020B	110		mg/kg	39
004	CMR-EB10-190606	Aqueous	Benzene	8260B	3500		ug/L	40
004	CMR-EB10-190606	Aqueous	Cyclohexane	8260B	490		ug/L	40
004	CMR-EB10-190606	Aqueous	1,2-Dichloroethane	8260B	140		ug/L	40
004	CMR-EB10-190606	Aqueous	Ethylbenzene	8260B	740		ug/L	40
004	CMR-EB10-190606	Aqueous	Isopropylbenzene	8260B	58		ug/L	40
004	CMR-EB10-190606	Aqueous	Methylcyclohexane	8260B	240	J	ug/L	40
004	CMR-EB10-190606	Aqueous	Naphthalene	8260B	110		ug/L	40
004	CMR-EB10-190606	Aqueous	Toluene	8260B	93		ug/L	40
004	CMR-EB10-190606	Aqueous	Xylenes (total)	8260B	990		ug/L	41
004	CMR-EB10-190606	Aqueous	m+p - Xylenes	8260B	910		ug/L	41
004	CMR-EB10-190606	Aqueous	o - Xylenes	8260B	83		ug/L	41
004	CMR-EB10-190606	Aqueous	2,4-Dimethylphenol	8270D	570		ug/L	42
004	CMR-EB10-190606	Aqueous	2-Methylnaphthalene	8270D	11	J	ug/L	43
004	CMR-EB10-190606	Aqueous	2-Methylphenol	8270D	86		ug/L	43
004	CMR-EB10-190606	Aqueous	Naphthalene	8270D	77		ug/L	43
004	CMR-EB10-190606	Aqueous	C11 - C22 Aromatics	Montana EPH	340		ug/L	45
004	CMR-EB10-190606	Aqueous	C5 - C8 Aliphatics,	Montana VPH	5600		ug/L	46
004	CMR-EB10-190606	Aqueous	C9 - C12 Aliphatics,	Montana VPH	1200	J	ug/L	46
004	CMR-EB10-190606	Aqueous	Benzene	Montana VPH	3300		ug/L	47
004	CMR-EB10-190606	Aqueous	C9 - C10 Aromatics	Montana VPH	2000		ug/L	47
004	CMR-EB10-190606	Aqueous	Ethylbenzene	Montana VPH	770		ug/L	47
004	CMR-EB10-190606	Aqueous	Naphthalene	Montana VPH	110		ug/L	47
004	CMR-EB10-190606	Aqueous	Toluene	Montana VPH	120		ug/L	47
004	CMR-EB10-190606	Aqueous	m+p - Xylenes	Montana VPH	890		ug/L	47
004	CMR-EB10-190606	Aqueous	o - Xylenes	Montana VPH	96	J	ug/L	47
004	CMR-EB10-190606	Aqueous	TPH	Montana VPH	12000		ug/L	48
004	CMR-EB10-190606	Aqueous	Antimony	6020B	1.0	J	ug/L	49
004	CMR-EB10-190606	Aqueous	Arsenic	6020B	25		ug/L	49

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
004	CMR-EB10-190606	Aqueous	Barium	6020B	120		ug/L	49
004	CMR-EB10-190606	Aqueous	Chromium	6020B	3.2	J	ug/L	49
004	CMR-EB10-190606	Aqueous	Cobalt	6020B	2.5	J	ug/L	49
004	CMR-EB10-190606	Aqueous	Copper	6020B	3.6	J	ug/L	49
004	CMR-EB10-190606	Aqueous	Lead	6020B	0.46	J	ug/L	49
004	CMR-EB10-190606	Aqueous	Nickel	6020B	24		ug/L	49
004	CMR-EB10-190606	Aqueous	Selenium	6020B	5.2		ug/L	49
004	CMR-EB10-190606	Aqueous	Vanadium	6020B	5.9		ug/L	49
004	CMR-EB10-190606	Aqueous	Zinc	6020B	15	B	ug/L	49
005	CMR-EB09-190607	Aqueous	Acetone	8260B	4.4	J	ug/L	50
005	CMR-EB09-190607	Aqueous	Benzene	8260B	6.7		ug/L	50
005	CMR-EB09-190607	Aqueous	Cyclohexane	8260B	5.9		ug/L	50
005	CMR-EB09-190607	Aqueous	1,2-Dichloroethane	8260B	1.6		ug/L	50
005	CMR-EB09-190607	Aqueous	Ethylbenzene	8260B	8.8		ug/L	50
005	CMR-EB09-190607	Aqueous	Isopropylbenzene	8260B	1.7		ug/L	50
005	CMR-EB09-190607	Aqueous	Methylcyclohexane	8260B	6.3		ug/L	50
005	CMR-EB09-190607	Aqueous	Naphthalene	8260B	3.6		ug/L	50
005	CMR-EB09-190607	Aqueous	Toluene	8260B	0.89		ug/L	50
005	CMR-EB09-190607	Aqueous	Xylenes (total)	8260B	11		ug/L	51
005	CMR-EB09-190607	Aqueous	m+p - Xylenes	8260B	9.2		ug/L	51
005	CMR-EB09-190607	Aqueous	o - Xylenes	8260B	1.6		ug/L	51
005	CMR-EB09-190607	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.91	BJ	ug/L	52
005	CMR-EB09-190607	Aqueous	Fluorene	8270D	0.056	J	ug/L	52
005	CMR-EB09-190607	Aqueous	2-Methylnaphthalene	8270D	1.4		ug/L	53
005	CMR-EB09-190607	Aqueous	Naphthalene	8270D	2.1		ug/L	53
005	CMR-EB09-190607	Aqueous	Phenanthrene	8270D	0.054	J	ug/L	53
005	CMR-EB09-190607	Aqueous	C5 - C8 Aliphatics,	Montana VPH	63	J	ug/L	56
005	CMR-EB09-190607	Aqueous	C9 - C12 Aliphatics,	Montana VPH	63	J	ug/L	56
005	CMR-EB09-190607	Aqueous	Benzene	Montana VPH	6.1		ug/L	57
005	CMR-EB09-190607	Aqueous	C9 - C10 Aromatics	Montana VPH	120		ug/L	57
005	CMR-EB09-190607	Aqueous	Ethylbenzene	Montana VPH	9.5		ug/L	57
005	CMR-EB09-190607	Aqueous	Naphthalene	Montana VPH	4.4	J	ug/L	57
005	CMR-EB09-190607	Aqueous	Toluene	Montana VPH	0.73	J	ug/L	57
005	CMR-EB09-190607	Aqueous	m+p - Xylenes	Montana VPH	9.7		ug/L	57
005	CMR-EB09-190607	Aqueous	o - Xylenes	Montana VPH	2.2	J	ug/L	57
005	CMR-EB09-190607	Aqueous	TPH	Montana VPH	270		ug/L	58
005	CMR-EB09-190607	Aqueous	Arsenic	6020B	4.4		ug/L	59
005	CMR-EB09-190607	Aqueous	Barium	6020B	120		ug/L	59
005	CMR-EB09-190607	Aqueous	Beryllium	6020B	0.20	J	ug/L	59
005	CMR-EB09-190607	Aqueous	Chromium	6020B	4.6	J	ug/L	59
005	CMR-EB09-190607	Aqueous	Cobalt	6020B	3.1	J	ug/L	59
005	CMR-EB09-190607	Aqueous	Copper	6020B	6.2		ug/L	59
005	CMR-EB09-190607	Aqueous	Lead	6020B	1.3		ug/L	59
005	CMR-EB09-190607	Aqueous	Nickel	6020B	9.9		ug/L	59
005	CMR-EB09-190607	Aqueous	Selenium	6020B	2.5	J	ug/L	59
005	CMR-EB09-190607	Aqueous	Vanadium	6020B	9.3		ug/L	59
005	CMR-EB09-190607	Aqueous	Zinc	6020B	27	B	ug/L	59

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page

(188 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-001
Description: CMR-EB01-0.5-1.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1350
% Solids: 89.8 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/11/2019 1952	JM1		19225	5.53

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1100	220	ug/kg	1
Benzene	71-43-2	8260B	ND		280	110	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		280	110	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		280	110	ug/kg	1
Bromoform	75-25-2	8260B	ND		280	110	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		280	110	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1100	220	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		280	110	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		280	110	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		280	110	ug/kg	1
Chloroethane	75-00-3	8260B	ND		280	110	ug/kg	1
Chloroform	67-66-3	8260B	ND		280	110	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		280	110	ug/kg	1
Cyclohexane	110-82-7	8260B	220	J	280	110	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		280	110	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		280	110	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		280	110	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		280	110	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		280	110	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		280	110	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		280	110	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		280	110	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		280	110	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		280	110	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		280	110	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		280	110	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		280	110	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		280	110	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		280	110	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		14000	1400	ug/kg	1
Ethylbenzene	100-41-4	8260B	210	J	280	110	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		560	220	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		280	110	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		280	110	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		280	110	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		560	220	ug/kg	1
Methylcyclohexane	108-87-2	8260B	780		280	110	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		280	110	ug/kg	1
Naphthalene	91-20-3	8260B	250	J	280	110	ug/kg	1
Styrene	100-42-5	8260B	ND		280	110	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		280	110	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		280	110	ug/kg	1
Toluene	108-88-3	8260B	280		280	110	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		280	110	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-001
Description: CMR-EB01-0.5-1.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1350
% Solids: 89.8 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/11/2019 1952	JM1		19225	5.53

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		280	110	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		280	110	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		280	110	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		280	110	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		280	110	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		280	110	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		280	110	ug/kg	1
Xylenes (total)	1330-20-7	8260B	2100		560	220	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	1400		280	110	ug/kg	1
o - Xylenes	95-47-6	8260B	660		280	110	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		103	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-001
Description: CMR-EB01-0.5-1.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1350
% Solids: 89.8 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/14/2019 1920	SCD	06/12/2019 1123	19304

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		290	91	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		290	100	ug/kg	1
Anthracene	120-12-7	8270D	ND		290	56	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		290	64	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		290	72	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	110	J	290	55	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		290	71	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		290	52	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		1400	550	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		1400	550	ug/kg	1
Carbazole	86-74-8	8270D	ND		1400	550	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		1400	550	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		1400	550	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		1400	550	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		1400	550	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		1400	550	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		1400	550	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		1400	550	ug/kg	1
Chrysene	218-01-9	8270D	ND		290	49	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		290	56	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		1400	550	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		7300	2700	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		7300	2700	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		7300	2700	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		1400	550	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1400	550	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		1400	550	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		1400	810	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		1400	550	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		1400	550	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		7300	2700	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		7300	2700	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		2900	1100	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		2900	1100	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		1400	550	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		7300	2700	ug/kg	1
Fluoranthene	206-44-0	8270D	79	J	290	46	ug/kg	1
Fluorene	86-73-7	8270D	ND		290	62	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		1400	550	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		1400	550	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		7300	2700	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		1400	550	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		290	110	ug/kg	1
Isophorone	78-59-1	8270D	ND		1400	550	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-001
Description: CMR-EB01-0.5-1.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1350
% Solids: 89.8 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/14/2019 1920	SCD	06/12/2019 1123	19304

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	430		290	110	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		1400	550	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		2900	1100	ug/kg	1
Naphthalene	91-20-3	8270D	190	J	290	110	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		2900	1100	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		2900	1100	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		2900	1100	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		1400	550	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		2900	1100	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		7300	2700	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		1400	550	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		1400	550	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		7300	2700	ug/kg	1
Phenanthrene	85-01-8	8270D	91	J	290	79	ug/kg	1
Phenol	108-95-2	8270D	ND		1400	550	ug/kg	1
Pyrene	129-00-0	8270D	110	J	290	55	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		3600	1100	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		7300	1100	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		7300	2700	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		1400	550	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		1400	550	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		71	33-102
2-Fluorophenol		46	35-115
Nitrobenzene-d5		55	22-109
Phenol-d5		48	33-122
Terphenyl-d14		85	41-120
2,4,6-Tribromophenol		30	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-001
Description: CMR-EB01-0.5-1.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1350
% Solids: 89.8 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0307	CHG	06/12/2019 1939	19365

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	24		10	10	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	67		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		94	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-001
Description: CMR-EB01-0.5-1.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1350
% Solids: 89.8 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0727	CHG	06/12/2019 1939	19366

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		84	40-140
2-Fluorobiphenyl (fractionation 1)		86	40-140
o - Terphenyl (aromatic)		87	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-001
Description: CMR-EB01-0.5-1.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1350
% Solids: 89.8 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/14/2019 1532	JJG		19751

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	45		3.8	0.77	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	74		3.8	0.77	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	155	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-001
Description: CMR-EB01-0.5-1.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1350
% Solids: 89.8 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/14/2019 1532	JJG		19750

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.070	J	0.26	0.035	mg/kg	1
C9 - C10 Aromatics		Montana VPH	45		1.3	0.51	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	1.1		0.26	0.032	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.26	0.055	mg/kg	1
Naphthalene	91-20-3	Montana VPH	2.5		0.26	0.13	mg/kg	1
Toluene	108-88-3	Montana VPH	0.47		0.26	0.041	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	1.9		0.26	0.057	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	1.8		0.26	0.029	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	227	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF08028-001
Description: CMR-EB01-0.5-1.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1350
% Solids: 89.8 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/14/2019 1532	JJG		19748

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	180		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	144	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-001
Description: CMR-EB01-0.5-1.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1350
% Solids: 89.8 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/13/2019 2313	BNW	06/11/2019 1033	19113
1	7471B	7471B	1	06/12/2019 1850	JMH	06/12/2019 1428	19109
2	3050B	6020B	10	06/14/2019 1554	BNW	06/11/2019 1033	19113

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.5		0.43	0.17	mg/kg	1
Arsenic	7440-38-2	6020B	90		0.43	0.17	mg/kg	1
Barium	7440-39-3	6020B	270		1.1	0.26	mg/kg	1
Beryllium	7440-41-7	6020B	0.57		0.085	0.029	mg/kg	1
Cadmium	7440-43-9	6020B	3.2		0.11	0.021	mg/kg	1
Chromium	7440-47-3	6020B	9.8		1.1	0.47	mg/kg	1
Cobalt	7440-48-4	6020B	6.7		1.1	0.26	mg/kg	1
Copper	7440-50-8	6020B	1000		11	2.8	mg/kg	2
Lead	7439-92-1	6020B	74		0.21	0.058	mg/kg	1
Mercury	7439-97-6	7471B	0.21		0.087	0.021	mg/kg	1
Nickel	7440-02-0	6020B	11		1.1	0.26	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.1	0.40	mg/kg	1
Silver	7440-22-4	6020B	1.3		0.21	0.051	mg/kg	1
Vanadium	7440-62-2	6020B	27		1.1	0.21	mg/kg	1
Zinc	7440-66-6	6020B	480		21	4.3	mg/kg	2

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-002
Description: CMR-EB01-4.0-5.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1405
% Solids: 81.5 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	40	06/11/2019 1930	JM1		19225	4.77

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		60000	12000	ug/kg	1
Benzene	71-43-2	8260B	11000	J	15000	6000	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		15000	6000	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		15000	6000	ug/kg	1
Bromoform	75-25-2	8260B	ND		15000	6000	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		15000	6000	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		60000	12000	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		15000	6000	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		15000	6000	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		15000	6000	ug/kg	1
Chloroethane	75-00-3	8260B	ND		15000	6000	ug/kg	1
Chloroform	67-66-3	8260B	ND		15000	6000	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		15000	6000	ug/kg	1
Cyclohexane	110-82-7	8260B	75000		15000	6000	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		15000	6000	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		15000	6000	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		15000	6000	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		15000	6000	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		15000	6000	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		15000	6000	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		15000	6000	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		15000	6000	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		15000	6000	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		15000	6000	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		15000	6000	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		15000	6000	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		15000	6000	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		15000	6000	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		15000	6000	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		760000	76000	ug/kg	1
Ethylbenzene	100-41-4	8260B	75000		15000	6000	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		30000	12000	ug/kg	1
Isopropylbenzene	98-82-8	8260B	10000	J	15000	6000	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		15000	6000	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		15000	6000	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		30000	12000	ug/kg	1
Methylcyclohexane	108-87-2	8260B	180000		15000	6000	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		15000	6000	ug/kg	1
Naphthalene	91-20-3	8260B	44000		15000	6000	ug/kg	1
Styrene	100-42-5	8260B	ND		15000	6000	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		15000	6000	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		15000	6000	ug/kg	1
Toluene	108-88-3	8260B	16000		15000	6000	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		15000	6000	ug/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-002
Description: CMR-EB01-4.0-5.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1405
% Solids: 81.5 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	40	06/11/2019 1930	JM1		19225	4.77

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		15000	6000	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		15000	6000	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		15000	6000	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		15000	6000	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		15000	6000	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		15000	6000	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		15000	6000	ug/kg	1
Xylenes (total)	1330-20-7	8260B	390000		30000	12000	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	320000		15000	6000	ug/kg	1
o - Xylenes	95-47-6	8260B	69000		15000	6000	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		134	53-142
Bromofluorobenzene	N	179	47-138
Toluene-d8	N	167	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-002
Description: CMR-EB01-4.0-5.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1405
% Solids: 81.5 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/14/2019 1945	SCD	06/12/2019 1123	19304

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	230	J	320	99	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		320	110	ug/kg	1
Anthracene	120-12-7	8270D	180	J	320	61	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		320	70	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		320	78	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		320	59	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		320	77	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		320	57	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		1500	590	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		1500	590	ug/kg	1
Carbazole	86-74-8	8270D	ND		1500	590	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		1500	590	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		1500	590	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		1500	590	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		1500	590	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		1500	590	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		1500	590	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		1500	590	ug/kg	1
Chrysene	218-01-9	8270D	ND		320	53	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		320	61	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		1500	590	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		8000	3000	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		8000	3000	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		8000	3000	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		1500	590	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1500	590	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		1500	590	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		1500	880	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		1500	590	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		1500	590	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		8000	3000	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		8000	3000	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		3200	1200	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		3200	1200	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		1500	590	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		8000	3000	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		320	50	ug/kg	1
Fluorene	86-73-7	8270D	ND		320	68	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		1500	590	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		1500	590	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		8000	3000	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		1500	590	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		320	120	ug/kg	1
Isophorone	78-59-1	8270D	ND		1500	590	ug/kg	1

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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-002
Description: CMR-EB01-4.0-5.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1405
% Solids: 81.5 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/14/2019 1945	SCD	06/12/2019 1123	19304

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	38000		320	120	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		1500	590	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		3200	1200	ug/kg	1
Naphthalene	91-20-3	8270D	21000		320	120	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		3200	1200	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		3200	1200	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		3200	1200	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		1500	590	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		3200	1200	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		8000	3000	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		1500	590	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		1500	590	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		8000	3000	ug/kg	1
Phenanthrene	85-01-8	8270D	650		320	85	ug/kg	1
Phenol	108-95-2	8270D	ND		1500	590	ug/kg	1
Pyrene	129-00-0	8270D	98	J	320	59	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		3900	1200	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		8000	1200	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		8000	3000	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		1500	590	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		1500	590	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		99	33-102
2-Fluorophenol	N	137	35-115
Nitrobenzene-d5	N	275	22-109
Phenol-d5	N	174	33-122
Terphenyl-d14		93	41-120
2,4,6-Tribromophenol		56	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-002
Description: CMR-EB01-4.0-5.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1405
% Solids: 81.5 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0336	CHG	06/12/2019 1939	19365

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	20		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	490		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		86	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
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ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-002
Description: CMR-EB01-4.0-5.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1405
% Solids: 81.5 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0756	CHG	06/12/2019 1939	19366

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	180		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		94	40-140
2-Fluorobiphenyl (fractionation 1)		111	40-140
o - Terphenyl (aromatic)		88	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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ND = Not detected at or above the DL
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-002
Description: CMR-EB01-4.0-5.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1405
% Solids: 81.5 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	40	06/14/2019 1601	JJG		19751

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	2400		190	39	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	1500		190	39	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	205	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-002
Description: CMR-EB01-4.0-5.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1405
% Solids: 81.5 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	40	06/14/2019 1601	JJG		19750

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	7.2	J	13	1.8	mg/kg	1
C9 - C10 Aromatics		Montana VPH	1100		65	26	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	62		13	1.6	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		13	2.8	mg/kg	1
Naphthalene	91-20-3	Montana VPH	48		13	6.7	mg/kg	1
Toluene	108-88-3	Montana VPH	17		13	2.1	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	190		13	2.9	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	58		13	1.4	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	246	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF08028-002
Description: CMR-EB01-4.0-5.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1405
% Solids: 81.5 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	40	06/14/2019 1601	JJG		19748

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	4800		360	70	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB01-4.0-5.0-190607
Date Sampled: 06/07/2019 1405
Date Received: 06/08/2019

Laboratory ID: UF08028-002
Matrix: Solid
% Solids: 81.5 06/09/2019 1712

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/13/2019 2353	BNW	06/11/2019 1033	19113
1	7471B	7471B	1	06/12/2019 1857	JMH	06/12/2019 1428	19109

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.48	0.19	mg/kg	1
Arsenic	7440-38-2	6020B	5.5		0.48	0.19	mg/kg	1
Barium	7440-39-3	6020B	300		1.2	0.30	mg/kg	1
Beryllium	7440-41-7	6020B	1.1		0.096	0.033	mg/kg	1
Cadmium	7440-43-9	6020B	0.18		0.12	0.024	mg/kg	1
Chromium	7440-47-3	6020B	24		1.2	0.53	mg/kg	1
Cobalt	7440-48-4	6020B	6.9		1.2	0.29	mg/kg	1
Copper	7440-50-8	6020B	15		1.2	0.31	mg/kg	1
Lead	7439-92-1	6020B	15		0.24	0.065	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.089	0.021	mg/kg	1
Nickel	7440-02-0	6020B	18		1.2	0.29	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.2	0.45	mg/kg	1
Silver	7440-22-4	6020B	0.080	J	0.24	0.057	mg/kg	1
Vanadium	7440-62-2	6020B	49		1.2	0.24	mg/kg	1
Zinc	7440-66-6	6020B	53		2.4	0.48	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-003
Description: CMR-EB01-14.0-15.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1535
% Solids: 86.2 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/11/2019 1908	JM1		19225	7.10

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		980	200	ug/kg	1
Benzene	71-43-2	8260B	450		240	98	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		240	98	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		240	98	ug/kg	1
Bromoform	75-25-2	8260B	ND		240	98	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		240	98	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		980	200	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		240	98	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		240	98	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		240	98	ug/kg	1
Chloroethane	75-00-3	8260B	ND		240	98	ug/kg	1
Chloroform	67-66-3	8260B	ND		240	98	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		240	98	ug/kg	1
Cyclohexane	110-82-7	8260B	1500		240	98	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		240	98	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		240	98	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		240	98	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		240	98	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		240	98	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		240	98	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		240	98	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		240	98	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		240	98	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		240	98	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		240	98	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		240	98	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		240	98	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		240	98	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		240	98	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		12000	1200	ug/kg	1
Ethylbenzene	100-41-4	8260B	810		240	98	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		490	200	ug/kg	1
Isopropylbenzene	98-82-8	8260B	260		240	98	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		240	98	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		240	98	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		490	200	ug/kg	1
Methylcyclohexane	108-87-2	8260B	4700		240	98	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		240	98	ug/kg	1
Naphthalene	91-20-3	8260B	480		240	98	ug/kg	1
Styrene	100-42-5	8260B	ND		240	98	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		240	98	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		240	98	ug/kg	1
Toluene	108-88-3	8260B	120	J	240	98	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		240	98	ug/kg	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-003
Description: CMR-EB01-14.0-15.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1535
% Solids: 86.2 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/11/2019 1908	JM1		19225	7.10

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		240	98	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		240	98	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		240	98	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		240	98	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		240	98	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		240	98	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		240	98	ug/kg	1
Xylenes (total)	1330-20-7	8260B	1800		490	200	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	1600		240	98	ug/kg	1
o - Xylenes	95-47-6	8260B	150	J	240	98	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		110	53-142
Bromofluorobenzene		127	47-138
Toluene-d8		124	68-124

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-003
Description: CMR-EB01-14.0-15.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1535
% Solids: 86.2 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/14/2019 2010	SCD	06/12/2019 1123	19304

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		15	4.6	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		15	5.3	ug/kg	1
Anthracene	120-12-7	8270D	ND		15	2.8	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		15	3.3	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		15	3.7	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		15	2.8	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		15	3.6	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		15	2.7	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		73	28	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		73	28	ug/kg	1
Carbazole	86-74-8	8270D	ND		73	28	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		73	28	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		73	28	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		73	28	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		73	28	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		73	28	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		73	28	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		73	28	ug/kg	1
Chrysene	218-01-9	8270D	ND		15	2.5	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		15	2.8	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		73	28	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		370	140	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		370	140	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		370	140	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		73	28	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		73	28	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		73	28	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		73	41	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	36	J	73	28	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		73	28	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		370	140	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		370	140	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		150	56	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		150	56	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		73	28	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		370	140	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		15	2.3	ug/kg	1
Fluorene	86-73-7	8270D	ND		15	3.2	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		73	28	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		73	28	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		370	140	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		73	28	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		15	5.6	ug/kg	1
Isophorone	78-59-1	8270D	ND		73	28	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-003
Description: CMR-EB01-14.0-15.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1535
% Solids: 86.2 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/14/2019 2010	SCD	06/12/2019 1123	19304

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	56		15	5.5	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		73	28	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		150	56	ug/kg	1
Naphthalene	91-20-3	8270D	42		15	5.4	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		150	56	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		150	56	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		150	56	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		73	28	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		150	56	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		370	140	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		73	28	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		73	28	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		370	140	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		15	4.0	ug/kg	1
Phenol	108-95-2	8270D	ND		73	28	ug/kg	1
Pyrene	129-00-0	8270D	ND		15	2.8	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		180	56	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		370	56	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		370	140	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		73	28	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		73	28	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		69	33-102
2-Fluorophenol		72	35-115
Nitrobenzene-d5		76	22-109
Phenol-d5		80	33-122
Terphenyl-d14		93	41-120
2,4,6-Tribromophenol		75	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-003
Description: CMR-EB01-14.0-15.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1535
% Solids: 86.2 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0405	CHG	06/12/2019 1939	19365

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		89	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-003
Description: CMR-EB01-14.0-15.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1535
% Solids: 86.2
Date Received: 06/08/2019
06/09/2019 1712

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/15/2019 0825	CHG	06/12/2019 1939	19366

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		105	40-140
2-Fluorobiphenyl (fractionation 1)		102	40-140
o - Terphenyl (aromatic)		89	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-003
Description: CMR-EB01-14.0-15.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1535
% Solids: 86.2 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/14/2019 1629	JJG		19751

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	3.2	J	4.4	0.87	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	0.92	J	4.4	0.87	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		103	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-003
Description: CMR-EB01-14.0-15.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1535
% Solids: 86.2 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/14/2019 1629	JJG		19750

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.29	0.040	mg/kg	1
C9 - C10 Aromatics		Montana VPH	1.7		1.5	0.58	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	0.055	J	0.29	0.036	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.29	0.063	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.29	0.15	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.29	0.047	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	0.080	J	0.29	0.065	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.29	0.033	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		108	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF08028-003
Description: CMR-EB01-14.0-15.0-190607
Matrix: Solid
Date Sampled: 06/07/2019 1535
% Solids: 86.2 06/09/2019 1712
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/14/2019 1629	JJG		19748

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	7.1	J	8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		104	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB01-14.0-15.0-190607
Date Sampled: 06/07/2019 1535
Date Received: 06/08/2019

Laboratory ID: UF08028-003
Matrix: Solid
% Solids: 86.2 06/09/2019 1712

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/13/2019 2359	BNW	06/11/2019 1033	19113
1	7471B	7471B	1	06/12/2019 1900	JMH	06/12/2019 1428	19109

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.23	J	0.44	0.17	mg/kg	1
Arsenic	7440-38-2	6020B	2.8		0.44	0.17	mg/kg	1
Barium	7440-39-3	6020B	1200		1.1	0.27	mg/kg	1
Beryllium	7440-41-7	6020B	0.49		0.087	0.030	mg/kg	1
Cadmium	7440-43-9	6020B	0.51		0.11	0.022	mg/kg	1
Chromium	7440-47-3	6020B	29		1.1	0.48	mg/kg	1
Cobalt	7440-48-4	6020B	11		1.1	0.26	mg/kg	1
Copper	7440-50-8	6020B	25		1.1	0.28	mg/kg	1
Lead	7439-92-1	6020B	5.7		0.22	0.059	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.093	0.022	mg/kg	1
Nickel	7440-02-0	6020B	24		1.1	0.26	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.1	0.41	mg/kg	1
Silver	7440-22-4	6020B	0.067	J	0.22	0.052	mg/kg	1
Vanadium	7440-62-2	6020B	82		1.1	0.22	mg/kg	1
Zinc	7440-66-6	6020B	110		2.2	0.44	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-004
Description: CMR-EB10-190606
Matrix: Aqueous
Date Sampled: 06/06/2019 1710
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	50	06/18/2019 1658	JM1		19880

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		500	100	ug/L	1
Benzene	71-43-2	8260B	3500		25	20	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		25	20	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		25	20	ug/L	1
Bromoform	75-25-2	8260B	ND		25	20	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		25	20	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		500	100	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		25	20	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		25	20	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		25	20	ug/L	1
Chloroethane	75-00-3	8260B	ND		25	20	ug/L	1
Chloroform	67-66-3	8260B	ND		25	20	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		25	20	ug/L	1
Cyclohexane	110-82-7	8260B	490		25	20	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		25	20	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		25	20	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		25	20	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		25	20	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		25	20	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		25	20	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		25	20	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		25	20	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	140		25	20	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		25	20	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		25	20	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		25	20	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		25	20	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		25	20	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		25	5.5	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		1000	670	ug/L	1
Ethylbenzene	100-41-4	8260B	740		25	20	ug/L	1
2-Hexanone	591-78-6	8260B	ND		500	100	ug/L	1
Isopropylbenzene	98-82-8	8260B	58		25	20	ug/L	1
Methyl acetate	79-20-9	8260B	ND		50	20	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		25	20	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		500	100	ug/L	1
Methylcyclohexane	108-87-2	8260B	240	J	250	20	ug/L	1
Methylene chloride	75-09-2	8260B	ND		25	20	ug/L	1
Naphthalene	91-20-3	8260B	110		25	20	ug/L	1
Styrene	100-42-5	8260B	ND		25	21	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		25	20	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		25	20	ug/L	1
Toluene	108-88-3	8260B	93		25	20	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		50	21	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-004
Description: CMR-EB10-190606
Matrix: Aqueous
Date Sampled: 06/06/2019 1710
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	50	06/18/2019 1658	JM1		19880

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		25	20	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		25	20	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		25	20	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		25	20	ug/L	1
Trichloroethene	79-01-6	8260B	ND		25	20	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		25	20	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		25	20	ug/L	1
Xylenes (total)	1330-20-7	8260B	990		50	20	ug/L	1
m+p - Xylenes	179601-23-1	8260B	910		25	20	ug/L	1
o - Xylenes	95-47-6	8260B	83		25	20	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		88	70-130
Bromofluorobenzene		96	70-130
Toluene-d8		95	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-004
Description: CMR-EB10-190606
Matrix: Aqueous
Date Sampled: 06/06/2019 1710
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	100	06/14/2019 1632	SCD	06/10/2019 1040	19057

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		16	4.0	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		16	4.0	ug/L	1
Anthracene	120-12-7	8270D	ND		16	4.0	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		16	4.0	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		16	4.0	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		16	4.0	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		16	4.0	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		16	4.0	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		80	15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		400	21	ug/L	1
Carbazole	86-74-8	8270D	ND		80	4.0	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		80	17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		80	26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		80	6.0	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		80	16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		80	15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		80	15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		80	16	ug/L	1
Chrysene	218-01-9	8270D	ND		16	4.0	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		16	4.0	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		80	16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		80	17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		80	18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		80	16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		400	81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		80	19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		400	19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		400	18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	570		80	15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		400	42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		400	89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		400	130	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		160	36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		160	34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		400	48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		400	38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		16	4.0	ug/L	1
Fluorene	86-73-7	8270D	ND		16	4.0	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		80	15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		80	17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		400	110	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		80	17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		16	4.0	ug/L	1
Isophorone	78-59-1	8270D	ND		80	22	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-004
Description: CMR-EB10-190606
Matrix: Aqueous
Date Sampled: 06/06/2019 1710
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	100	06/14/2019 1632	SCD	06/10/2019 1040	19057

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	11	J	16	4.0	ug/L	1
2-Methylphenol	95-48-7	8270D	86		80	21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		160	46	ug/L	1
Naphthalene	91-20-3	8270D	77		16	4.0	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		160	66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		160	15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		160	130	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		80	17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		160	44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		400	210	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		80	28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		80	50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		400	130	ug/L	1
Phenanthrene	85-01-8	8270D	ND		16	4.0	ug/L	1
Phenol	108-95-2	8270D	ND		80	19	ug/L	1
Pyrene	129-00-0	8270D	ND		16	4.0	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		80	25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		80	55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		80	37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		80	19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		80	22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		59	37-129
2-Fluorophenol		53	24-127
Nitrobenzene-d5	N	11	38-127
Phenol-d5		40	28-128
Terphenyl-d14		25	10-148
2,4,6-Tribromophenol		67	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-004
Description: CMR-EB10-190606
Matrix: Aqueous
Date Sampled: 06/06/2019 1710
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/15/2019 1021	CHG	06/13/2019 1310	19463

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		43	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-004
Description: CMR-EB10-190606
Matrix: Aqueous
Date Sampled: 06/06/2019 1710
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/15/2019 1246	CHG	06/13/2019 1310	19464

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	340		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		96	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		50	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-004
Description: CMR-EB10-190606
Matrix: Aqueous
Date Sampled: 06/06/2019 1710
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/14/2019 1322	JJG		19784
2	VPH	Montana VPH	20	06/18/2019 1341	JJG		19890

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	5600		1500	300	ug/L	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	1200	J	1500	300	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		96	70-130		96	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-004
Description: CMR-EB10-190606
Matrix: Aqueous
Date Sampled: 06/06/2019 1710
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/14/2019 1322	JJG		19782

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	3300		100	10	ug/L	1
C9 - C10 Aromatics		Montana VPH	2000		500	100	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	770		100	12	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		100	24	ug/L	1
Naphthalene	91-20-3	Montana VPH	110		100	14	ug/L	1
Toluene	108-88-3	Montana VPH	120		100	11	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	890		100	24	ug/L	1
o - Xylenes	95-47-6	Montana VPH	96	J	100	12	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		91	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF08028-004
Description: CMR-EB10-190606
Matrix: Aqueous
Date Sampled: 06/06/2019 1710
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	20	06/14/2019 1322	JJG		19781

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	12000		3500	700	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-004
Description: CMR-EB10-190606
Matrix: Aqueous
Date Sampled: 06/06/2019 1710
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/11/2019 1035	JMH	06/10/2019 1545	19073
1	3005A	6020B	1	06/11/2019 1021	BNW	06/10/2019 1054	19043
2	3005A	6020B	1	06/14/2019 1532	BNW	06/13/2019 1957	19535

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	1.0	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	25		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	120		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	3.2	J	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	2.5	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	3.6	J	5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	0.46	J	1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	24		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	5.2		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	5.9		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	15	B	10	2.5	ug/L	2

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-005
Description: CMR-EB09-190607
Matrix: Aqueous
Date Sampled: 06/07/2019 1620
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/10/2019 1307	BWS		19078

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	4.4	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	6.7		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	5.9		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	1.6		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	8.8		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	1.7		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	6.3		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	3.6		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	0.89		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-005
Description: CMR-EB09-190607
Matrix: Aqueous
Date Sampled: 06/07/2019 1620
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/10/2019 1307	BWS		19078

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	11		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	9.2		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	1.6		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		100	70-130
Bromofluorobenzene		107	70-130
Toluene-d8		105	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-005
Description: CMR-EB09-190607
Matrix: Aqueous
Date Sampled: 06/07/2019 1620
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/14/2019 1519	SCD	06/10/2019 1040	19057

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.91	BJ	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	0.056	J	0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-005
Description: CMR-EB09-190607
Matrix: Aqueous
Date Sampled: 06/07/2019 1620
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/14/2019 1519	SCD	06/10/2019 1040	19057

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	1.4		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	2.1		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	0.054	J	0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		54	37-129
2-Fluorophenol		27	24-127
Nitrobenzene-d5		65	38-127
Phenol-d5		43	28-128
Terphenyl-d14		68	10-148
2,4,6-Tribromophenol		75	35-144

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-005
Description: CMR-EB09-190607
Matrix: Aqueous
Date Sampled: 06/07/2019 1620
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/15/2019 1050	CHG	06/13/2019 1310	19463

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		40	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-005
Description: CMR-EB09-190607
Matrix: Aqueous
Date Sampled: 06/07/2019 1620
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	06/15/2019 1315	CHG	06/13/2019 1310	19464

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		101	40-140
2-Fluorobiphenyl (fractionation 1)		99	40-140
o - Terphenyl (aromatic)		81	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-005
Description: CMR-EB09-190607
Matrix: Aqueous
Date Sampled: 06/07/2019 1620
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/10/2019 1603	JJG		19235

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	63	J	75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	63	J	75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		93	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF08028-005
Description: CMR-EB09-190607
Matrix: Aqueous
Date Sampled: 06/07/2019 1620
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/10/2019 1603	JJG		19234

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	6.1		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	120		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	9.5		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	4.4	J	5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	0.73	J	5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	9.7		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	2.2	J	5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		90	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF08028-005
Description: CMR-EB09-190607
Matrix: Aqueous
Date Sampled: 06/07/2019 1620
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/10/2019 1603	JJG		19236

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	270		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-005
Description: CMR-EB09-190607
Matrix: Aqueous
Date Sampled: 06/07/2019 1620
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/11/2019 1037	JMH	06/10/2019 1545	19073
1	3005A	6020B	1	06/11/2019 1027	BNW	06/10/2019 1054	19043
2	3005A	6020B	1	06/14/2019 1537	BNW	06/13/2019 1957	19535

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	4.4		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	120		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	0.20	J	0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	4.6	J	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	3.1	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	6.2		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	1.3		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	9.9		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	2.5	J	5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	9.3		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	27	B	10	2.5	ug/L	2

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-006
Description: TB-08-20190606
Matrix: Aqueous
Date Sampled: 06/06/2019
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/18/2019 1208	JM1		19880

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF08028-006
Description: TB-08-20190606
Matrix: Aqueous
Date Sampled: 06/06/2019
Date Received: 06/08/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/18/2019 1208	JM1		19880

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		96	70-130
Toluene-d8		95	70-130

LOQ = Limit of Quantitation
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19078-001
Batch: 19078
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/10/2019 1059
Benzene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Bromoform	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/10/2019 1059
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/10/2019 1059
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Chloroethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Chloroform	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Cyclohexane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/10/2019 1059
1,4-Dioxane	ND		1	20	13	ug/L	06/10/2019 1059
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
2-Hexanone	ND		1	10	2.0	ug/L	06/10/2019 1059
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Methyl acetate	ND		1	1.0	0.40	ug/L	06/10/2019 1059
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/10/2019 1059
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/10/2019 1059
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/10/2019 1059
Methylene chloride	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Naphthalene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Styrene	ND		1	0.50	0.41	ug/L	06/10/2019 1059
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Toluene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/10/2019 1059

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19078-001
Batch: 19078
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Trichloroethene	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/10/2019 1059
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/10/2019 1059
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/10/2019 1059
o - Xylenes	ND		1	0.50	0.40	ug/L	06/10/2019 1059

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		100	70-130
Bromofluorobenzene		111	70-130
Toluene-d8		109	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19078-002
Batch: 19078
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	70		1	70	60-140	06/10/2019 1005
Benzene	50	48		1	96	70-130	06/10/2019 1005
Bromochloromethane	50	46		1	93	70-130	06/10/2019 1005
Bromodichloromethane	50	49		1	99	70-130	06/10/2019 1005
Bromoform	50	46		1	91	70-130	06/10/2019 1005
Bromomethane (Methyl bromide)	50	46		1	91	70-130	06/10/2019 1005
2-Butanone (MEK)	100	87		1	87	70-130	06/10/2019 1005
Carbon disulfide	50	50		1	99	70-130	06/10/2019 1005
Carbon tetrachloride	50	49		1	98	70-130	06/10/2019 1005
Chlorobenzene	50	48		1	95	70-130	06/10/2019 1005
Chloroethane	50	50		1	100	70-130	06/10/2019 1005
Chloroform	50	48		1	95	70-130	06/10/2019 1005
Chloromethane (Methyl chloride)	50	42		1	84	60-140	06/10/2019 1005
Cyclohexane	50	48		1	95	70-130	06/10/2019 1005
1,2-Dibromo-3-chloropropane (DBCP)	50	48		1	96	70-130	06/10/2019 1005
Dibromochloromethane	50	53		1	106	70-130	06/10/2019 1005
1,2-Dibromoethane (EDB)	50	52		1	104	70-130	06/10/2019 1005
1,2-Dichlorobenzene	50	47		1	95	70-130	06/10/2019 1005
1,3-Dichlorobenzene	50	46		1	93	70-130	06/10/2019 1005
1,4-Dichlorobenzene	50	46		1	91	70-130	06/10/2019 1005
Dichlorodifluoromethane	50	38		1	76	60-140	06/10/2019 1005
1,1-Dichloroethane	50	48		1	95	70-130	06/10/2019 1005
1,2-Dichloroethane	50	47		1	93	70-130	06/10/2019 1005
1,1-Dichloroethene	50	53		1	106	70-130	06/10/2019 1005
cis-1,2-Dichloroethene	50	49		1	98	70-130	06/10/2019 1005
trans-1,2-Dichloroethene	50	50		1	100	70-130	06/10/2019 1005
1,2-Dichloropropane	50	47		1	95	70-130	06/10/2019 1005
cis-1,3-Dichloropropene	50	53		1	106	70-130	06/10/2019 1005
trans-1,3-Dichloropropene	50	55		1	109	70-130	06/10/2019 1005
1,4-Dioxane	500	420		1	84	60-140	06/10/2019 1005
Ethylbenzene	50	51		1	102	70-130	06/10/2019 1005
2-Hexanone	100	100		1	103	70-130	06/10/2019 1005
Isopropylbenzene	50	55		1	110	70-130	06/10/2019 1005
Methyl acetate	50	39		1	79	70-130	06/10/2019 1005
Methyl tertiary butyl ether (MTBE)	50	49		1	99	70-130	06/10/2019 1005
4-Methyl-2-pentanone	100	99		1	99	70-130	06/10/2019 1005
Methylcyclohexane	50	52		1	103	70-130	06/10/2019 1005
Methylene chloride	50	48		1	95	70-130	06/10/2019 1005
Naphthalene	50	53		1	106	70-130	06/10/2019 1005
Styrene	50	48		1	97	70-130	06/10/2019 1005
1,1,2,2-Tetrachloroethane	50	49		1	97	70-130	06/10/2019 1005
Tetrachloroethene	50	50		1	99	70-130	06/10/2019 1005
Toluene	50	51		1	102	70-130	06/10/2019 1005
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	46		1	91	70-130	06/10/2019 1005

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19078-002
Batch: 19078
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	99	70-130	06/10/2019 1005
1,2,4-Trichlorobenzene	50	49		1	97	70-130	06/10/2019 1005
1,1,1-Trichloroethane	50	49		1	97	70-130	06/10/2019 1005
1,1,2-Trichloroethane	50	51		1	101	70-130	06/10/2019 1005
Trichloroethene	50	48		1	96	70-130	06/10/2019 1005
Trichlorofluoromethane	50	48		1	95	70-130	06/10/2019 1005
Vinyl chloride	50	38		1	76	70-130	06/10/2019 1005
Xylenes (total)	100	110		1	106	70-130	06/10/2019 1005
m+p - Xylenes	50	53		1	106	70-130	06/10/2019 1005
o - Xylenes	50	54		1	107	70-130	06/10/2019 1005

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	70-130
Bromofluorobenzene		112	70-130
Toluene-d8		109	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19225-001
Batch: 19225
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	06/10/2019 1712
Benzene	ND		1	250	100	ug/kg	06/10/2019 1712
Bromochloromethane	ND		1	250	100	ug/kg	06/10/2019 1712
Bromodichloromethane	ND		1	250	100	ug/kg	06/10/2019 1712
Bromoform	ND		1	250	100	ug/kg	06/10/2019 1712
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	06/10/2019 1712
2-Butanone (MEK)	ND		1	1000	200	ug/kg	06/10/2019 1712
Carbon disulfide	ND		1	250	100	ug/kg	06/10/2019 1712
Carbon tetrachloride	ND		1	250	100	ug/kg	06/10/2019 1712
Chlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
Chloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
Chloroform	ND		1	250	100	ug/kg	06/10/2019 1712
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	06/10/2019 1712
Cyclohexane	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	06/10/2019 1712
Dibromochloromethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
Dichlorodifluoromethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,1-Dichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,1-Dichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
1,2-Dichloropropane	ND		1	250	100	ug/kg	06/10/2019 1712
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/10/2019 1712
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/10/2019 1712
1,4-Dioxane	ND		1	13000	1300	ug/kg	06/10/2019 1712
Ethylbenzene	ND		1	250	100	ug/kg	06/10/2019 1712
2-Hexanone	ND		1	500	200	ug/kg	06/10/2019 1712
Isopropylbenzene	ND		1	250	100	ug/kg	06/10/2019 1712
Methyl acetate	ND		1	250	100	ug/kg	06/10/2019 1712
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	06/10/2019 1712
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	06/10/2019 1712
Methylcyclohexane	ND		1	250	100	ug/kg	06/10/2019 1712
Methylene chloride	ND		1	250	100	ug/kg	06/10/2019 1712
Naphthalene	ND		1	250	100	ug/kg	06/10/2019 1712
Styrene	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
Tetrachloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
Toluene	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	06/10/2019 1712

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19225-001
Batch: 19225
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	06/10/2019 1712
Trichloroethene	ND		1	250	100	ug/kg	06/10/2019 1712
Trichlorofluoromethane	ND		1	250	100	ug/kg	06/10/2019 1712
Vinyl chloride	ND		1	250	100	ug/kg	06/10/2019 1712
Xylenes (total)	ND		1	500	200	ug/kg	06/10/2019 1712
m+p - Xylenes	ND		1	250	100	ug/kg	06/10/2019 1712
o - Xylenes	ND		1	250	100	ug/kg	06/10/2019 1712

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		98	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		102	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19225-002
Batch: 19225
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	4500		1	89	60-140	06/10/2019 1650
Benzene	2500	2800		1	112	70-130	06/10/2019 1650
Bromochloromethane	2500	2600		1	106	70-130	06/10/2019 1650
Bromodichloromethane	2500	2700		1	107	70-130	06/10/2019 1650
Bromoform	2500	2400		1	97	70-130	06/10/2019 1650
Bromomethane (Methyl bromide)	2500	2200		1	87	70-130	06/10/2019 1650
2-Butanone (MEK)	5000	5000		1	101	60-140	06/10/2019 1650
Carbon disulfide	2500	2600		1	105	70-130	06/10/2019 1650
Carbon tetrachloride	2500	3000		1	119	70-130	06/10/2019 1650
Chlorobenzene	2500	2800		1	110	70-130	06/10/2019 1650
Chloroethane	2500	2600		1	106	70-130	06/10/2019 1650
Chloroform	2500	2800		1	111	70-130	06/10/2019 1650
Chloromethane (Methyl chloride)	2500	2200		1	86	60-140	06/10/2019 1650
Cyclohexane	2500	3100		1	123	70-130	06/10/2019 1650
1,2-Dibromo-3-chloropropane (DBCP)	2500	2200		1	89	70-130	06/10/2019 1650
Dibromochloromethane	2500	2700		1	109	70-130	06/10/2019 1650
1,2-Dibromoethane (EDB)	2500	2700		1	106	70-130	06/10/2019 1650
1,2-Dichlorobenzene	2500	2700		1	106	70-130	06/10/2019 1650
1,3-Dichlorobenzene	2500	2800		1	112	70-130	06/10/2019 1650
1,4-Dichlorobenzene	2500	2800		1	111	70-130	06/10/2019 1650
Dichlorodifluoromethane	2500	1800		1	72	60-140	06/10/2019 1650
1,1-Dichloroethane	2500	2800		1	110	70-130	06/10/2019 1650
1,2-Dichloroethane	2500	2600		1	105	70-130	06/10/2019 1650
1,1-Dichloroethene	2500	3000		1	120	70-130	06/10/2019 1650
cis-1,2-Dichloroethene	2500	2800		1	111	70-130	06/10/2019 1650
trans-1,2-Dichloroethene	2500	3000		1	120	70-130	06/10/2019 1650
1,2-Dichloropropane	2500	2700		1	107	70-130	06/10/2019 1650
cis-1,3-Dichloropropene	2500	2700		1	109	70-130	06/10/2019 1650
trans-1,3-Dichloropropene	2500	2800		1	111	70-130	06/10/2019 1650
1,4-Dioxane	25000	24000		1	95	60-140	06/10/2019 1650
Ethylbenzene	2500	2900		1	116	70-130	06/10/2019 1650
2-Hexanone	5000	5300		1	105	70-130	06/10/2019 1650
Isopropylbenzene	2500	2900		1	116	70-130	06/10/2019 1650
Methyl acetate	2500	2000		1	81	70-130	06/10/2019 1650
Methyl tertiary butyl ether (MTBE)	2500	2400		1	96	70-130	06/10/2019 1650
4-Methyl-2-pentanone	5000	4800		1	96	70-130	06/10/2019 1650
Methylcyclohexane	2500	3400	N	1	136	70-130	06/10/2019 1650
Methylene chloride	2500	2500		1	101	70-130	06/10/2019 1650
Naphthalene	2500	2300		1	90	70-130	06/10/2019 1650
Styrene	2500	2800		1	113	70-130	06/10/2019 1650
1,1,2,2-Tetrachloroethane	2500	2700		1	106	70-130	06/10/2019 1650
Tetrachloroethene	2500	3100		1	124	70-130	06/10/2019 1650
Toluene	2500	2900		1	115	70-130	06/10/2019 1650
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3000		1	119	70-130	06/10/2019 1650

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19225-002
Batch: 19225
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2600		1	103	70-130	06/10/2019 1650
1,2,4-Trichlorobenzene	2500	2700		1	106	70-130	06/10/2019 1650
1,1,1-Trichloroethane	2500	2800		1	111	70-130	06/10/2019 1650
1,1,2-Trichloroethane	2500	2700		1	107	70-130	06/10/2019 1650
Trichloroethene	2500	2800		1	112	70-130	06/10/2019 1650
Trichlorofluoromethane	2500	2900		1	117	70-130	06/10/2019 1650
Vinyl chloride	2500	2300		1	91	70-130	06/10/2019 1650
Xylenes (total)	5000	5800		1	115	70-130	06/10/2019 1650
m+p - Xylenes	2500	2900		1	117	70-130	06/10/2019 1650
o - Xylenes	2500	2800		1	113	70-130	06/10/2019 1650

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		106	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19880-001
Batch: 19880
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/18/2019 1039
Benzene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Bromoform	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/18/2019 1039
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/18/2019 1039
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Chloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Chloroform	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Cyclohexane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/18/2019 1039
1,4-Dioxane	ND		1	20	13	ug/L	06/18/2019 1039
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
2-Hexanone	ND		1	10	2.0	ug/L	06/18/2019 1039
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Methyl acetate	ND		1	1.0	0.40	ug/L	06/18/2019 1039
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/18/2019 1039
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/18/2019 1039
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/18/2019 1039
Methylene chloride	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Naphthalene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Styrene	ND		1	0.50	0.41	ug/L	06/18/2019 1039
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Toluene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/18/2019 1039

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19880-001
Batch: 19880
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Trichloroethene	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/18/2019 1039
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/18/2019 1039
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/18/2019 1039
o - Xylenes	ND		1	0.50	0.40	ug/L	06/18/2019 1039

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	70-130
Bromofluorobenzene		96	70-130
Toluene-d8		95	70-130

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19880-002
Batch: 19880
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	88		1	88	60-140	06/18/2019 0938
Benzene	50	50		1	99	70-130	06/18/2019 0938
Bromochloromethane	50	47		1	93	70-130	06/18/2019 0938
Bromodichloromethane	50	50		1	100	70-130	06/18/2019 0938
Bromoform	50	49		1	97	70-130	06/18/2019 0938
Bromomethane (Methyl bromide)	50	46		1	92	70-130	06/18/2019 0938
2-Butanone (MEK)	100	95		1	95	70-130	06/18/2019 0938
Carbon disulfide	50	50		1	100	70-130	06/18/2019 0938
Carbon tetrachloride	50	50		1	99	70-130	06/18/2019 0938
Chlorobenzene	50	48		1	96	70-130	06/18/2019 0938
Chloroethane	50	51		1	102	70-130	06/18/2019 0938
Chloroform	50	48		1	95	70-130	06/18/2019 0938
Chloromethane (Methyl chloride)	50	50		1	100	60-140	06/18/2019 0938
Cyclohexane	50	50		1	99	70-130	06/18/2019 0938
1,2-Dibromo-3-chloropropane (DBCP)	50	49		1	98	70-130	06/18/2019 0938
Dibromochloromethane	50	50		1	101	70-130	06/18/2019 0938
1,2-Dibromoethane (EDB)	50	51		1	101	70-130	06/18/2019 0938
1,2-Dichlorobenzene	50	47		1	95	70-130	06/18/2019 0938
1,3-Dichlorobenzene	50	48		1	97	70-130	06/18/2019 0938
1,4-Dichlorobenzene	50	45		1	91	70-130	06/18/2019 0938
Dichlorodifluoromethane	50	55		1	111	60-140	06/18/2019 0938
1,1-Dichloroethane	50	49		1	98	70-130	06/18/2019 0938
1,2-Dichloroethane	50	48		1	96	70-130	06/18/2019 0938
1,1-Dichloroethene	50	54		1	108	70-130	06/18/2019 0938
cis-1,2-Dichloroethene	50	49		1	98	70-130	06/18/2019 0938
trans-1,2-Dichloroethene	50	51		1	103	70-130	06/18/2019 0938
1,2-Dichloropropane	50	50		1	99	70-130	06/18/2019 0938
cis-1,3-Dichloropropene	50	53		1	105	70-130	06/18/2019 0938
trans-1,3-Dichloropropene	50	52		1	104	70-130	06/18/2019 0938
1,4-Dioxane	500	560		1	111	60-140	06/18/2019 0938
Ethylbenzene	50	49		1	98	70-130	06/18/2019 0938
2-Hexanone	100	98		1	98	70-130	06/18/2019 0938
Isopropylbenzene	50	52		1	104	70-130	06/18/2019 0938
Methyl acetate	50	43		1	86	70-130	06/18/2019 0938
Methyl tertiary butyl ether (MTBE)	50	49		1	97	70-130	06/18/2019 0938
4-Methyl-2-pentanone	100	100		1	101	70-130	06/18/2019 0938
Methylcyclohexane	50	54		1	108	70-130	06/18/2019 0938
Methylene chloride	50	47		1	94	70-130	06/18/2019 0938
Naphthalene	50	51		1	102	70-130	06/18/2019 0938
Styrene	50	51		1	102	70-130	06/18/2019 0938
1,1,2,2-Tetrachloroethane	50	51		1	102	70-130	06/18/2019 0938
Tetrachloroethene	50	49		1	99	70-130	06/18/2019 0938
Toluene	50	50		1	99	70-130	06/18/2019 0938
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	98	70-130	06/18/2019 0938

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19880-002
Batch: 19880
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	51		1	101	70-130	06/18/2019 0938
1,2,4-Trichlorobenzene	50	48		1	97	70-130	06/18/2019 0938
1,1,1-Trichloroethane	50	48		1	96	70-130	06/18/2019 0938
1,1,2-Trichloroethane	50	50		1	101	70-130	06/18/2019 0938
Trichloroethene	50	50		1	101	70-130	06/18/2019 0938
Trichlorofluoromethane	50	52		1	105	70-130	06/18/2019 0938
Vinyl chloride	50	44		1	88	70-130	06/18/2019 0938
Xylenes (total)	100	100		1	102	70-130	06/18/2019 0938
m+p - Xylenes	50	51		1	101	70-130	06/18/2019 0938
o - Xylenes	50	51		1	102	70-130	06/18/2019 0938

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		81	70-130
Bromofluorobenzene		92	70-130
Toluene-d8		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
+ = RPD is out of criteria

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19057-001
Batch: 19057
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/10/2019 1040

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Acenaphthylene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Anthracene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	06/14/2019 1053
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	06/14/2019 1053
Carbazole	ND		1	0.80	0.040	ug/L	06/14/2019 1053
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	06/14/2019 1053
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	06/14/2019 1053
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	06/14/2019 1053
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	06/14/2019 1053
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	06/14/2019 1053
2-Chlorophenol	ND		1	0.80	0.15	ug/L	06/14/2019 1053
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	06/14/2019 1053
Chrysene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Dibenzofuran	ND		1	0.80	0.16	ug/L	06/14/2019 1053
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	06/14/2019 1053
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	06/14/2019 1053
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	06/14/2019 1053
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	06/14/2019 1053
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	06/14/2019 1053
Diethylphthalate	ND		1	4.0	0.19	ug/L	06/14/2019 1053
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	06/14/2019 1053
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	06/14/2019 1053
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	06/14/2019 1053
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	06/14/2019 1053
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	06/14/2019 1053
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	06/14/2019 1053
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	06/14/2019 1053
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	06/14/2019 1053
bis(2-Ethylhexyl)phthalate	0.62	J	1	4.0	0.38	ug/L	06/14/2019 1053
Fluoranthene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Fluorene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	06/14/2019 1053
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	06/14/2019 1053
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	06/14/2019 1053
Hexachloroethane	ND		1	0.80	0.17	ug/L	06/14/2019 1053
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Isophorone	ND		1	0.80	0.22	ug/L	06/14/2019 1053

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19057-001
Batch: 19057
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/10/2019 1040

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
2-Methylphenol	ND		1	0.80	0.21	ug/L	06/14/2019 1053
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	06/14/2019 1053
Naphthalene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
2-Nitroaniline	ND		1	1.6	0.66	ug/L	06/14/2019 1053
3-Nitroaniline	ND		1	1.6	0.15	ug/L	06/14/2019 1053
4-Nitroaniline	ND		1	1.6	1.3	ug/L	06/14/2019 1053
Nitrobenzene	ND		1	0.80	0.17	ug/L	06/14/2019 1053
2-Nitrophenol	ND		1	1.6	0.44	ug/L	06/14/2019 1053
4-Nitrophenol	ND		1	4.0	2.1	ug/L	06/14/2019 1053
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	06/14/2019 1053
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	06/14/2019 1053
Pentachlorophenol	ND		1	4.0	1.3	ug/L	06/14/2019 1053
Phenanthrene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
Phenol	ND		1	0.80	0.19	ug/L	06/14/2019 1053
Pyrene	ND		1	0.16	0.040	ug/L	06/14/2019 1053
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	06/14/2019 1053
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	06/14/2019 1053
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	06/14/2019 1053
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	06/14/2019 1053
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	06/14/2019 1053

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		69	37-129
2-Fluorophenol		64	24-127
Nitrobenzene-d5		75	38-127
Phenol-d5		71	28-128
Terphenyl-d14		87	10-148
2,4,6-Tribromophenol		72	35-144

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19057-002
Batch: 19057
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/10/2019 1040

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	5.5		1	68	30-122	06/14/2019 1117
Acenaphthylene	8.0	5.7		1	71	30-130	06/14/2019 1117
Anthracene	8.0	5.9		1	74	30-123	06/14/2019 1117
Benzo(a)anthracene	8.0	6.4		1	80	40-125	06/14/2019 1117
Benzo(a)pyrene	8.0	6.2		1	78	40-128	06/14/2019 1117
Benzo(b)fluoranthene	8.0	6.3		1	78	30-130	06/14/2019 1117
Benzo(g,h,i)perylene	8.0	6.5		1	81	30-130	06/14/2019 1117
Benzo(k)fluoranthene	8.0	6.3		1	79	30-130	06/14/2019 1117
4-Bromophenyl phenyl ether	8.0	5.5		1	69	30-124	06/14/2019 1117
Butyl benzyl phthalate	8.0	7.2		1	90	54-135	06/14/2019 1117
Carbazole	8.0	6.4		1	80	45-101	06/14/2019 1117
bis (2-Chloro-1-methylethyl) ether	8.0	6.5		1	82	42-124	06/14/2019 1117
4-Chloro-3-methyl phenol	8.0	6.0		1	75	30-123	06/14/2019 1117
bis(2-Chloroethoxy)methane	8.0	5.7		1	71	44-127	06/14/2019 1117
bis(2-Chloroethyl)ether	8.0	6.2		1	77	46-120	06/14/2019 1117
2-Chloronaphthalene	8.0	5.2		1	65	46-100	06/14/2019 1117
2-Chlorophenol	8.0	6.3		1	79	50-117	06/14/2019 1117
4-Chlorophenyl phenyl ether	8.0	5.5		1	68	30-121	06/14/2019 1117
Chrysene	8.0	6.3		1	79	30-130	06/14/2019 1117
Dibenzo(a,h)anthracene	8.0	6.5		1	82	30-130	06/14/2019 1117
Dibenzofuran	8.0	5.6		1	70	30-118	06/14/2019 1117
1,2-Dichlorobenzene	8.0	4.8		1	60	32-111	06/14/2019 1117
1,3-Dichlorobenzene	8.0	4.8		1	60	28-110	06/14/2019 1117
1,4-Dichlorobenzene	8.0	4.7		1	59	29-112	06/14/2019 1117
3,3'-Dichlorobenzidine	8.0	2.1		1	26	10-126	06/14/2019 1117
2,4-Dichlorophenol	8.0	5.5		1	68	30-121	06/14/2019 1117
Diethylphthalate	8.0	6.4		1	80	40-125	06/14/2019 1117
Dimethyl phthalate	8.0	6.0		1	75	40-127	06/14/2019 1117
2,4-Dimethylphenol	8.0	6.2		1	77	20-125	06/14/2019 1117
Di-n-butyl phthalate	8.0	7.2		1	90	40-127	06/14/2019 1117
4,6-Dinitro-2-methylphenol	8.0	6.4		1	80	56-128	06/14/2019 1117
2,4-Dinitrophenol	16	12		1	74	11-126	06/14/2019 1117
2,4-Dinitrotoluene	8.0	6.4		1	80	59-127	06/14/2019 1117
2,6-Dinitrotoluene	8.0	6.2		1	77	59-126	06/14/2019 1117
Di-n-octylphthalate	8.0	6.5		1	81	50-136	06/14/2019 1117
bis(2-Ethylhexyl)phthalate	8.0	7.4		1	93	56-128	06/14/2019 1117
Fluoranthene	8.0	6.6		1	83	40-128	06/14/2019 1117
Fluorene	8.0	5.7		1	71	30-124	06/14/2019 1117
Hexachlorobenzene	8.0	5.6		1	70	30-125	06/14/2019 1117
Hexachlorobutadiene	8.0	4.3		1	54	24-110	06/14/2019 1117
Hexachlorocyclopentadiene	40	14		1	35	16-96	06/14/2019 1117
Hexachloroethane	8.0	4.3		1	54	31-110	06/14/2019 1117
Indeno(1,2,3-c,d)pyrene	8.0	6.4		1	80	30-130	06/14/2019 1117
Isophorone	8.0	5.8		1	72	57-123	06/14/2019 1117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19057-002
Batch: 19057
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/10/2019 1040

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	5.4		1	67	40-132	06/14/2019 1117
2-Methylphenol	8.0	8.0		1	100	56-119	06/14/2019 1117
3+4-Methylphenol	8.0	8.0		1	101	53-119	06/14/2019 1117
Naphthalene	8.0	5.3		1	67	30-130	06/14/2019 1117
2-Nitroaniline	8.0	6.4		1	80	60-124	06/14/2019 1117
3-Nitroaniline	8.0	3.7		1	46	43-123	06/14/2019 1117
4-Nitroaniline	8.0	4.6		1	58	30-135	06/14/2019 1117
Nitrobenzene	8.0	5.5		1	69	51-122	06/14/2019 1117
2-Nitrophenol	8.0	5.8		1	72	51-118	06/14/2019 1117
4-Nitrophenol	16	14		1	85	53-130	06/14/2019 1117
N-Nitrosodi-n-propylamine	8.0	6.7		1	83	54-127	06/14/2019 1117
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.8		1	73	30-123	06/14/2019 1117
Pentachlorophenol	16	13		1	84	42-131	06/14/2019 1117
Phenanthrene	8.0	5.8		1	73	40-123	06/14/2019 1117
Phenol	8.0	7.6		1	95	49-117	06/14/2019 1117
Pyrene	8.0	6.0		1	75	40-126	06/14/2019 1117
1,2,4,5-Tetrachlorobenzene	8.0	4.8		1	60	30-130	06/14/2019 1117
2,3,4,6-Tetrachlorophenol	8.0	5.6		1	70	30-130	06/14/2019 1117
1,2,4-Trichlorobenzene	8.0	4.9		1	61	20-90	06/14/2019 1117
2,4,5-Trichlorophenol	8.0	5.9		1	73	30-123	06/14/2019 1117
2,4,6-Trichlorophenol	8.0	5.8		1	72	30-125	06/14/2019 1117

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		67	37-129
2-Fluorophenol		73	24-127
Nitrobenzene-d5		73	38-127
Phenol-d5		83	28-128
Terphenyl-d14		84	10-148
2,4,6-Tribromophenol		75	35-144

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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N = Recovery is out of criteria
+ = RPD is out of criteria

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF08028-005MS
Batch: 19057
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/10/2019 1040

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	ND	16	8.2		1	51	30-122	06/14/2019 1544
Acenaphthylene	ND	16	8.5		1	53	30-130	06/14/2019 1544
Anthracene	ND	16	9.8		1	61	30-123	06/14/2019 1544
Benzo(a)anthracene	ND	16	11		1	68	40-125	06/14/2019 1544
Benzo(a)pyrene	ND	16	7.2		1	45	40-128	06/14/2019 1544
Benzo(b)fluoranthene	ND	16	10		1	64	30-130	06/14/2019 1544
Benzo(g,h,i)perylene	ND	16	8.1		1	51	30-130	06/14/2019 1544
Benzo(k)fluoranthene	ND	16	9.7		1	61	30-130	06/14/2019 1544
4-Bromophenyl phenyl ether	ND	16	8.5		1	53	30-124	06/14/2019 1544
Butyl benzyl phthalate	ND	16	12		1	74	54-135	06/14/2019 1544
Carbazole	ND	16	11		1	70	45-101	06/14/2019 1544
bis (2-Chloro-1-methylethyl) ether	ND	16	7.7		1	48	42-124	06/14/2019 1544
4-Chloro-3-methyl phenol	ND	16	8.7		1	55	30-123	06/14/2019 1544
bis(2-Chloroethoxy)methane	ND	16	8.1		1	51	44-127	06/14/2019 1544
bis(2-Chloroethyl)ether	ND	16	7.3		1	46	46-120	06/14/2019 1544
2-Chloronaphthalene	ND	16	7.6		1	48	46-100	06/14/2019 1544
2-Chlorophenol	ND	16	7.1	N	1	45	50-117	06/14/2019 1544
4-Chlorophenyl phenyl ether	ND	16	8.3		1	52	30-121	06/14/2019 1544
Chrysene	ND	16	10		1	65	30-130	06/14/2019 1544
Dibenzo(a,h)anthracene	ND	16	8.8		1	55	30-130	06/14/2019 1544
Dibenzofuran	ND	16	8.5		1	53	30-118	06/14/2019 1544
1,2-Dichlorobenzene	ND	16	6.8		1	42	32-111	06/14/2019 1544
1,3-Dichlorobenzene	ND	16	6.8		1	42	28-110	06/14/2019 1544
1,4-Dichlorobenzene	ND	16	6.7		1	42	29-112	06/14/2019 1544
3,3'-Dichlorobenzidine	ND	16	ND	N	1	0.00	10-126	06/14/2019 1544
2,4-Dichlorophenol	ND	16	7.7		1	48	30-121	06/14/2019 1544
Diethylphthalate	ND	16	9.7		1	61	40-125	06/14/2019 1544
Dimethyl phthalate	ND	16	8.9		1	56	40-127	06/14/2019 1544
2,4-Dimethylphenol	ND	16	12		1	73	20-125	06/14/2019 1544
Di-n-butyl phthalate	ND	16	12		1	77	40-127	06/14/2019 1544
4,6-Dinitro-2-methylphenol	ND	16	11		1	69	56-128	06/14/2019 1544
2,4-Dinitrophenol	ND	32	23		1	73	30-130	06/14/2019 1544
2,4-Dinitrotoluene	ND	16	10		1	62	59-127	06/14/2019 1544
2,6-Dinitrotoluene	ND	16	9.1	N	1	57	59-126	06/14/2019 1544
Di-n-octylphthalate	ND	16	4.1	N	1	26	50-136	06/14/2019 1544
bis(2-Ethylhexyl)phthalate	0.91	16	6.2	N	1	33	56-128	06/14/2019 1544
Fluoranthene	ND	16	12		1	72	40-128	06/14/2019 1544
Fluorene	0.056	16	8.5		1	53	30-124	06/14/2019 1544
Hexachlorobenzene	ND	16	8.3		1	52	30-125	06/14/2019 1544
Hexachlorobutadiene	ND	16	6.4		1	40	30-130	06/14/2019 1544
Hexachlorocyclopentadiene	ND	80	27		1	34	16-96	06/14/2019 1544
Hexachloroethane	ND	16	7.3		1	46	31-110	06/14/2019 1544
Indeno(1,2,3-c,d)pyrene	ND	16	8.6		1	54	30-130	06/14/2019 1544
Isophorone	ND	16	8.3	N	1	52	57-123	06/14/2019 1544

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF08028-005MS
Batch: 19057
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/10/2019 1040

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	1.4	16	8.8		1	47	40-132	06/14/2019 1544
2-Methylphenol	ND	16	11		1	70	56-119	06/14/2019 1544
3+4-Methylphenol	ND	16	7.4	N	1	46	53-119	06/14/2019 1544
Naphthalene	2.1	16	9.4		1	46	30-130	06/14/2019 1544
2-Nitroaniline	ND	16	9.6		1	60	60-124	06/14/2019 1544
3-Nitroaniline	ND	16	3.5	N	1	22	43-123	06/14/2019 1544
4-Nitroaniline	ND	16	5.9		1	37	30-135	06/14/2019 1544
Nitrobenzene	ND	16	8.2		1	51	51-122	06/14/2019 1544
2-Nitrophenol	ND	16	8.7		1	55	51-118	06/14/2019 1544
4-Nitrophenol	ND	32	27		1	85	53-130	06/14/2019 1544
N-Nitrosodi-n-propylamine	ND	16	7.5	N	1	47	54-127	06/14/2019 1544
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	7.1		1	44	30-123	06/14/2019 1544
Pentachlorophenol	ND	32	32		1	100	42-131	06/14/2019 1544
Phenanthrene	0.054	16	9.5		1	59	40-123	06/14/2019 1544
Phenol	ND	16	8.1		1	51	49-117	06/14/2019 1544
Pyrene	ND	16	9.8		1	61	40-126	06/14/2019 1544
1,2,4,5-Tetrachlorobenzene	ND	16	6.9		1	43	30-130	06/14/2019 1544
2,3,4,6-Tetrachlorophenol	ND	16	11		1	67	30-130	06/14/2019 1544
1,2,4-Trichlorobenzene	ND	16	7.0		1	44	20-90	06/14/2019 1544
2,4,5-Trichlorophenol	ND	16	9.0		1	56	30-123	06/14/2019 1544
2,4,6-Trichlorophenol	ND	16	8.7		1	55	30-125	06/14/2019 1544

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		50	37-129
2-Fluorophenol		38	24-127
Nitrobenzene-d5		54	38-127
Phenol-d5		45	28-128
Terphenyl-d14		39	10-148
2,4,6-Tribromophenol		68	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF08028-005MD
Batch: 19057
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/10/2019 1040

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acenaphthene	ND	16	9.0		1	56	9.5	30-122	40	06/14/2019 1608
Acenaphthylene	ND	16	9.4		1	59	10	30-130	40	06/14/2019 1608
Anthracene	ND	16	11		1	66	7.6	30-123	40	06/14/2019 1608
Benzo(a)anthracene	ND	16	11		1	68	0.80	40-125	40	06/14/2019 1608
Benzo(a)pyrene	ND	16	6.4		1	40	11	40-128	40	06/14/2019 1608
Benzo(b)fluoranthene	ND	16	9.4		1	59	7.9	30-130	40	06/14/2019 1608
Benzo(g,h,i)perylene	ND	16	6.3		1	39	26	30-130	40	06/14/2019 1608
Benzo(k)fluoranthene	ND	16	8.9		1	56	8.5	30-130	40	06/14/2019 1608
4-Bromophenyl phenyl ether	ND	16	9.5		1	60	11	30-124	40	06/14/2019 1608
Butyl benzyl phthalate	ND	16	12		1	75	0.44	54-135	40	06/14/2019 1608
Carbazole	ND	16	11		1	72	1.9	45-101	40	06/14/2019 1608
bis (2-Chloro-1-methylethyl) ether	ND	16	9.1		1	57	17	42-124	40	06/14/2019 1608
4-Chloro-3-methyl phenol	ND	16	9.7		1	61	11	30-123	40	06/14/2019 1608
bis(2-Chloroethoxy)methane	ND	16	9.3		1	58	14	44-127	40	06/14/2019 1608
bis(2-Chloroethyl)ether	ND	16	8.7		1	54	17	46-120	40	06/14/2019 1608
2-Chloronaphthalene	ND	16	8.4		1	53	10	46-100	40	06/14/2019 1608
2-Chlorophenol	ND	16	8.5		1	53	18	50-117	40	06/14/2019 1608
4-Chlorophenyl phenyl ether	ND	16	9.0		1	56	8.6	30-121	40	06/14/2019 1608
Chrysene	ND	16	10		1	66	0.30	30-130	40	06/14/2019 1608
Dibenzo(a,h)anthracene	ND	16	6.7		1	42	27	30-130	40	06/14/2019 1608
Dibenzofuran	ND	16	9.3		1	58	8.7	30-118	40	06/14/2019 1608
1,2-Dichlorobenzene	ND	16	7.5		1	47	9.8	32-111	20	06/14/2019 1608
1,3-Dichlorobenzene	ND	16	7.3		1	46	7.1	28-110	20	06/14/2019 1608
1,4-Dichlorobenzene	ND	16	7.3		1	45	8.7	29-112	20	06/14/2019 1608
3,3'-Dichlorobenzidine	ND	16	ND	N	1	0.00	0.00	10-126	40	06/14/2019 1608
2,4-Dichlorophenol	ND	16	9.1		1	57	16	30-121	40	06/14/2019 1608
Diethylphthalate	ND	16	11		1	66	8.9	40-125	40	06/14/2019 1608
Dimethyl phthalate	ND	16	9.9		1	62	10	40-127	40	06/14/2019 1608
2,4-Dimethylphenol	ND	16	13		1	82	12	20-125	40	06/14/2019 1608
Di-n-butyl phthalate	ND	16	13		1	78	1.4	40-127	40	06/14/2019 1608
4,6-Dinitro-2-methylphenol	ND	16	12		1	73	5.3	56-128	40	06/14/2019 1608
2,4-Dinitrophenol	ND	32	25		1	79	7.4	30-130	40	06/14/2019 1608
2,4-Dinitrotoluene	ND	16	11		1	68	8.6	59-127	40	06/14/2019 1608
2,6-Dinitrotoluene	ND	16	10		1	64	12	59-126	40	06/14/2019 1608
Di-n-octylphthalate	ND	16	3.4	N	1	21	20	50-136	40	06/14/2019 1608
bis(2-Ethylhexyl)phthalate	0.91	16	5.8	N	1	30	7.1	56-128	40	06/14/2019 1608
Fluoranthene	ND	16	12		1	74	2.1	40-128	40	06/14/2019 1608
Fluorene	0.056	16	9.3		1	58	8.9	30-124	40	06/14/2019 1608
Hexachlorobenzene	ND	16	9.3		1	58	12	30-125	40	06/14/2019 1608
Hexachlorobutadiene	ND	16	7.1		1	44	11	30-130	40	06/14/2019 1608
Hexachlorocyclopentadiene	ND	80	30		1	37	8.8	16-96	40	06/14/2019 1608
Hexachloroethane	ND	16	8.1		1	50	9.5	31-110	40	06/14/2019 1608
Indeno(1,2,3-c,d)pyrene	ND	16	6.7		1	42	25	30-130	40	06/14/2019 1608
Isophorone	ND	16	9.6		1	60	14	57-123	40	06/14/2019 1608

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF08028-005MD
Batch: 19057
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/10/2019 1040

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
2-Methylnaphthalene	1.4	16	9.9		1	53	11	40-132	40	06/14/2019 1608
2-Methylphenol	ND	16	14		1	85	20	56-119	40	06/14/2019 1608
3+4-Methylphenol	ND	16	9.1		1	57	21	53-119	40	06/14/2019 1608
Naphthalene	2.1	16	11		1	54	12	30-130	40	06/14/2019 1608
2-Nitroaniline	ND	16	11		1	68	12	60-124	40	06/14/2019 1608
3-Nitroaniline	ND	16	3.8	N	1	24	6.8	43-123	40	06/14/2019 1608
4-Nitroaniline	ND	16	5.1		1	32	15	30-135	40	06/14/2019 1608
Nitrobenzene	ND	16	9.3		1	58	12	51-122	40	06/14/2019 1608
2-Nitrophenol	ND	16	9.8		1	61	12	51-118	40	06/14/2019 1608
4-Nitrophenol	ND	32	27		1	83	2.3	53-130	40	06/14/2019 1608
N-Nitrosodi-n-propylamine	ND	16	9.1		1	57	19	54-127	40	06/14/2019 1608
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	7.0		1	44	0.66	30-123	40	06/14/2019 1608
Pentachlorophenol	ND	32	33		1	103	2.6	42-131	40	06/14/2019 1608
Phenanthrene	0.054	16	10		1	65	9.6	40-123	40	06/14/2019 1608
Phenol	ND	16	11		1	69	30	49-117	40	06/14/2019 1608
Pyrene	ND	16	10		1	64	4.2	40-126	40	06/14/2019 1608
1,2,4,5-Tetrachlorobenzene	ND	16	7.5		1	47	8.0	30-130	40	06/14/2019 1608
2,3,4,6-Tetrachlorophenol	ND	16	11		1	71	7.2	30-130	40	06/14/2019 1608
1,2,4-Trichlorobenzene	ND	16	7.7		1	48	10	20-90	40	06/14/2019 1608
2,4,5-Trichlorophenol	ND	16	10		1	63	11	30-123	40	06/14/2019 1608
2,4,6-Trichlorophenol	ND	16	9.8		1	61	12	30-125	40	06/14/2019 1608

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		55	37-129
2-Fluorophenol		42	24-127
Nitrobenzene-d5		62	38-127
Phenol-d5		55	28-128
Terphenyl-d14		30	10-148
2,4,6-Tribromophenol		77	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19304-001
Batch: 19304
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/12/2019 1123

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	06/12/2019 1509
Acenaphthylene	ND		1	2.7	0.95	ug/kg	06/12/2019 1509
Anthracene	ND		1	2.7	0.51	ug/kg	06/12/2019 1509
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	06/12/2019 1509
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	06/12/2019 1509
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	06/12/2019 1509
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	06/12/2019 1509
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	06/12/2019 1509
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/12/2019 1509
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	06/12/2019 1509
Carbazole	ND		1	13	5.0	ug/kg	06/12/2019 1509
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	06/12/2019 1509
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	06/12/2019 1509
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	06/12/2019 1509
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	06/12/2019 1509
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	06/12/2019 1509
2-Chlorophenol	ND		1	13	5.0	ug/kg	06/12/2019 1509
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/12/2019 1509
Chrysene	ND		1	2.7	0.45	ug/kg	06/12/2019 1509
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	06/12/2019 1509
Dibenzofuran	ND		1	13	5.0	ug/kg	06/12/2019 1509
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	06/12/2019 1509
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	06/12/2019 1509
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	06/12/2019 1509
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	06/12/2019 1509
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	06/12/2019 1509
Diethylphthalate	ND		1	13	5.0	ug/kg	06/12/2019 1509
Dimethyl phthalate	ND		1	13	7.4	ug/kg	06/12/2019 1509
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	06/12/2019 1509
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	06/12/2019 1509
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	06/12/2019 1509
2,4-Dinitrophenol	ND		1	67	25	ug/kg	06/12/2019 1509
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	06/12/2019 1509
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	06/12/2019 1509
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	06/12/2019 1509
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	06/12/2019 1509
Fluoranthene	ND		1	2.7	0.42	ug/kg	06/12/2019 1509
Fluorene	ND		1	2.7	0.57	ug/kg	06/12/2019 1509
Hexachlorobenzene	ND		1	13	5.0	ug/kg	06/12/2019 1509
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	06/12/2019 1509
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	06/12/2019 1509
Hexachloroethane	ND		1	13	5.0	ug/kg	06/12/2019 1509
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	06/12/2019 1509
Isophorone	ND		1	13	5.0	ug/kg	06/12/2019 1509

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19304-001
Batch: 19304
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/12/2019 1123

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	06/12/2019 1509
2-Methylphenol	ND		1	13	5.0	ug/kg	06/12/2019 1509
3+4-Methylphenol	ND		1	27	10	ug/kg	06/12/2019 1509
Naphthalene	ND		1	2.7	0.97	ug/kg	06/12/2019 1509
2-Nitroaniline	ND		1	27	10	ug/kg	06/12/2019 1509
3-Nitroaniline	ND		1	27	10	ug/kg	06/12/2019 1509
4-Nitroaniline	ND		1	27	10	ug/kg	06/12/2019 1509
Nitrobenzene	ND		1	13	5.0	ug/kg	06/12/2019 1509
2-Nitrophenol	ND		1	27	10	ug/kg	06/12/2019 1509
4-Nitrophenol	ND		1	67	25	ug/kg	06/12/2019 1509
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	06/12/2019 1509
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	06/12/2019 1509
Pentachlorophenol	ND		1	67	25	ug/kg	06/12/2019 1509
Phenanthrene	ND		1	2.7	0.72	ug/kg	06/12/2019 1509
Phenol	ND		1	13	5.0	ug/kg	06/12/2019 1509
Pyrene	ND		1	2.7	0.50	ug/kg	06/12/2019 1509
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	06/12/2019 1509
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	06/12/2019 1509
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	06/12/2019 1509
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	06/12/2019 1509
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	06/12/2019 1509

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		77	33-102
2-Fluorophenol		86	35-115
Nitrobenzene-d5		82	22-109
Phenol-d5		85	33-122
Terphenyl-d14		97	41-120
2,4,6-Tribromophenol		79	30-117

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19304-002
Batch: 19304
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/12/2019 1123

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	100		1	78	12-111	06/12/2019 1533
Acenaphthylene	130	110		1	81	44-122	06/12/2019 1533
Anthracene	130	110		1	84	16-122	06/12/2019 1533
Benzo(a)anthracene	130	110		1	84	40-121	06/12/2019 1533
Benzo(a)pyrene	130	110		1	86	36-114	06/12/2019 1533
Benzo(b)fluoranthene	130	110		1	84	38-123	06/12/2019 1533
Benzo(g,h,i)perylene	130	120		1	89	43-120	06/12/2019 1533
Benzo(k)fluoranthene	130	110		1	82	40-126	06/12/2019 1533
4-Bromophenyl phenyl ether	130	110		1	81	30-130	06/12/2019 1533
Butyl benzyl phthalate	130	120		1	92	48-124	06/12/2019 1533
Carbazole	130	110		1	84	47-125	06/12/2019 1533
bis (2-Chloro-1-methylethyl) ether	130	97		1	73	41-113	06/12/2019 1533
4-Chloro-3-methyl phenol	130	110		1	84	48-120	06/12/2019 1533
bis(2-Chloroethoxy)methane	130	100		1	77	38-115	06/12/2019 1533
bis(2-Chloroethyl)ether	130	94		1	71	46-122	06/12/2019 1533
2-Chloronaphthalene	130	98		1	74	37-106	06/12/2019 1533
2-Chlorophenol	130	100		1	75	44-122	06/12/2019 1533
4-Chlorophenyl phenyl ether	130	100		1	79	32-107	06/12/2019 1533
Chrysene	130	110		1	83	41-124	06/12/2019 1533
Dibenzo(a,h)anthracene	130	120		1	89	38-125	06/12/2019 1533
Dibenzofuran	130	110		1	79	45-128	06/12/2019 1533
1,2-Dichlorobenzene	130	91		1	69	39-94	06/12/2019 1533
1,3-Dichlorobenzene	130	88		1	66	30-130	06/12/2019 1533
1,4-Dichlorobenzene	130	90		1	68	39-92	06/12/2019 1533
3,3'-Dichlorobenzidine	130	87		1	66	10-119	06/12/2019 1533
2,4-Dichlorophenol	130	100		1	77	30-96	06/12/2019 1533
Diethylphthalate	130	110		1	83	30-130	06/12/2019 1533
Dimethyl phthalate	130	110		1	82	24-127	06/12/2019 1533
2,4-Dimethylphenol	130	140		1	107	30-130	06/12/2019 1533
Di-n-butyl phthalate	130	120		1	88	35-108	06/12/2019 1533
4,6-Dinitro-2-methylphenol	130	94		1	71	53-150	06/12/2019 1533
2,4-Dinitrophenol	270	140		1	54	32-115	06/12/2019 1533
2,4-Dinitrotoluene	130	110		1	86	40-130	06/12/2019 1533
2,6-Dinitrotoluene	130	110		1	86	46-118	06/12/2019 1533
Di-n-octylphthalate	130	120		1	90	49-118	06/12/2019 1533
bis(2-Ethylhexyl)phthalate	130	120		1	92	33-123	06/12/2019 1533
Fluoranthene	130	120		1	87	26-133	06/12/2019 1533
Fluorene	130	110		1	81	19-108	06/12/2019 1533
Hexachlorobenzene	130	110		1	80	10-125	06/12/2019 1533
Hexachlorobutadiene	130	92		1	69	47-116	06/12/2019 1533
Hexachlorocyclopentadiene	670	360		1	55	48-127	06/12/2019 1533
Hexachloroethane	130	89		1	67	18-154	06/12/2019 1533
Indeno(1,2,3-c,d)pyrene	130	120		1	89	42-123	06/12/2019 1533
Isophorone	130	110		1	79	30-130	06/12/2019 1533

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

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+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19304-002
Batch: 19304
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/12/2019 1123

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	100		1	77	10-107	06/12/2019 1533
2-Methylphenol	130	110		1	85	33-103	06/12/2019 1533
3+4-Methylphenol	130	110		1	79	18-121	06/12/2019 1533
Naphthalene	130	99		1	74	10-112	06/12/2019 1533
2-Nitroaniline	130	120		1	91	46-128	06/12/2019 1533
3-Nitroaniline	130	91		1	68	30-130	06/12/2019 1533
4-Nitroaniline	130	120		1	92	51-129	06/12/2019 1533
Nitrobenzene	130	98		1	74	49-142	06/12/2019 1533
2-Nitrophenol	130	100		1	79	33-114	06/12/2019 1533
4-Nitrophenol	270	200		1	77	27-138	06/12/2019 1533
N-Nitrosodi-n-propylamine	130	100		1	76	45-112	06/12/2019 1533
N-Nitrosodiphenylamine (Diphenylamine)	130	110		1	85	49-123	06/12/2019 1533
Pentachlorophenol	270	190		1	70	36-108	06/12/2019 1533
Phenanthrene	130	110		1	79	16-123	06/12/2019 1533
Phenol	130	340	N	1	254	39-108	06/12/2019 1533
Pyrene	130	110		1	82	34-121	06/12/2019 1533
1,2,4,5-Tetrachlorobenzene	130	94		1	71	30-130	06/12/2019 1533
2,3,4,6-Tetrachlorophenol	130	97		1	73	53-125	06/12/2019 1533
1,2,4-Trichlorobenzene	130	95		1	72	30-130	06/12/2019 1533
2,4,5-Trichlorophenol	130	110		1	80	32-105	06/12/2019 1533
2,4,6-Trichlorophenol	130	110		1	80	31-102	06/12/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		78	33-102
2-Fluorophenol		77	35-115
Nitrobenzene-d5		79	22-109
Phenol-d5		80	33-122
Terphenyl-d14		93	41-120
2,4,6-Tribromophenol		89	30-117

LOQ = Limit of Quantitation
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ19365-001
Batch: 19365
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/15/2019 0012
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/15/2019 0012

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		88	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Montana EPH (aliphatics) - LCS

Sample ID: UQ19365-002
Batch: 19365
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	43		1	107	40-140	06/15/2019 0042
C9 - C18 Aliphatics	30	20		1	67	40-140	06/15/2019 0042

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		99	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics) - LCSD

Sample ID: UQ19365-003
Batch: 19365
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	43		1	107	0.023	40-140	25	06/15/2019 0111
C9 - C18 Aliphatics	30	19		1	64	4.7	40-140	25	06/15/2019 0111

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		98	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ19366-001
Batch: 19366
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/15/2019 0434

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		96	40-140
2-Fluorobiphenyl (fractionation 1)		93	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ19366-002
Batch: 19366
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	75		1	88	40-140	06/15/2019 0503

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		102	40-140
2-Fluorobiphenyl (fractionation 1)		100	40-140
o - Terphenyl (aromatic)		94	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ19366-003
Batch: 19366
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/12/2019 1939

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	74		1	87	1.3	40-140	25	06/15/2019 0531

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		99	40-140
2-Fluorobiphenyl (fractionation 1)		102	40-140
o - Terphenyl (aromatic)		92	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ19463-001
Batch: 19463
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/13/2019 1310

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	06/15/2019 0854
C9 - C18 Aliphatics	ND		1	100	100	ug/L	06/15/2019 0854

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		77	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ19463-002
Batch: 19463
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/13/2019 1310

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	320		1	81	40-140	06/15/2019 0923
C9 - C18 Aliphatics	300	180		1	60	40-140	06/15/2019 0923

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		77	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana EPH (aliphatics) - LCSD

Sample ID: UQ19463-003
Batch: 19463
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/13/2019 1310

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	340		1	85	5.2	40-140	25	06/15/2019 0952
C9 - C18 Aliphatics	300	180		1	59	1.5	40-140	25	06/15/2019 0952

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		79	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana EPH (aromatics) - MB

Sample ID: UQ19464-001
Batch: 19464
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/13/2019 1310

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	06/15/2019 1119

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		102	40-140
2-Fluorobiphenyl (fractionation 1)		100	40-140
o - Terphenyl (aromatic)		83	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ19464-002
Batch: 19464
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/13/2019 1310

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	660		1	77	40-140	06/15/2019 1148

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		103	40-140
2-Fluorobiphenyl (fractionation 1)		102	40-140
o - Terphenyl (aromatic)		85	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana EPH (aromatics) - LCSD

Sample ID: UQ19464-003
Batch: 19464
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/13/2019 1310

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	780		1	92	18	40-140	25	06/15/2019 1217

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		115	40-140
2-Fluorobiphenyl (fractionation 1)		115	40-140
o - Terphenyl (aromatic)		99	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ19234-001
Batch: 19234
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/10/2019 1315
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	06/10/2019 1315
Ethylbenzene	ND		1	5.0	0.62	ug/L	06/10/2019 1315
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/10/2019 1315
Naphthalene	ND		1	5.0	0.70	ug/L	06/10/2019 1315
Toluene	ND		1	5.0	0.53	ug/L	06/10/2019 1315
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/10/2019 1315
o - Xylenes	ND		1	5.0	0.58	ug/L	06/10/2019 1315

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		85	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ19234-002
Batch: 19234
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	25		1	99	70-130	06/10/2019 1218
C9 - C10 Aromatics	25	26		1	103	70-130	06/10/2019 1218
Ethylbenzene	25	25		1	99	70-130	06/10/2019 1218
Methyl tertiary butyl ether (MTBE)	25	22		1	89	70-130	06/10/2019 1218
Naphthalene	25	23		1	93	70-130	06/10/2019 1218
Toluene	25	25		1	99	70-130	06/10/2019 1218
m+p - Xylenes	50	50		1	101	70-130	06/10/2019 1218
o - Xylenes	25	24		1	96	70-130	06/10/2019 1218

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ19234-003
Batch: 19234
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	25		1	99	0.40	70-130	25	06/10/2019 1247
C9 - C10 Aromatics	25	26		1	103	0.39	70-130	25	06/10/2019 1247
Ethylbenzene	25	25		1	99	0.40	70-130	25	06/10/2019 1247
Methyl tertiary butyl ether (MTBE)	25	25		1	99	11	70-130	25	06/10/2019 1247
Naphthalene	25	23		1	94	0.43	70-130	25	06/10/2019 1247
Toluene	25	24		1	97	2.4	70-130	25	06/10/2019 1247
m+p - Xylenes	50	50		1	99	1.2	70-130	25	06/10/2019 1247
o - Xylenes	25	25		1	99	2.9	70-130	25	06/10/2019 1247

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ19235-001
Batch: 19235
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/10/2019 1315
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/10/2019 1315

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ19235-002
Batch: 19235
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	100		1	104	70-130	06/10/2019 1218
C9 - C12 Aliphatics, Adjusted	75	72		1	96	70-130	06/10/2019 1218

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ19235-003
Batch: 19235
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	108	3.8	70-130	25	06/10/2019 1247
C9 - C12 Aliphatics, Adjusted	75	72		1	96	0.14	70-130	25	06/10/2019 1247

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ19236-001
Batch: 19236
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	06/10/2019 1315

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ19236-002
Batch: 19236
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	380		1	102	70-130	06/10/2019 1218

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - LCSD

Sample ID: UQ19236-003
Batch: 19236
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	380		1	102	0.78	70-130	25	06/10/2019 1247

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		93	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ19748-001
Batch: 19748
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/14/2019 1216

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ19748-002
Batch: 19748
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	21		1	110	70-130	06/14/2019 1119

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ19748-003
Batch: 19748
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	108	2.0	70-130	25	06/14/2019 1147

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ19750-001
Batch: 19750
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	06/14/2019 1216
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/14/2019 1216
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/14/2019 1216
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/14/2019 1216
Naphthalene	ND		1	0.25	0.13	mg/kg	06/14/2019 1216
Toluene	ND		1	0.25	0.040	mg/kg	06/14/2019 1216
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/14/2019 1216
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/14/2019 1216

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ19750-002
Batch: 19750
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.3		1	104	70-130	06/14/2019 1119
C9 - C10 Aromatics	1.3	1.4		1	112	70-130	06/14/2019 1119
Ethylbenzene	1.3	1.3		1	104	70-130	06/14/2019 1119
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	70-130	06/14/2019 1119
Naphthalene	1.3	1.1		1	88	70-130	06/14/2019 1119
Toluene	1.3	1.3		1	104	70-130	06/14/2019 1119
m+p - Xylenes	2.5	2.7		1	108	70-130	06/14/2019 1119
o - Xylenes	1.3	1.3		1	104	70-130	06/14/2019 1119

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ19750-003
Batch: 19750
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	0.00	70-130	25	06/14/2019 1147
C9 - C10 Aromatics	1.3	1.3		1	104	7.4	70-130	25	06/14/2019 1147
Ethylbenzene	1.3	1.3		1	104	0.00	70-130	25	06/14/2019 1147
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	0.00	70-130	25	06/14/2019 1147
Naphthalene	1.3	0.99		1	79	11	70-130	25	06/14/2019 1147
Toluene	1.3	1.3		1	104	0.00	70-130	25	06/14/2019 1147
m+p - Xylenes	2.5	2.6		1	104	3.8	70-130	25	06/14/2019 1147
o - Xylenes	1.3	1.3		1	104	0.00	70-130	25	06/14/2019 1147

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ19751-001
Batch: 19751
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/14/2019 1216
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/14/2019 1216

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ19751-002
Batch: 19751
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.6		1	111	70-130	06/14/2019 1119
C9 - C12 Aliphatics, Adjusted	3.8	4.3		1	114	70-130	06/14/2019 1119

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ19751-003
Batch: 19751
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.5		1	110	1.4	70-130	25	06/14/2019 1147
C9 - C12 Aliphatics, Adjusted	3.8	4.3		1	114	0.63	70-130	25	06/14/2019 1147

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ19781-001
Batch: 19781
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	06/14/2019 1244

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - LCS

Sample ID: UQ19781-002
Batch: 19781
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	380		1	102	70-130	06/14/2019 1022

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ19781-003
Batch: 19781
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	460		1	123	19	70-130	25	06/14/2019 1050

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ19782-001
Batch: 19782
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/14/2019 1244
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	06/14/2019 1244
Ethylbenzene	ND		1	5.0	0.62	ug/L	06/14/2019 1244
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/14/2019 1244
Naphthalene	ND		1	5.0	0.70	ug/L	06/14/2019 1244
Toluene	ND		1	5.0	0.53	ug/L	06/14/2019 1244
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/14/2019 1244
o - Xylenes	ND		1	5.0	0.58	ug/L	06/14/2019 1244

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ19782-002
Batch: 19782
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	24		1	98	70-130	06/14/2019 1022
C9 - C10 Aromatics	25	26		1	104	70-130	06/14/2019 1022
Ethylbenzene	25	24		1	97	70-130	06/14/2019 1022
Methyl tertiary butyl ether (MTBE)	25	24		1	97	70-130	06/14/2019 1022
Naphthalene	25	21		1	82	70-130	06/14/2019 1022
Toluene	25	24		1	96	70-130	06/14/2019 1022
m+p - Xylenes	50	49		1	98	70-130	06/14/2019 1022
o - Xylenes	25	25		1	98	70-130	06/14/2019 1022

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ19782-003
Batch: 19782
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	28		1	112	14	70-130	25	06/14/2019 1050
C9 - C10 Aromatics	25	33		1	130	22	70-130	25	06/14/2019 1050
Ethylbenzene	25	29		1	117	19	70-130	25	06/14/2019 1050
Methyl tertiary butyl ether (MTBE)	25	30		1	121	22	70-130	25	06/14/2019 1050
Naphthalene	25	22		1	89	7.5	70-130	25	06/14/2019 1050
Toluene	25	29		1	114	17	70-130	25	06/14/2019 1050
m+p - Xylenes	50	59		1	119	19	70-130	25	06/14/2019 1050
o - Xylenes	25	30		1	120	20	70-130	25	06/14/2019 1050

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ19784-001
Batch: 19784
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/14/2019 1244

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		93	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ19784-002
Batch: 19784
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C9 - C12 Aliphatics, Adjusted	75	77		1	103	70-130	06/14/2019 1022

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ19784-003
Batch: 19784
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C9 - C12 Aliphatics, Adjusted	75	93		1	125	19	70-130	25	06/14/2019 1050

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ19890-001
Batch: 19890
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/18/2019 1253

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ19890-002
Batch: 19890
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	110	70-130	06/18/2019 1156

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ19890-003
Batch: 19890
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	107	2.8	70-130	25	06/18/2019 1225

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ19043-001
Batch: 19043
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/10/2019 1054

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	06/11/2019 1033
Arsenic	ND		1	2.0	1.3	ug/L	06/11/2019 1033
Barium	ND		1	5.0	1.3	ug/L	06/11/2019 1033
Beryllium	ND		1	0.40	0.15	ug/L	06/11/2019 1033
Cadmium	ND		1	0.50	0.13	ug/L	06/11/2019 1033
Chromium	ND		1	5.0	1.3	ug/L	06/11/2019 1033
Cobalt	ND		1	5.0	1.3	ug/L	06/11/2019 1033
Copper	ND		1	5.0	1.3	ug/L	06/11/2019 1033
Lead	ND		1	1.0	0.25	ug/L	06/11/2019 1033
Nickel	ND		1	5.0	1.3	ug/L	06/11/2019 1033
Selenium	ND		1	5.0	1.3	ug/L	06/11/2019 1033
Silver	ND		1	1.0	0.25	ug/L	06/11/2019 1033
Vanadium	ND		1	5.0	2.5	ug/L	06/11/2019 1033

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ19043-002
Batch: 19043
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/10/2019 1054

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	100		1	100	80-120	06/11/2019 1016
Arsenic	100	97		1	97	80-120	06/11/2019 1016
Barium	100	100		1	101	80-120	06/11/2019 1016
Beryllium	100	100		1	101	80-120	06/11/2019 1016
Cadmium	100	100		1	100	80-120	06/11/2019 1016
Chromium	100	100		1	100	80-120	06/11/2019 1016
Cobalt	100	100		1	100	80-120	06/11/2019 1016
Copper	100	98		1	98	80-120	06/11/2019 1016
Lead	100	100		1	105	80-120	06/11/2019 1016
Nickel	100	99		1	99	80-120	06/11/2019 1016
Selenium	100	100		1	103	80-120	06/11/2019 1016
Silver	100	100		1	103	80-120	06/11/2019 1016
Vanadium	100	100		1	100	80-120	06/11/2019 1016

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-MS - MB

Sample ID: UQ19113-001
Batch: 19113
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/11/2019 1033

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	06/12/2019 0300
Arsenic	ND		1	0.50	0.20	mg/kg	06/12/2019 0300
Barium	ND		1	1.3	0.31	mg/kg	06/12/2019 0300
Beryllium	ND		1	0.10	0.034	mg/kg	06/12/2019 0300
Cadmium	ND		1	0.13	0.025	mg/kg	06/12/2019 0300
Chromium	ND		1	1.3	0.55	mg/kg	06/13/2019 2302
Cobalt	ND		1	1.3	0.30	mg/kg	06/12/2019 0300
Copper	ND		1	1.3	0.33	mg/kg	06/12/2019 0300
Lead	ND		1	0.25	0.068	mg/kg	06/12/2019 0300
Nickel	ND		1	1.3	0.30	mg/kg	06/12/2019 0300
Selenium	ND		1	1.3	0.47	mg/kg	06/12/2019 0300
Silver	ND		1	0.25	0.060	mg/kg	06/12/2019 0300
Vanadium	ND		1	1.3	0.25	mg/kg	06/12/2019 0300
Zinc	ND		1	2.5	0.50	mg/kg	06/12/2019 0300

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ19113-002
Batch: 19113
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/11/2019 1033

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	50		1	100	80-120	06/12/2019 0305
Arsenic	50	49		1	99	80-120	06/12/2019 0305
Barium	50	50		1	101	80-120	06/12/2019 0305
Beryllium	50	56		1	112	80-120	06/12/2019 0305
Cadmium	50	48		1	96	80-120	06/12/2019 0305
Chromium	50	53		1	106	80-120	06/13/2019 2307
Cobalt	50	51		1	102	80-120	06/12/2019 0305
Copper	50	49		1	99	80-120	06/12/2019 0305
Lead	50	51		1	102	80-120	06/12/2019 0305
Nickel	50	50		1	100	80-120	06/12/2019 0305
Selenium	50	46		1	92	80-120	06/12/2019 0305
Silver	50	52		1	105	80-120	06/12/2019 0305
Vanadium	50	52		1	105	80-120	06/12/2019 0305
Zinc	50	48		1	96	80-120	06/12/2019 0305

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UF08028-001MS
Batch: 19113
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/11/2019 1033

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	1.5	49	38	N	1	74	75-125	06/13/2019 2319
Arsenic	90	49	190	N	1	192	75-125	06/13/2019 2319
Barium	270	49	350	N	1	162	75-125	06/13/2019 2319
Beryllium	0.57	49	53		1	106	75-125	06/13/2019 2319
Cadmium	3.2	49	54		1	103	75-125	06/13/2019 2319
Chromium	9.8	49	68		1	118	75-125	06/13/2019 2319
Cobalt	6.7	49	55		1	98	75-125	06/13/2019 2319
Copper	1000	49	1700	N	10	1380	75-125	06/14/2019 1600
Lead	74	49	130		1	116	75-125	06/13/2019 2319
Nickel	11	49	62		1	104	75-125	06/13/2019 2319
Selenium	ND	49	44		1	88	75-125	06/13/2019 2319
Silver	1.3	49	51		1	100	75-125	06/13/2019 2319
Vanadium	27	49	94	N	1	136	75-125	06/13/2019 2319
Zinc	480	49	690	N	10	421	75-125	06/14/2019 1600

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF08028-001MD
Batch: 19113
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/11/2019 1033

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Antimony	1.5	39	28	N,+	1	68	31	75-125	20	06/13/2019 2324
Arsenic	90	39	180	N	1	228	3.3	75-125	20	06/13/2019 2324
Barium	270	39	410	N	1	350	15	75-125	20	06/13/2019 2324
Beryllium	0.57	39	44		1	111	19	75-125	20	06/13/2019 2324
Cadmium	3.2	39	48		1	113	13	75-125	20	06/13/2019 2324
Chromium	9.8	39	65	N	1	140	5.2	75-125	20	06/13/2019 2324
Cobalt	6.7	39	48		1	106	13	75-125	20	06/13/2019 2324
Copper	1000	39	1500	N	10	1190	13	75-125	20	06/14/2019 1606
Lead	74	39	140	N	1	163	4.8	75-125	20	06/13/2019 2324
Nickel	11	39	53		1	110	14	75-125	20	06/13/2019 2324
Selenium	ND	39	39		1	100	11	75-125	20	06/13/2019 2324
Silver	1.3	39	44		1	109	14	75-125	20	06/13/2019 2324
Vanadium	27	39	96	N	1	177	1.8	75-125	20	06/13/2019 2324
Zinc	480	39	750	N	10	685	8.3	75-125	20	06/14/2019 1606

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ19535-001
Batch: 19535
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/13/2019 1957

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Zinc	3.4	J	1	10	2.5	ug/L	06/14/2019 1230

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ19535-002
Batch: 19535
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/13/2019 1957

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Zinc	100	99		1	99	80-120	06/14/2019 1236

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ19073-001
Batch: 19073
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/10/2019 1545

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/11/2019 1030

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ19073-002
Batch: 19073
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/10/2019 1545

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0020		1	99	80-120	06/11/2019 1032

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ19109-001
Batch: 19109
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/12/2019 1428

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/12/2019 1845

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-MS - LCS

Sample ID: UQ19109-002
Batch: 19109
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/12/2019 1428

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.84		1	101	80-120	06/12/2019 1847

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - MS

Sample ID: UF08028-001MS
Batch: 19109
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/12/2019 1428

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.21	0.85	1.1		1	108	80-120	06/12/2019 1852

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF08028-001MD
Batch: 19109
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/12/2019 1428

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Mercury	0.21	0.83	1.0		1	96	12	80-120	20	06/12/2019 1855

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Chain of Custody
and
Miscellaneous Documents

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

Chain of Custody Record

Number

Client	Report to Contact	Telephone No. / E-mail	Quote No.
Ramboll US Corporation	Daniel Price/Michael Wilson	[214] 803-2770/dprice@ramboll.com [316] 440-7396/mwilson@ramboll.com	

Address	Sampler's Signature	Analysis (Attach list if more space is needed)	Page
7500 College Boulevard Suite 1905	x Elizabeth Borucki		1 of 1

City	State	Zip Code
Overland Park	KS	66210

Project Name	Project Number	P.O No.
CMR RIAM East Rail	1690012344-003	

UF08028

KMN2

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous		No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH					Remarks / Cooler I.D.
CMR-EB01-0.5-1.0-190607	6/7/2019	13:50	G		X			2					1	2	X	X	X	X	X					Cooler 001
CMR-EB01-4.0-5.0-190607	6/7/2019	14:05	G		X			2					1	2	X	X	X	X	X					Cooler 001
CMR-EB01-14.0-15.0-190607	6/7/2019	15:35	G		X			2					1	2	X	X	X	X	X					Cooler 001
CMR-EB10-190606	6/6/2019	17:10	G	X				2		1	7				X	X	X	X	X					Cooler 001
CMR-EB09-190607	6/7/2019	16:20	G	X				2		1	7				X	X	X	X	X					Cooler 001, 24-hour turn on VOCs
TB-06	NA	NA	G	X							2				X									Trip Blank/Cooler 001

Turn Around Time Required (Prior lab approval required for expedited TAT)	Sample Disposal	Possible Hazard Identification (List any known hazards in the remarks)	QC Requirements
☐ Standard ☐ Rush (Please Specify)	☐ Return to Client ☐ Disposal by Lab	☐ Non-Hazardous ☐ Flammable ☐ Skin Irr ☐ 526 prob ☒ Unknown	

1. Relinquished by	Date 6/7/2019	Time 17:35	1. Received by	Date	Time
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by Fed Ex	Date 6-8-19	Time 1115	4. Laboratory Received by L Hite	Date 6-8-19	Time 1115

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) ☒ Y ☐ N ☐ Ice Pack

Receipt Temp. 4.0 °C

Document Number: ME002OW-01

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL US CORP. Cooler Inspected by/date: LKH / 06-08-2019 Lot #: UF08028

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: LKH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

4.0 /4.0 °C NA /NA °C NA /NA °C NA /NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # _____

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H_2SO_4, HNO_3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JSH Date: 06-08-2019

Comments:

MEMO

Date: **July 19, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF13022, 5 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF13022 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB03-0.0-1.0-190612	UF13022-001
CMR-EB03-4.0-4.5-190612	UF13022-002
CMR-EB03-4.0-4.5-190612-Dup	UF13022-003
CMR-EB03-5.0-6.0-190612	UF13022-004
CMR-EB03-9.0-10.0-190612	UF13022-005
TB-09-20190612	UF13022-006

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of 1,1-DCA, trichlorofluoromethane, methylcyclohexane, and acetone. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all 1,1-DCA, trichlorofluoromethane, methylcyclohexane, and acetone results have been validated as estimated.

Field Duplicate Samples
One field duplicate sample was submitted with project samples in order to evaluate precision. In general analytes detected above the reporting limit showed acceptable precision. However, benzene, cyclohexane, TPH, C5-C8 aliphatics, and all SVOCs had results with RPDs above 50% indicating a possible precision issue. Due to this, all detected benzene, cyclohexane, TPH, C5-C8 aliphatics, and all SVOCs results were validated as estimated (J).

Blank Detections
During analysis, antimony, beryllium, and chromium were detected in equipment blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All antimony, beryllium, and chromium results below the RL or below 5x the blank result have been validated as non-detect (U).

Calibration Range Exceedances
During analysis benzene was detected above the calibration range of the instrument. Results outside of calibration range are unreliable due to reduced accuracy. The sample was rerun at a dilution and benzene was not detected. The result outside calibration range should be used for project purposes.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF13022

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 5 GW, 1 Water

Reviewer Name R Huening

Completion Date July 11, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Antimony, beryllium, and chromium detected in equipment blank samples. All antimony, beryllium, and chromium project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	One field duplicate submitted. Results show acceptable agreement, no action taken.
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All antimony, beryllium, and chromium project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.

SDG No. UF13022

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 5 GW, 1 Water

Reviewer Name R Huening

Completion Date July 11, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	No issues	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Several surrogates were out of criteria due to dilutions. No action taken.	Several surrogates were out of criteria due to dilutions. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with sample results. No action taken.	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	Recoveries out for VOCs 1,1-DCA, trichlorofluoromethane, methylcyclohexane, and acetone and SVOCs hexachlorocyclopentadiene and 3-nitroaniline. RPDs out for multiple compounds. Hexachlorocyclopentadiene, acetone, and 3-nitroaniline biased low. All hexachlorocyclopentadiene, acetone, and 3-nitroaniline results validated as estimated (J, UJ). Methylcyclohexane biased high with detections. All methylcyclohexane detections validated as estimated (J).	No issues
Field Duplicates	One field duplicate submitted. All analytes show acceptable agreement with the exception of detected SVOCs, benzene (VOC), and cyclohexane. All detected SVOCs, benzene, and cyclohexane results validated as estimated (J).	One field duplicate submitted. All analytes except TPH and C5-C8 aliphatics showed acceptable agreement. All TPH and C5-C8 aliphatics detected results validated as estimated (J).
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by lab.	N/A

SDG No. UF13022 **Site** Calumet Montana Refining

Laboratory Shealy Environmental **Number of Samples/Matrix** 5 GW, 1 Water

Reviewer Name R Huening **Completion Date** July 11, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Other Non-conformances	One benzene result was above calibration range. A diluted sample was run with benzene not detected. The above calibration result was retained.	No other non-conformances noted during review.
Overall Assessment of Data	All methylcyclohexane detections validated as estimated (J). All hexachlorocyclopentadiene, acetone, and 3-nitroaniline results validated as estimated (J, UJ). All detected SVOCs, benzene, and cyclohexane results validated as estimated (J).	All TPH and C5-C8 aliphatics detected results validated as estimated (J).

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF13022**

Date Completed:07/08/2019

07/10/2019 5:33 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF13022

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batches 19924 and 20121 had methylcyclohexane recovered marginally outside of the acceptance limits. The laboratory control sample duplicate (LCSD) associated with batch 20424 had acetone recovered marginally outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

The LCS associated with batch 20120 had 1,1-dichloroethene and trichlorotrifluoromethane recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections for this compound in the samples associated with this batch; therefore, data quality is not impacted.

Sample -004 had surrogates recovered outside of the acceptance limits due to sample dilution.No corrective action was required, as high dilutions impact recovery accuracy.

Sample -002 had benzene detected above the instrument's calibration range. The sample was analzyed high level and benzene was not detected at that dilution. Both sets of data are reported.

Semivolatiles
The LCS associated with batch 19960 had hexachlorocylcopentadiene and 3-nitroaniline recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Sample -002 was diluted 50X due to the sample matrix. The reporting limits have been raised accordingly. The associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Samples -003 and -004 were diluted 50X due to high concentrations of target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana EPH
Sample -004 was diluted 5X due to high concentrations of the target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
Samples -002, -004, and -005 had multiple compounds detected in the VPH analysis above the LOQ. Naphthalene was detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same time as MTBE and naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Samples -004 and -005 had surrogates recovered outside of the acceptance limits due to sample dilution. No corrective action was required, as high dilutions impact recovery accuracy.

Metals
The method blank associated with batch 20301 had antimony, beryllium, and chromium detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for these metals have been flagged with a “B” qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF13022

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB03-0.0-1.0-190612	Solid	06/12/2019 1405	06/13/2019
002	CMR-EB03-4.0-4.5-190612	Solid	06/12/2019 1430	06/13/2019
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	06/12/2019 1435	06/13/2019
004	CMR-EB03-5.0-6.0-190612	Solid	06/12/2019 1415	06/13/2019
005	CMR-EB03-9.0-10.0-190612	Solid	06/12/2019 1500	06/13/2019
006	TB-09-20190612	Aqueous	06/12/2019	06/13/2019

(6 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF13022

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB03-0.0-1.0-190612	Solid	Acetone	8260B	12	J	ug/kg	10
001	CMR-EB03-0.0-1.0-190612	Solid	C9 - C12 Aliphatics,	Montana VPH	1.2	J	mg/kg	16
001	CMR-EB03-0.0-1.0-190612	Solid	o - Xylenes	Montana VPH	0.055	J	mg/kg	17
001	CMR-EB03-0.0-1.0-190612	Solid	TPH	Montana VPH	3.0	J	mg/kg	18
001	CMR-EB03-0.0-1.0-190612	Solid	Arsenic	6020B	3.4		mg/kg	19
001	CMR-EB03-0.0-1.0-190612	Solid	Barium	6020B	420		mg/kg	19
001	CMR-EB03-0.0-1.0-190612	Solid	Beryllium	6020B	0.21	B	mg/kg	19
001	CMR-EB03-0.0-1.0-190612	Solid	Cadmium	6020B	0.032	J	mg/kg	19
001	CMR-EB03-0.0-1.0-190612	Solid	Chromium	6020B	4.7	B	mg/kg	19
001	CMR-EB03-0.0-1.0-190612	Solid	Cobalt	6020B	2.8		mg/kg	19
001	CMR-EB03-0.0-1.0-190612	Solid	Copper	6020B	4.7		mg/kg	19
001	CMR-EB03-0.0-1.0-190612	Solid	Lead	6020B	3.0		mg/kg	19
001	CMR-EB03-0.0-1.0-190612	Solid	Nickel	6020B	5.2		mg/kg	19
001	CMR-EB03-0.0-1.0-190612	Solid	Vanadium	6020B	8.7		mg/kg	19
001	CMR-EB03-0.0-1.0-190612	Solid	Zinc	6020B	16		mg/kg	19
002	CMR-EB03-4.0-4.5-190612	Solid	Acetone	8260B	290		ug/kg	22
002	CMR-EB03-4.0-4.5-190612	Solid	Benzene	8260B	260	E	ug/kg	22
002	CMR-EB03-4.0-4.5-190612	Solid	2-Butanone (MEK)	8260B	12	J	ug/kg	22
002	CMR-EB03-4.0-4.5-190612	Solid	Cyclohexane	8260B	180		ug/kg	22
002	CMR-EB03-4.0-4.5-190612	Solid	Ethylbenzene	8260B	7.2		ug/kg	22
002	CMR-EB03-4.0-4.5-190612	Solid	Isopropylbenzene	8260B	3.7	J	ug/kg	22
002	CMR-EB03-4.0-4.5-190612	Solid	Methylcyclohexane	8260B	150		ug/kg	22
002	CMR-EB03-4.0-4.5-190612	Solid	Toluene	8260B	12		ug/kg	22
002	CMR-EB03-4.0-4.5-190612	Solid	Xylenes (total)	8260B	17		ug/kg	23
002	CMR-EB03-4.0-4.5-190612	Solid	m+p - Xylenes	8260B	11		ug/kg	23
002	CMR-EB03-4.0-4.5-190612	Solid	o - Xylenes	8260B	6.3		ug/kg	23
002	CMR-EB03-4.0-4.5-190612	Solid	2-Methylnaphthalene	8270D	110	J	ug/kg	25
002	CMR-EB03-4.0-4.5-190612	Solid	Pyrene	8270D	69	J	ug/kg	25
002	CMR-EB03-4.0-4.5-190612	Solid	C5 - C8 Aliphatics,	Montana VPH	30		mg/kg	28
002	CMR-EB03-4.0-4.5-190612	Solid	C9 - C12 Aliphatics,	Montana VPH	3.2	J	mg/kg	28
002	CMR-EB03-4.0-4.5-190612	Solid	Benzene	Montana VPH	0.62		mg/kg	29
002	CMR-EB03-4.0-4.5-190612	Solid	C9 - C10 Aromatics	Montana VPH	3.6		mg/kg	29
002	CMR-EB03-4.0-4.5-190612	Solid	Ethylbenzene	Montana VPH	0.18	J	mg/kg	29
002	CMR-EB03-4.0-4.5-190612	Solid	Toluene	Montana VPH	0.12	J	mg/kg	29
002	CMR-EB03-4.0-4.5-190612	Solid	o - Xylenes	Montana VPH	0.31		mg/kg	29
002	CMR-EB03-4.0-4.5-190612	Solid	TPH	Montana VPH	31		mg/kg	30
002	CMR-EB03-4.0-4.5-190612	Solid	Antimony	6020B	0.33	BJ	mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Arsenic	6020B	10		mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Barium	6020B	200		mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Beryllium	6020B	0.87	B	mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Cadmium	6020B	0.46		mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Chromium	6020B	23	B	mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Cobalt	6020B	9.2		mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Copper	6020B	30		mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Lead	6020B	16		mg/kg	31

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-EB03-4.0-4.5-190612	Solid	Mercury	7471B	0.029	J	mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Nickel	6020B	22		mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Silver	6020B	0.11	J	mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Vanadium	6020B	52		mg/kg	31
002	CMR-EB03-4.0-4.5-190612	Solid	Zinc	6020B	93		mg/kg	31
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Acetone	8260B	530	J	ug/kg	32
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Benzene	8260B	580		ug/kg	32
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Cyclohexane	8260B	780		ug/kg	32
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Methyl acetate	8260B	120	J	ug/kg	32
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Methylcyclohexane	8260B	1300		ug/kg	32
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Toluene	8260B	160	J	ug/kg	32
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Anthracene	8270D	54	J	ug/kg	34
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Benzo(a)pyrene	8270D	50	J	ug/kg	34
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Benzo(b)fluoranthene	8270D	51	J	ug/kg	34
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Fluoranthene	8270D	51	J	ug/kg	34
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	2-Methylnaphthalene	8270D	540		ug/kg	35
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Naphthalene	8270D	170		ug/kg	35
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Phenanthrene	8270D	200		ug/kg	35
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Pyrene	8270D	260		ug/kg	35
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	C19 - C36 Aliphatics	Montana EPH	120		mg/kg	36
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	C9 - C18 Aliphatics	Montana EPH	53		mg/kg	36
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	C11 - C22 Aromatics	Montana EPH	120		mg/kg	37
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	C5 - C8 Aliphatics,	Montana VPH	11		mg/kg	38
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	C9 - C12 Aliphatics,	Montana VPH	1.8	J	mg/kg	38
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Benzene	Montana VPH	0.29	J	mg/kg	39
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	C9 - C10 Aromatics	Montana VPH	1.2	J	mg/kg	39
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Ethylbenzene	Montana VPH	0.054	J	mg/kg	39
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	TPH	Montana VPH	11		mg/kg	40
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Antimony	6020B	0.25	BJ	mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Arsenic	6020B	11		mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Barium	6020B	190		mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Beryllium	6020B	0.87	B	mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Cadmium	6020B	0.50		mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Chromium	6020B	23	B	mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Cobalt	6020B	9.1		mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Copper	6020B	34		mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Lead	6020B	23		mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Mercury	7471B	0.062	J	mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Nickel	6020B	21		mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Silver	6020B	0.11	J	mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Vanadium	6020B	57		mg/kg	41
003	CMR-EB03-4.0-4.5-190612-Dup	Solid	Zinc	6020B	100		mg/kg	41
004	CMR-EB03-5.0-6.0-190612	Solid	Benzene	8260B	14000		ug/kg	42
004	CMR-EB03-5.0-6.0-190612	Solid	Cyclohexane	8260B	22000		ug/kg	42
004	CMR-EB03-5.0-6.0-190612	Solid	Ethylbenzene	8260B	47000		ug/kg	42
004	CMR-EB03-5.0-6.0-190612	Solid	Isopropylbenzene	8260B	6800	J	ug/kg	42
004	CMR-EB03-5.0-6.0-190612	Solid	Methylcyclohexane	8260B	90000		ug/kg	42
004	CMR-EB03-5.0-6.0-190612	Solid	Naphthalene	8260B	20000		ug/kg	42

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
004	CMR-EB03-5.0-6.0-190612	Solid	Toluene	8260B	4000	J	ug/kg	42
004	CMR-EB03-5.0-6.0-190612	Solid	Xylenes (total)	8260B	120000		ug/kg	43
004	CMR-EB03-5.0-6.0-190612	Solid	m+p - Xylenes	8260B	98000		ug/kg	43
004	CMR-EB03-5.0-6.0-190612	Solid	o - Xylenes	8260B	19000		ug/kg	43
004	CMR-EB03-5.0-6.0-190612	Solid	Acenaphthene	8270D	540		ug/kg	44
004	CMR-EB03-5.0-6.0-190612	Solid	Anthracene	8270D	760		ug/kg	44
004	CMR-EB03-5.0-6.0-190612	Solid	Benzo(a)anthracene	8270D	170		ug/kg	44
004	CMR-EB03-5.0-6.0-190612	Solid	Benzo(a)pyrene	8270D	120	J	ug/kg	44
004	CMR-EB03-5.0-6.0-190612	Solid	Benzo(b)fluoranthene	8270D	200		ug/kg	44
004	CMR-EB03-5.0-6.0-190612	Solid	Benzo(g,h,i)perylene	8270D	51	J	ug/kg	44
004	CMR-EB03-5.0-6.0-190612	Solid	Chrysene	8270D	220		ug/kg	44
004	CMR-EB03-5.0-6.0-190612	Solid	Fluoranthene	8270D	220		ug/kg	44
004	CMR-EB03-5.0-6.0-190612	Solid	Fluorene	8270D	1600		ug/kg	44
004	CMR-EB03-5.0-6.0-190612	Solid	2-Methylnaphthalene	8270D	21000		ug/kg	45
004	CMR-EB03-5.0-6.0-190612	Solid	Naphthalene	8270D	7300		ug/kg	45
004	CMR-EB03-5.0-6.0-190612	Solid	Phenanthrene	8270D	3000		ug/kg	45
004	CMR-EB03-5.0-6.0-190612	Solid	Pyrene	8270D	750		ug/kg	45
004	CMR-EB03-5.0-6.0-190612	Solid	C19 - C36 Aliphatics	Montana EPH	2600		mg/kg	46
004	CMR-EB03-5.0-6.0-190612	Solid	C9 - C18 Aliphatics	Montana EPH	6800		mg/kg	46
004	CMR-EB03-5.0-6.0-190612	Solid	C11 - C22 Aromatics	Montana EPH	2400		mg/kg	47
004	CMR-EB03-5.0-6.0-190612	Solid	C5 - C8 Aliphatics,	Montana VPH	1200		mg/kg	48
004	CMR-EB03-5.0-6.0-190612	Solid	C9 - C12 Aliphatics,	Montana VPH	870		mg/kg	48
004	CMR-EB03-5.0-6.0-190612	Solid	Benzene	Montana VPH	17		mg/kg	49
004	CMR-EB03-5.0-6.0-190612	Solid	C9 - C10 Aromatics	Montana VPH	570		mg/kg	49
004	CMR-EB03-5.0-6.0-190612	Solid	Ethylbenzene	Montana VPH	43		mg/kg	49
004	CMR-EB03-5.0-6.0-190612	Solid	Naphthalene	Montana VPH	62		mg/kg	49
004	CMR-EB03-5.0-6.0-190612	Solid	Toluene	Montana VPH	5.6		mg/kg	49
004	CMR-EB03-5.0-6.0-190612	Solid	m+p - Xylenes	Montana VPH	16		mg/kg	49
004	CMR-EB03-5.0-6.0-190612	Solid	o - Xylenes	Montana VPH	15		mg/kg	49
004	CMR-EB03-5.0-6.0-190612	Solid	TPH	Montana VPH	2700		mg/kg	50
004	CMR-EB03-5.0-6.0-190612	Solid	Antimony	6020B	0.33	BJ	mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Arsenic	6020B	10		mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Barium	6020B	250		mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Beryllium	6020B	0.79	B	mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Cadmium	6020B	0.75		mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Chromium	6020B	45	B	mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Cobalt	6020B	6.1		mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Copper	6020B	34		mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Lead	6020B	46		mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Mercury	7471B	0.044	J	mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Nickel	6020B	25		mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Silver	6020B	0.31		mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Vanadium	6020B	37		mg/kg	51
004	CMR-EB03-5.0-6.0-190612	Solid	Zinc	6020B	130		mg/kg	51
005	CMR-EB03-9.0-10.0-190612	Solid	Benzene	8260B	490		ug/kg	52
005	CMR-EB03-9.0-10.0-190612	Solid	Cyclohexane	8260B	3400		ug/kg	52
005	CMR-EB03-9.0-10.0-190612	Solid	Ethylbenzene	8260B	1000		ug/kg	52
005	CMR-EB03-9.0-10.0-190612	Solid	Isopropylbenzene	8260B	710		ug/kg	52

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
005	CMR-EB03-9.0-10.0-190612	Solid	Methylcyclohexane	8260B	9000		ug/kg	52
005	CMR-EB03-9.0-10.0-190612	Solid	Naphthalene	8260B	1300		ug/kg	52
005	CMR-EB03-9.0-10.0-190612	Solid	Toluene	8260B	220	J	ug/kg	52
005	CMR-EB03-9.0-10.0-190612	Solid	Xylenes (total)	8260B	480	J	ug/kg	53
005	CMR-EB03-9.0-10.0-190612	Solid	m+p - Xylenes	8260B	340	J	ug/kg	53
005	CMR-EB03-9.0-10.0-190612	Solid	Acenaphthene	8270D	20	J	ug/kg	54
005	CMR-EB03-9.0-10.0-190612	Solid	Anthracene	8270D	24	J	ug/kg	54
005	CMR-EB03-9.0-10.0-190612	Solid	Dibenzofuran	8270D	57	J	ug/kg	54
005	CMR-EB03-9.0-10.0-190612	Solid	Fluorene	8270D	99		ug/kg	54
005	CMR-EB03-9.0-10.0-190612	Solid	2-Methylnaphthalene	8270D	1500		ug/kg	55
005	CMR-EB03-9.0-10.0-190612	Solid	Naphthalene	8270D	580		ug/kg	55
005	CMR-EB03-9.0-10.0-190612	Solid	Phenanthrene	8270D	97		ug/kg	55
005	CMR-EB03-9.0-10.0-190612	Solid	Pyrene	8270D	25	J	ug/kg	55
005	CMR-EB03-9.0-10.0-190612	Solid	C19 - C36 Aliphatics	Montana EPH	52		mg/kg	56
005	CMR-EB03-9.0-10.0-190612	Solid	C9 - C18 Aliphatics	Montana EPH	120		mg/kg	56
005	CMR-EB03-9.0-10.0-190612	Solid	C11 - C22 Aromatics	Montana EPH	15		mg/kg	57
005	CMR-EB03-9.0-10.0-190612	Solid	C5 - C8 Aliphatics,	Montana VPH	480		mg/kg	58
005	CMR-EB03-9.0-10.0-190612	Solid	C9 - C12 Aliphatics,	Montana VPH	350		mg/kg	58
005	CMR-EB03-9.0-10.0-190612	Solid	Benzene	Montana VPH	1.5		mg/kg	59
005	CMR-EB03-9.0-10.0-190612	Solid	C9 - C10 Aromatics	Montana VPH	210		mg/kg	59
005	CMR-EB03-9.0-10.0-190612	Solid	Ethylbenzene	Montana VPH	9.5		mg/kg	59
005	CMR-EB03-9.0-10.0-190612	Solid	Naphthalene	Montana VPH	13		mg/kg	59
005	CMR-EB03-9.0-10.0-190612	Solid	Toluene	Montana VPH	2.0		mg/kg	59
005	CMR-EB03-9.0-10.0-190612	Solid	m+p - Xylenes	Montana VPH	2.0		mg/kg	59
005	CMR-EB03-9.0-10.0-190612	Solid	o - Xylenes	Montana VPH	13		mg/kg	59
005	CMR-EB03-9.0-10.0-190612	Solid	TPH	Montana VPH	1000		mg/kg	60
005	CMR-EB03-9.0-10.0-190612	Solid	Antimony	6020B	0.23	BJ	mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Arsenic	6020B	7.1		mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Barium	6020B	180		mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Beryllium	6020B	1.2	B	mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Cadmium	6020B	1.0		mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Chromium	6020B	21	B	mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Cobalt	6020B	7.7		mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Copper	6020B	24		mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Lead	6020B	20		mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Mercury	7471B	0.056	J	mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Nickel	6020B	14		mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Selenium	6020B	0.56	J	mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Silver	6020B	0.10	J	mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Vanadium	6020B	57		mg/kg	61
005	CMR-EB03-9.0-10.0-190612	Solid	Zinc	6020B	63		mg/kg	61

(182 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-001
Description: CMR-EB03-0.0-1.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1405
% Solids: 97.7 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/19/2019 1320	JM1		20120	5.29

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	12	J	19	3.9	ug/kg	1
Benzene	71-43-2	8260B	ND		4.8	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.8	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.8	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.8	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.8	1.9	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.9	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.8	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.8	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.8	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.8	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.8	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.8	1.9	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.8	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.8	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.8	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.8	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.8	1.9	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.8	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.8	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.8	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.8	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.8	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.8	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		240	24	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.8	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.7	3.9	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.8	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.8	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.8	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.7	3.9	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.8	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.8	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.8	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.8	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.8	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.8	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.8	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.8	1.9	ug/kg	1

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Description: CMR-EB03-0.0-1.0-190612
Date Sampled: 06/12/2019 1405
Date Received: 06/13/2019

Laboratory ID: UF13022-001
Matrix: Solid
% Solids: 97.7 06/13/2019 2347

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/19/2019 1320	JM1		20120	5.29

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.8	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.8	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.8	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.8	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.8	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.8	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.8	1.9	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.7	3.9	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.8	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.8	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		103	53-142
Bromofluorobenzene		112	47-138
Toluene-d8		115	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-001
Description: CMR-EB03-0.0-1.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1405
% Solids: 97.7
06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	06/23/2019 0151	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		2.8	0.85	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		2.8	0.97	ug/kg	1
Anthracene	120-12-7	8270D	ND		2.8	0.52	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		2.8	0.60	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		2.8	0.67	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		2.8	0.51	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		2.8	0.66	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		2.8	0.49	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		13	5.1	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		13	5.1	ug/kg	1
Carbazole	86-74-8	8270D	ND		13	5.1	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		13	5.1	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		13	5.1	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		13	5.1	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		13	5.1	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		13	5.1	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		13	5.1	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		13	5.1	ug/kg	1
Chrysene	218-01-9	8270D	ND		2.8	0.46	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		2.8	0.52	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		13	5.1	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		69	26	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		69	26	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		69	26	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		13	5.1	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		13	5.1	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		13	5.1	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		13	7.6	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		13	5.1	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		13	5.1	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		69	26	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		69	26	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		28	10	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		28	10	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		13	5.1	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		69	26	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		2.8	0.43	ug/kg	1
Fluorene	86-73-7	8270D	ND		2.8	0.58	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		13	5.1	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		13	5.1	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		69	26	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		13	5.1	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		2.8	1.0	ug/kg	1
Isophorone	78-59-1	8270D	ND		13	5.1	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-001
Description: CMR-EB03-0.0-1.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1405
% Solids: 97.7 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	06/23/2019 0151	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		2.8	1.0	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		13	5.1	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		28	10	ug/kg	1
Naphthalene	91-20-3	8270D	ND		2.8	0.99	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		28	10	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		28	10	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		28	10	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		13	5.1	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		28	10	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		69	26	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		13	5.1	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		13	5.1	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		69	26	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		2.8	0.74	ug/kg	1
Phenol	108-95-2	8270D	ND		13	5.1	ug/kg	1
Pyrene	129-00-0	8270D	ND		2.8	0.51	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		34	10	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		69	10	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		69	26	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		13	5.1	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		13	5.1	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		54	33-102
2-Fluorophenol		48	35-115
Nitrobenzene-d5		50	22-109
Phenol-d5		54	33-122
Terphenyl-d14		70	41-120
2,4,6-Tribromophenol		59	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-001
Description: CMR-EB03-0.0-1.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1405
% Solids: 97.7 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/20/2019 2323	CHG	06/17/2019 1329	19756

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		10	10	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		72	40-140

LOQ = Limit of Quantitation
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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-001
Description: CMR-EB03-0.0-1.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1405
% Solids: 97.7 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/21/2019 0716	CHG	06/17/2019 1329	19757

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		52	40-140
2-Fluorobiphenyl (fractionation 1)		106	40-140
o - Terphenyl (aromatic)		78	40-140

LOQ = Limit of Quantitation
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W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-001
Description: CMR-EB03-0.0-1.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1405
% Solids: 97.7 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1438	JJG		20075

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.4	0.88	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	1.2	J	4.4	0.88	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-001
Description: CMR-EB03-0.0-1.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1405
% Solids: 97.7 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1438	JJG		20074

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.29	0.040	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.5	0.58	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.29	0.036	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.29	0.063	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.29	0.15	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.29	0.047	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.29	0.065	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.055	J	0.29	0.033	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		86	70-130

LOQ = Limit of Quantitation
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF13022-001
Description: CMR-EB03-0.0-1.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1405
% Solids: 97.7 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1438	JJG		20073

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	3.0	J	8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-001
Description: CMR-EB03-0.0-1.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1405
% Solids: 97.7 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	7471B	7471B	1	06/20/2019 1627	TJW	06/19/2019 2108	19617
2	3050B	6020B	1	06/24/2019 2028	BNW	06/22/2019 0957	20301

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.43	0.17	mg/kg	2
Arsenic	7440-38-2	6020B	3.4		0.43	0.17	mg/kg	2
Barium	7440-39-3	6020B	420		1.1	0.27	mg/kg	2
Beryllium	7440-41-7	6020B	0.21	B	0.087	0.030	mg/kg	2
Cadmium	7440-43-9	6020B	0.032	J	0.11	0.022	mg/kg	2
Chromium	7440-47-3	6020B	4.7	B	1.1	0.48	mg/kg	2
Cobalt	7440-48-4	6020B	2.8		1.1	0.26	mg/kg	2
Copper	7440-50-8	6020B	4.7		1.1	0.28	mg/kg	2
Lead	7439-92-1	6020B	3.0		0.22	0.059	mg/kg	2
Mercury	7439-97-6	7471B	ND		0.080	0.019	mg/kg	1
Nickel	7440-02-0	6020B	5.2		1.1	0.26	mg/kg	2
Selenium	7782-49-2	6020B	ND		1.1	0.41	mg/kg	2
Silver	7440-22-4	6020B	ND		0.22	0.052	mg/kg	2
Vanadium	7440-62-2	6020B	8.7		1.1	0.22	mg/kg	2
Zinc	7440-66-6	6020B	16		2.2	0.43	mg/kg	2

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612
Matrix: Solid
Date Sampled: 06/12/2019 1430
% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	2	06/18/2019 1550	JM1		19924	4.64
2	5035	8260B	1	06/19/2019 1342	JM1		20120	5.33

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		2900	580	ug/kg	1
Benzene	71-43-2	8260B	ND		730	290	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		730	290	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		730	290	ug/kg	1
Bromoform	75-25-2	8260B	ND		730	290	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		730	290	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		2900	580	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		730	290	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		730	290	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		730	290	ug/kg	1
Chloroethane	75-00-3	8260B	ND		730	290	ug/kg	1
Chloroform	67-66-3	8260B	ND		730	290	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		730	290	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		730	290	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		730	290	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		730	290	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		730	290	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		730	290	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		730	290	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		730	290	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		730	290	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		730	290	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		730	290	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		730	290	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		730	290	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		730	290	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		730	290	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		730	290	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		730	290	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		36000	3600	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		730	290	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		1500	580	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		730	290	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		730	290	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		730	290	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		1500	580	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		730	290	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		730	290	ug/kg	1
Naphthalene	91-20-3	8260B	ND		730	290	ug/kg	1
Styrene	100-42-5	8260B	ND		730	290	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		730	290	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		730	290	ug/kg	1
Toluene	108-88-3	8260B	ND		730	290	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612
Matrix: Solid
Date Sampled: 06/12/2019 1430
% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	2	06/18/2019 1550	JM1		19924	4.64
2	5035	8260B	1	06/19/2019 1342	JM1		20120	5.33

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		730	290	ug/kg	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		730	290	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		730	290	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		730	290	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		730	290	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		730	290	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		730	290	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		730	290	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		1500	580	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		730	290	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		730	290	ug/kg	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
1,2-Dichloroethane-d4		113	53-142		102	53-142
Bromofluorobenzene		120	47-138		101	47-138
Toluene-d8		119	68-124		123	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612
Matrix: Solid
Date Sampled: 06/12/2019 1430
% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	2	06/18/2019 1550	JM1		19924	4.64
2	5035	8260B	1	06/19/2019 1342	JM1		20120	5.33

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	290		22	4.4	ug/kg	2
Benzene	71-43-2	8260B	260	E	5.5	2.2	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		5.5	2.2	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		5.5	2.2	ug/kg	2
Bromoform	75-25-2	8260B	ND		5.5	2.2	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.5	2.2	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	12	J	22	4.4	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		5.5	2.2	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		5.5	2.2	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		5.5	2.2	ug/kg	2
Chloroethane	75-00-3	8260B	ND		5.5	2.2	ug/kg	2
Chloroform	67-66-3	8260B	ND		5.5	2.2	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.5	2.2	ug/kg	2
Cyclohexane	110-82-7	8260B	180		5.5	2.2	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.5	2.2	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		5.5	2.2	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.5	2.2	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.5	2.2	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.5	2.2	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.5	2.2	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		5.5	2.2	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		5.5	2.2	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		5.5	2.2	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		5.5	2.2	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.5	2.2	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.5	2.2	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		5.5	2.2	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.5	2.2	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.5	2.2	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		280	28	ug/kg	2
Ethylbenzene	100-41-4	8260B	7.2		5.5	2.2	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		11	4.4	ug/kg	2
Isopropylbenzene	98-82-8	8260B	3.7	J	5.5	2.2	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		5.5	2.2	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.5	2.2	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		11	4.4	ug/kg	2
Methylcyclohexane	108-87-2	8260B	150		5.5	2.2	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		5.5	2.2	ug/kg	2
Naphthalene	91-20-3	8260B	ND		5.5	2.2	ug/kg	2
Styrene	100-42-5	8260B	ND		5.5	2.2	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.5	2.2	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		5.5	2.2	ug/kg	2
Toluene	108-88-3	8260B	12		5.5	2.2	ug/kg	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612
Matrix: Solid
Date Sampled: 06/12/2019 1430
% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	2	06/18/2019 1550	JM1		19924	4.64
2	5035	8260B	1	06/19/2019 1342	JM1		20120	5.33

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.5	2.2	ug/kg	2
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.5	2.2	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.5	2.2	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.5	2.2	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.5	2.2	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		5.5	2.2	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		5.5	2.2	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		5.5	2.2	ug/kg	2
Xylenes (total)	1330-20-7	8260B	17		11	4.4	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	11		5.5	2.2	ug/kg	2
o - Xylenes	95-47-6	8260B	6.3		5.5	2.2	ug/kg	2

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
1,2-Dichloroethane-d4		113	53-142		102	53-142
Bromofluorobenzene		120	47-138		101	47-138
Toluene-d8		119	68-124		123	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612
Matrix: Solid
Date Sampled: 06/12/2019 1430
% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	06/22/2019 2119	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		160	48	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		160	55	ug/kg	1
Anthracene	120-12-7	8270D	ND		160	30	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		160	34	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		160	38	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		160	29	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		160	38	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		160	28	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		750	290	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		750	290	ug/kg	1
Carbazole	86-74-8	8270D	ND		750	290	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		750	290	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		750	290	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		750	290	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		750	290	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		750	290	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		750	290	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		750	290	ug/kg	1
Chrysene	218-01-9	8270D	ND		160	26	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		160	30	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		750	290	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		3900	1500	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		3900	1500	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		3900	1500	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		750	290	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		750	290	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		750	290	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		750	430	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		750	290	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		750	290	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		3900	1500	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		3900	1500	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1600	580	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1600	580	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		750	290	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		3900	1500	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		160	24	ug/kg	1
Fluorene	86-73-7	8270D	ND		160	33	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		750	290	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		750	290	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		3900	1500	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		750	290	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		160	58	ug/kg	1
Isophorone	78-59-1	8270D	ND		750	290	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612
Matrix: Solid
Date Sampled: 06/12/2019 1430
% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	06/22/2019 2119	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	110	J	160	57	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		750	290	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1600	580	ug/kg	1
Naphthalene	91-20-3	8270D	ND		160	56	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1600	580	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1600	580	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1600	580	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		750	290	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1600	580	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		3900	1500	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		750	290	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		750	290	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		3900	1500	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		160	42	ug/kg	1
Phenol	108-95-2	8270D	ND		750	290	ug/kg	1
Pyrene	129-00-0	8270D	69	J	160	29	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		1900	580	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		3900	580	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		3900	1500	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		750	290	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		750	290	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		46	33-102
2-Fluorophenol	N	27	35-115
Nitrobenzene-d5		39	22-109
Phenol-d5	N	21	33-122
Terphenyl-d14		57	41-120
2,4,6-Tribromophenol	N	25	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612
Matrix: Solid
Date Sampled: 06/12/2019 1430
% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	07/06/2019 1507	DAL1	06/25/2019 1759	20678

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		12	12	mg/kg	2
C9 - C18 Aliphatics		Montana EPH	ND		12	12	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		65	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation	Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612	Matrix: Solid
Date Sampled: 06/12/2019 1430	% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	07/06/2019 2205	DAL1	06/25/2019 1759	20679

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		12	12	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		63	40-140
2-Fluorobiphenyl (fractionation 1)		78	40-140
o - Terphenyl (aromatic)		71	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612
Matrix: Solid
Date Sampled: 06/12/2019 1430
% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1507	JJG		20075

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	30		4.3	0.87	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	3.2	J	4.3	0.87	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		98	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612
Matrix: Solid
Date Sampled: 06/12/2019 1430
% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1507	JJG		20074

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.62		0.29	0.039	mg/kg	1
C9 - C10 Aromatics		Montana VPH	3.6		1.4	0.58	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	0.18	J	0.29	0.036	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.29	0.063	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.29	0.15	mg/kg	1
Toluene	108-88-3	Montana VPH	0.12	J	0.29	0.046	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.29	0.065	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.31		0.29	0.032	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF13022-002
Description: CMR-EB03-4.0-4.5-190612
Matrix: Solid
Date Sampled: 06/12/2019 1430
% Solids: 84.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1507	JJG		20073

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	31		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		99	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB03-4.0-4.5-190612
Date Sampled: 06/12/2019 1430
Date Received: 06/13/2019

Laboratory ID: UF13022-002
Matrix: Solid
% Solids: 84.8 06/13/2019 2347

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/23/2019 2143	LLL	06/22/2019 0957	20301
1	7471B	7471B	1	06/20/2019 1629	TJW	06/19/2019 2108	19617

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.33	BJ	0.55	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	10		0.55	0.22	mg/kg	1
Barium	7440-39-3	6020B	200		1.4	0.34	mg/kg	1
Beryllium	7440-41-7	6020B	0.87	B	0.11	0.037	mg/kg	1
Cadmium	7440-43-9	6020B	0.46		0.14	0.027	mg/kg	1
Chromium	7440-47-3	6020B	23	B	1.4	0.61	mg/kg	1
Cobalt	7440-48-4	6020B	9.2		1.4	0.33	mg/kg	1
Copper	7440-50-8	6020B	30		1.4	0.36	mg/kg	1
Lead	7439-92-1	6020B	16		0.27	0.075	mg/kg	1
Mercury	7439-97-6	7471B	0.029	J	0.095	0.023	mg/kg	1
Nickel	7440-02-0	6020B	22		1.4	0.33	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.52	mg/kg	1
Silver	7440-22-4	6020B	0.11	J	0.27	0.066	mg/kg	1
Vanadium	7440-62-2	6020B	52		1.4	0.27	mg/kg	1
Zinc	7440-66-6	6020B	93		2.7	0.55	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-003
Description: CMR-EB03-4.0-4.5-190612-Dup
Matrix: Solid
Date Sampled: 06/12/2019 1435
% Solids: 86.1 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	1	06/19/2019 1701	JM1		20121	5.92

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	530	J	1100	230	ug/kg	2
Benzene	71-43-2	8260B	580		290	110	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		290	110	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		290	110	ug/kg	2
Bromoform	75-25-2	8260B	ND		290	110	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		290	110	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		1100	230	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		290	110	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		290	110	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		290	110	ug/kg	2
Chloroethane	75-00-3	8260B	ND		290	110	ug/kg	2
Chloroform	67-66-3	8260B	ND		290	110	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		290	110	ug/kg	2
Cyclohexane	110-82-7	8260B	780		290	110	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		290	110	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		290	110	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		290	110	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		290	110	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		290	110	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		290	110	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		290	110	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		290	110	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		290	110	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		290	110	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		290	110	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		290	110	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		290	110	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		290	110	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		290	110	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		14000	1400	ug/kg	2
Ethylbenzene	100-41-4	8260B	ND		290	110	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		570	230	ug/kg	2
Isopropylbenzene	98-82-8	8260B	ND		290	110	ug/kg	2
Methyl acetate	79-20-9	8260B	120	J	290	110	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		290	110	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		570	230	ug/kg	2
Methylcyclohexane	108-87-2	8260B	1300		290	110	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		290	110	ug/kg	2
Naphthalene	91-20-3	8260B	ND		290	110	ug/kg	2
Styrene	100-42-5	8260B	ND		290	110	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		290	110	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		290	110	ug/kg	2
Toluene	108-88-3	8260B	160	J	290	110	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		290	110	ug/kg	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-003
Description: CMR-EB03-4.0-4.5-190612-Dup
Matrix: Solid
Date Sampled: 06/12/2019 1435
% Solids: 86.1 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	1	06/19/2019 1701	JM1		20121	5.92

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		290	110	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		290	110	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		290	110	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		290	110	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		290	110	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		290	110	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		290	110	ug/kg	2
Xylenes (total)	1330-20-7	8260B	ND		570	230	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	ND		290	110	ug/kg	2
o - Xylenes	95-47-6	8260B	ND		290	110	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		105	53-142
Bromofluorobenzene		109	47-138
Toluene-d8		106	68-124

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-003
Description: CMR-EB03-4.0-4.5-190612-Dup
Matrix: Solid
Date Sampled: 06/12/2019 1435
% Solids: 86.1 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	06/22/2019 2143	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		160	48	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		160	55	ug/kg	1
Anthracene	120-12-7	8270D	54	J	160	30	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		160	34	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	50	J	160	38	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	51	J	160	29	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		160	38	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		160	28	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		750	290	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		750	290	ug/kg	1
Carbazole	86-74-8	8270D	ND		750	290	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		750	290	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		750	290	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		750	290	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		750	290	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		750	290	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		750	290	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		750	290	ug/kg	1
Chrysene	218-01-9	8270D	ND		160	26	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		160	30	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		750	290	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		3900	1400	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		3900	1400	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		3900	1400	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		750	290	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		750	290	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		750	290	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		750	430	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		750	290	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		750	290	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		3900	1400	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		3900	1400	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1600	580	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1600	580	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		750	290	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		3900	1400	ug/kg	1
Fluoranthene	206-44-0	8270D	51	J	160	24	ug/kg	1
Fluorene	86-73-7	8270D	ND		160	33	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		750	290	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		750	290	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		3900	1400	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		750	290	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		160	58	ug/kg	1
Isophorone	78-59-1	8270D	ND		750	290	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-003
Description: CMR-EB03-4.0-4.5-190612-Dup
Matrix: Solid
Date Sampled: 06/12/2019 1435
% Solids: 86.1 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	06/22/2019 2143	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	540		160	57	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		750	290	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1600	580	ug/kg	1
Naphthalene	91-20-3	8270D	170		160	56	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1600	580	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1600	580	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1600	580	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		750	290	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1600	580	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		3900	1400	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		750	290	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		750	290	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		3900	1400	ug/kg	1
Phenanthrene	85-01-8	8270D	200		160	42	ug/kg	1
Phenol	108-95-2	8270D	ND		750	290	ug/kg	1
Pyrene	129-00-0	8270D	260		160	29	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		1900	580	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		3900	580	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		3900	1400	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		750	290	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		750	290	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		52	33-102
2-Fluorophenol	N	32	35-115
Nitrobenzene-d5		27	22-109
Phenol-d5	N	28	33-122
Terphenyl-d14		55	41-120
2,4,6-Tribromophenol		37	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-003
Description: CMR-EB03-4.0-4.5-190612-Dup
Matrix: Solid
Date Sampled: 06/12/2019 1435
% Solids: 86.1 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/21/2019 0022	CHG	06/17/2019 1329	19756

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	120		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	53		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		79	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-003
Description: CMR-EB03-4.0-4.5-190612-Dup
Matrix: Solid
Date Sampled: 06/12/2019 1435
% Solids: 86.1 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/21/2019 0937	CHG	06/17/2019 1329	19757

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	120		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		95	40-140
2-Fluorobiphenyl (fractionation 1)		103	40-140
o - Terphenyl (aromatic)		103	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-003
Description: CMR-EB03-4.0-4.5-190612-Dup
Matrix: Solid
Date Sampled: 06/12/2019 1435
% Solids: 86.1 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1535	JJG		20075

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	11		4.6	0.92	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	1.8	J	4.6	0.92	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-003
Description: CMR-EB03-4.0-4.5-190612-Dup
Matrix: Solid
Date Sampled: 06/12/2019 1435
% Solids: 86.1 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1535	JJG		20074

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.29	J	0.31	0.042	mg/kg	1
C9 - C10 Aromatics		Montana VPH	1.2	J	1.5	0.62	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	0.054	J	0.31	0.038	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.31	0.067	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.31	0.16	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.31	0.049	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.31	0.069	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.31	0.035	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF13022-003
Description: CMR-EB03-4.0-4.5-190612-Dup
Matrix: Solid
Date Sampled: 06/12/2019 1435
% Solids: 86.1 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1535	JJG		20073

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	11		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-003
Description: CMR-EB03-4.0-4.5-190612-Dup
Matrix: Solid
Date Sampled: 06/12/2019 1435
% Solids: 86.1 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/23/2019 2148	LLL	06/22/2019 0957	20301
1	7471B	7471B	1	06/20/2019 1632	TJW	06/19/2019 2108	19617

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.25	BJ	0.51	0.20	mg/kg	1
Arsenic	7440-38-2	6020B	11		0.51	0.20	mg/kg	1
Barium	7440-39-3	6020B	190		1.3	0.32	mg/kg	1
Beryllium	7440-41-7	6020B	0.87	B	0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	0.50		0.13	0.025	mg/kg	1
Chromium	7440-47-3	6020B	23	B	1.3	0.56	mg/kg	1
Cobalt	7440-48-4	6020B	9.1		1.3	0.31	mg/kg	1
Copper	7440-50-8	6020B	34		1.3	0.33	mg/kg	1
Lead	7439-92-1	6020B	23		0.25	0.069	mg/kg	1
Mercury	7439-97-6	7471B	0.062	J	0.088	0.021	mg/kg	1
Nickel	7440-02-0	6020B	21		1.3	0.31	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.3	0.48	mg/kg	1
Silver	7440-22-4	6020B	0.11	J	0.25	0.061	mg/kg	1
Vanadium	7440-62-2	6020B	57		1.3	0.25	mg/kg	1
Zinc	7440-66-6	6020B	100		2.5	0.51	mg/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-004
Description: CMR-EB03-5.0-6.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1415
% Solids: 80.4 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	20	06/18/2019 1634	JM1		19924	4.85

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		31000	6100	ug/kg	1
Benzene	71-43-2	8260B	14000		7600	3100	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		7600	3100	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		7600	3100	ug/kg	1
Bromoform	75-25-2	8260B	ND		7600	3100	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		7600	3100	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		31000	6100	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		7600	3100	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		7600	3100	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		7600	3100	ug/kg	1
Chloroethane	75-00-3	8260B	ND		7600	3100	ug/kg	1
Chloroform	67-66-3	8260B	ND		7600	3100	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		7600	3100	ug/kg	1
Cyclohexane	110-82-7	8260B	22000		7600	3100	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		7600	3100	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		7600	3100	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		7600	3100	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		7600	3100	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		7600	3100	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		7600	3100	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		7600	3100	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		7600	3100	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		7600	3100	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		7600	3100	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		7600	3100	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		7600	3100	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		7600	3100	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		7600	3100	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		7600	3100	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		380000	38000	ug/kg	1
Ethylbenzene	100-41-4	8260B	47000		7600	3100	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		15000	6100	ug/kg	1
Isopropylbenzene	98-82-8	8260B	6800	J	7600	3100	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		7600	3100	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		7600	3100	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		15000	6100	ug/kg	1
Methylcyclohexane	108-87-2	8260B	90000		7600	3100	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		7600	3100	ug/kg	1
Naphthalene	91-20-3	8260B	20000		7600	3100	ug/kg	1
Styrene	100-42-5	8260B	ND		7600	3100	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		7600	3100	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		7600	3100	ug/kg	1
Toluene	108-88-3	8260B	4000	J	7600	3100	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		7600	3100	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-004
Description: CMR-EB03-5.0-6.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1415
% Solids: 80.4 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	20	06/18/2019 1634	JM1		19924	4.85

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		7600	3100	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		7600	3100	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		7600	3100	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		7600	3100	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		7600	3100	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		7600	3100	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		7600	3100	ug/kg	1
Xylenes (total)	1330-20-7	8260B	120000		15000	6100	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	98000		7600	3100	ug/kg	1
o - Xylenes	95-47-6	8260B	19000		7600	3100	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		138	53-142
Bromofluorobenzene	N	141	47-138
Toluene-d8	N	162	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-004
Description: CMR-EB03-5.0-6.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1415
% Solids: 80.4 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	06/22/2019 2208	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	540		170	51	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		170	59	ug/kg	1
Anthracene	120-12-7	8270D	760		170	32	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	170		170	37	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	120	J	170	41	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	200		170	31	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	51	J	170	40	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		170	30	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		810	310	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		810	310	ug/kg	1
Carbazole	86-74-8	8270D	ND		810	310	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		810	310	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		810	310	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		810	310	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		810	310	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		810	310	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		810	310	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		810	310	ug/kg	1
Chrysene	218-01-9	8270D	220		170	28	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		170	32	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		810	310	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4200	1500	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4200	1500	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4200	1500	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		810	310	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		810	310	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		810	310	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		810	460	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		810	310	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		810	310	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4200	1500	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4200	1500	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1700	620	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1700	620	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		810	310	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4200	1500	ug/kg	1
Fluoranthene	206-44-0	8270D	220		170	26	ug/kg	1
Fluorene	86-73-7	8270D	1600		170	35	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		810	310	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		810	310	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4200	1500	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		810	310	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		170	62	ug/kg	1
Isophorone	78-59-1	8270D	ND		810	310	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-004
Description: CMR-EB03-5.0-6.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1415
% Solids: 80.4 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	06/22/2019 2208	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	21000		170	61	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		810	310	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1700	620	ug/kg	1
Naphthalene	91-20-3	8270D	7300		170	60	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1700	620	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1700	620	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1700	620	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		810	310	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1700	620	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		4200	1500	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		810	310	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		810	310	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		4200	1500	ug/kg	1
Phenanthrene	85-01-8	8270D	3000		170	45	ug/kg	1
Phenol	108-95-2	8270D	ND		810	310	ug/kg	1
Pyrene	129-00-0	8270D	750		170	31	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		2000	620	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4200	620	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4200	1500	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		810	310	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		810	310	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		79	33-102
2-Fluorophenol		49	35-115
Nitrobenzene-d5	N	128	22-109
Phenol-d5		93	33-122
Terphenyl-d14		63	41-120
2,4,6-Tribromophenol		85	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-004
Description: CMR-EB03-5.0-6.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1415
% Solids: 80.4 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	5	06/27/2019 1737	CHG	06/17/2019 1329	19756

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	2600		58	58	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	6800		58	58	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)	N	29	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-004
Description: CMR-EB03-5.0-6.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1415
% Solids: 80.4 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	5	06/27/2019 1908	CHG	06/17/2019 1329	19757

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	2400		58	58	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		99	40-140
2-Fluorobiphenyl (fractionation 1)	N	168	40-140
o - Terphenyl (aromatic)		92	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-004
Description: CMR-EB03-5.0-6.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1415
% Solids: 80.4 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	10	06/19/2019 1603	JJG		20075

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	1200		44	8.8	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	870		44	8.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-004
Description: CMR-EB03-5.0-6.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1415
% Solids: 80.4 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	10	06/19/2019 1603	JJG		20074

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	17		2.9	0.40	mg/kg	1
C9 - C10 Aromatics		Montana VPH	570		15	5.9	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	43		2.9	0.36	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		2.9	0.63	mg/kg	1
Naphthalene	91-20-3	Montana VPH	62		2.9	1.5	mg/kg	1
Toluene	108-88-3	Montana VPH	5.6		2.9	0.47	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	16		2.9	0.66	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	15		2.9	0.33	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF13022-004
Description: CMR-EB03-5.0-6.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1415
% Solids: 80.4 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	10	06/19/2019 1603	JJG		20073

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	2700		89	18	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB03-5.0-6.0-190612
Date Sampled: 06/12/2019 1415
Date Received: 06/13/2019

Laboratory ID: UF13022-004
Matrix: Solid
% Solids: 80.4 06/13/2019 2347

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/23/2019 2154	LLL	06/22/2019 0957	20301
1	7471B	7471B	1	06/20/2019 1634	TJW	06/19/2019 2108	19617

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.33	BJ	0.52	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	10		0.52	0.21	mg/kg	1
Barium	7440-39-3	6020B	250		1.4	0.32	mg/kg	1
Beryllium	7440-41-7	6020B	0.79	B	0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	0.75		0.14	0.026	mg/kg	1
Chromium	7440-47-3	6020B	45	B	1.4	0.58	mg/kg	1
Cobalt	7440-48-4	6020B	6.1		1.4	0.31	mg/kg	1
Copper	7440-50-8	6020B	34		1.4	0.34	mg/kg	1
Lead	7439-92-1	6020B	46		0.26	0.071	mg/kg	1
Mercury	7439-97-6	7471B	0.044	J	0.10	0.024	mg/kg	1
Nickel	7440-02-0	6020B	25		1.4	0.31	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.49	mg/kg	1
Silver	7440-22-4	6020B	0.31		0.26	0.062	mg/kg	1
Vanadium	7440-62-2	6020B	37		1.4	0.26	mg/kg	1
Zinc	7440-66-6	6020B	130		2.6	0.52	mg/kg	1

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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-005
Description: CMR-EB03-9.0-10.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1500
% Solids: 88.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	2	06/19/2019 1723	JM1		20121	7.73

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1700	340	ug/kg	2
Benzene	71-43-2	8260B	490		430	170	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		430	170	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		430	170	ug/kg	2
Bromoform	75-25-2	8260B	ND		430	170	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		430	170	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		1700	340	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		430	170	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		430	170	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		430	170	ug/kg	2
Chloroethane	75-00-3	8260B	ND		430	170	ug/kg	2
Chloroform	67-66-3	8260B	ND		430	170	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		430	170	ug/kg	2
Cyclohexane	110-82-7	8260B	3400		430	170	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		430	170	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		430	170	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		430	170	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		430	170	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		430	170	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		430	170	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		430	170	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		430	170	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		430	170	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		430	170	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		430	170	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		430	170	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		430	170	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		430	170	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		430	170	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		21000	2100	ug/kg	2
Ethylbenzene	100-41-4	8260B	1000		430	170	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		850	340	ug/kg	2
Isopropylbenzene	98-82-8	8260B	710		430	170	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		430	170	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		430	170	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		850	340	ug/kg	2
Methylcyclohexane	108-87-2	8260B	9000		430	170	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		430	170	ug/kg	2
Naphthalene	91-20-3	8260B	1300		430	170	ug/kg	2
Styrene	100-42-5	8260B	ND		430	170	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		430	170	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		430	170	ug/kg	2
Toluene	108-88-3	8260B	220	J	430	170	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		430	170	ug/kg	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-005
Description: CMR-EB03-9.0-10.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1500
% Solids: 88.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	2	06/19/2019 1723	JM1		20121	7.73

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		430	170	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		430	170	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		430	170	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		430	170	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		430	170	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		430	170	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		430	170	ug/kg	2
Xylenes (total)	1330-20-7	8260B	480	J	850	340	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	340	J	430	170	ug/kg	2
o - Xylenes	95-47-6	8260B	ND		430	170	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		86	53-142
Bromofluorobenzene		90	47-138
Toluene-d8		98	68-124

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-005
Description: CMR-EB03-9.0-10.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1500
% Solids: 88.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	06/22/2019 2233	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	20	J	29	9.0	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		29	10	ug/kg	1
Anthracene	120-12-7	8270D	24	J	29	5.5	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		29	6.4	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		29	7.2	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		29	5.4	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		29	7.1	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		29	5.2	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		140	54	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		140	54	ug/kg	1
Carbazole	86-74-8	8270D	ND		140	54	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		140	54	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		140	54	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		140	54	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		140	54	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		140	54	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		140	54	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		140	54	ug/kg	1
Chrysene	218-01-9	8270D	ND		29	4.9	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		29	5.5	ug/kg	1
Dibenzofuran	132-64-9	8270D	57	J	140	54	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		730	270	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		730	270	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		730	270	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		140	54	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		140	54	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		140	54	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		140	80	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		140	54	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		140	54	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		730	270	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		730	270	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		290	110	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		290	110	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		140	54	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		730	270	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		29	4.6	ug/kg	1
Fluorene	86-73-7	8270D	99		29	6.2	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		140	54	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		140	54	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		730	270	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		140	54	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		29	11	ug/kg	1
Isophorone	78-59-1	8270D	ND		140	54	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-005
Description: CMR-EB03-9.0-10.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1500
% Solids: 88.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	06/22/2019 2233	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	1500		29	11	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		140	54	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		290	110	ug/kg	1
Naphthalene	91-20-3	8270D	580		29	11	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		290	110	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		290	110	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		290	110	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		140	54	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		290	110	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		730	270	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		140	54	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		140	54	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		730	270	ug/kg	1
Phenanthrene	85-01-8	8270D	97		29	7.8	ug/kg	1
Phenol	108-95-2	8270D	ND		140	54	ug/kg	1
Pyrene	129-00-0	8270D	25	J	29	5.4	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		360	110	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		730	110	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		730	270	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		140	54	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		140	54	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		53	33-102
2-Fluorophenol		35	35-115
Nitrobenzene-d5		55	22-109
Phenol-d5		35	33-122
Terphenyl-d14		51	41-120
2,4,6-Tribromophenol		53	30-117

LOQ = Limit of Quantitation
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-005
Description: CMR-EB03-9.0-10.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1500
% Solids: 88.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/24/2019 1718	CHG	06/17/2019 1329	19756

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	52		10	10	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	120		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		72	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-005
Description: CMR-EB03-9.0-10.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1500
% Solids: 88.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/24/2019 1922	CHG	06/17/2019 1329	19757

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	15		10	10	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		41	40-140
2-Fluorobiphenyl (fractionation 1)		93	40-140
o - Terphenyl (aromatic)		75	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-005
Description: CMR-EB03-9.0-10.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1500
% Solids: 88.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1631	JJG		20075

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	480		5.8	1.2	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	350		5.8	1.2	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	420	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF13022-005
Description: CMR-EB03-9.0-10.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1500
% Solids: 88.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1631	JJG		20074

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	1.5		0.39	0.053	mg/kg	1
C9 - C10 Aromatics		Montana VPH	210		1.9	0.78	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	9.5		0.39	0.048	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.39	0.084	mg/kg	1
Naphthalene	91-20-3	Montana VPH	13		0.39	0.20	mg/kg	1
Toluene	108-88-3	Montana VPH	2.0		0.39	0.062	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	2.0		0.39	0.087	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	13		0.39	0.044	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	161	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF13022-005
Description: CMR-EB03-9.0-10.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1500
% Solids: 88.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1631	JJG		20073

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1000		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	424	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-005
Description: CMR-EB03-9.0-10.0-190612
Matrix: Solid
Date Sampled: 06/12/2019 1500
% Solids: 88.8 06/13/2019 2347
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/23/2019 2200	LLL	06/22/2019 0957	20301
1	7471B	7471B	1	06/20/2019 1641	TJW	06/19/2019 2108	19617

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.23	BJ	0.46	0.18	mg/kg	1
Arsenic	7440-38-2	6020B	7.1		0.46	0.18	mg/kg	1
Barium	7440-39-3	6020B	180		1.2	0.29	mg/kg	1
Beryllium	7440-41-7	6020B	1.2	B	0.092	0.031	mg/kg	1
Cadmium	7440-43-9	6020B	1.0		0.12	0.023	mg/kg	1
Chromium	7440-47-3	6020B	21	B	1.2	0.51	mg/kg	1
Cobalt	7440-48-4	6020B	7.7		1.2	0.28	mg/kg	1
Copper	7440-50-8	6020B	24		1.2	0.30	mg/kg	1
Lead	7439-92-1	6020B	20		0.23	0.063	mg/kg	1
Mercury	7439-97-6	7471B	0.056	J	0.086	0.021	mg/kg	1
Nickel	7440-02-0	6020B	14		1.2	0.28	mg/kg	1
Selenium	7782-49-2	6020B	0.56	J	1.2	0.44	mg/kg	1
Silver	7440-22-4	6020B	0.10	J	0.23	0.055	mg/kg	1
Vanadium	7440-62-2	6020B	57		1.2	0.23	mg/kg	1
Zinc	7440-66-6	6020B	63		2.3	0.46	mg/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-006
Description: TB-09-20190612
Matrix: Aqueous
Date Sampled: 06/12/2019
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/22/2019 2330	STM		20424

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

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N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF13022-006
Description: TB-09-20190612
Matrix: Aqueous
Date Sampled: 06/12/2019
Date Received: 06/13/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/22/2019 2330	STM		20424

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		102	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19924-001
Batch: 19924
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	06/17/2019 1617
Benzene	ND		1	250	100	ug/kg	06/17/2019 1617
Bromochloromethane	ND		1	250	100	ug/kg	06/17/2019 1617
Bromodichloromethane	ND		1	250	100	ug/kg	06/17/2019 1617
Bromoform	ND		1	250	100	ug/kg	06/17/2019 1617
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	06/17/2019 1617
2-Butanone (MEK)	ND		1	1000	200	ug/kg	06/17/2019 1617
Carbon disulfide	ND		1	250	100	ug/kg	06/17/2019 1617
Carbon tetrachloride	ND		1	250	100	ug/kg	06/17/2019 1617
Chlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
Chloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
Chloroform	ND		1	250	100	ug/kg	06/17/2019 1617
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	06/17/2019 1617
Cyclohexane	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	06/17/2019 1617
Dibromochloromethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
Dichlorodifluoromethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,1-Dichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,1-Dichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dichloropropane	ND		1	250	100	ug/kg	06/17/2019 1617
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/17/2019 1617
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/17/2019 1617
1,4-Dioxane	ND		1	13000	1300	ug/kg	06/17/2019 1617
Ethylbenzene	ND		1	250	100	ug/kg	06/17/2019 1617
2-Hexanone	ND		1	500	200	ug/kg	06/17/2019 1617
Isopropylbenzene	ND		1	250	100	ug/kg	06/17/2019 1617
Methyl acetate	ND		1	250	100	ug/kg	06/17/2019 1617
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	06/17/2019 1617
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	06/17/2019 1617
Methylcyclohexane	ND		1	250	100	ug/kg	06/17/2019 1617
Methylene chloride	ND		1	250	100	ug/kg	06/17/2019 1617
Naphthalene	ND		1	250	100	ug/kg	06/17/2019 1617
Styrene	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
Tetrachloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
Toluene	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	06/17/2019 1617

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19924-001
Batch: 19924
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
Trichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
Trichlorofluoromethane	ND		1	250	100	ug/kg	06/17/2019 1617
Vinyl chloride	ND		1	250	100	ug/kg	06/17/2019 1617
Xylenes (total)	ND		1	500	200	ug/kg	06/17/2019 1617
m+p - Xylenes	ND		1	250	100	ug/kg	06/17/2019 1617
o - Xylenes	ND		1	250	100	ug/kg	06/17/2019 1617

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		106	53-142
Bromofluorobenzene		109	47-138
Toluene-d8		110	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19924-002
Batch: 19924
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	4900		1	97	60-140	06/18/2019 1718
Benzene	2500	2800		1	112	70-130	06/18/2019 1718
Bromochloromethane	2500	2700		1	109	70-130	06/18/2019 1718
Bromodichloromethane	2500	2700		1	109	70-130	06/18/2019 1718
Bromoform	2500	2600		1	104	70-130	06/18/2019 1718
Bromomethane (Methyl bromide)	2500	2200		1	88	70-130	06/18/2019 1718
2-Butanone (MEK)	5000	4700		1	95	60-140	06/18/2019 1718
Carbon disulfide	2500	2500		1	101	70-130	06/18/2019 1718
Carbon tetrachloride	2500	2900		1	117	70-130	06/18/2019 1718
Chlorobenzene	2500	2800		1	111	70-130	06/18/2019 1718
Chloroethane	2500	2600		1	106	70-130	06/18/2019 1718
Chloroform	2500	2800		1	113	70-130	06/18/2019 1718
Chloromethane (Methyl chloride)	2500	2300		1	93	60-140	06/18/2019 1718
Cyclohexane	2500	3000		1	122	70-130	06/18/2019 1718
1,2-Dibromo-3-chloropropane (DBCP)	2500	2400		1	96	70-130	06/18/2019 1718
Dibromochloromethane	2500	2800		1	112	70-130	06/18/2019 1718
1,2-Dibromoethane (EDB)	2500	2800		1	111	70-130	06/18/2019 1718
1,2-Dichlorobenzene	2500	2700		1	109	70-130	06/18/2019 1718
1,3-Dichlorobenzene	2500	2800		1	113	70-130	06/18/2019 1718
1,4-Dichlorobenzene	2500	2800		1	111	70-130	06/18/2019 1718
Dichlorodifluoromethane	2500	2400		1	97	60-140	06/18/2019 1718
1,1-Dichloroethane	2500	2700		1	110	70-130	06/18/2019 1718
1,2-Dichloroethane	2500	2700		1	108	70-130	06/18/2019 1718
1,1-Dichloroethene	2500	3000		1	119	70-130	06/18/2019 1718
cis-1,2-Dichloroethene	2500	2700		1	108	70-130	06/18/2019 1718
trans-1,2-Dichloroethene	2500	3000		1	118	70-130	06/18/2019 1718
1,2-Dichloropropane	2500	2800		1	111	70-130	06/18/2019 1718
cis-1,3-Dichloropropene	2500	2800		1	113	70-130	06/18/2019 1718
trans-1,3-Dichloropropene	2500	2900		1	115	70-130	06/18/2019 1718
1,4-Dioxane	25000	24000		1	95	60-140	06/18/2019 1718
Ethylbenzene	2500	2900		1	115	70-130	06/18/2019 1718
2-Hexanone	5000	5400		1	108	70-130	06/18/2019 1718
Isopropylbenzene	2500	2900		1	118	70-130	06/18/2019 1718
Methyl acetate	2500	2100		1	85	70-130	06/18/2019 1718
Methyl tertiary butyl ether (MTBE)	2500	2600		1	104	70-130	06/18/2019 1718
4-Methyl-2-pentanone	5000	5100		1	102	70-130	06/18/2019 1718
Methylcyclohexane	2500	3400	N	1	137	70-130	06/18/2019 1718
Methylene chloride	2500	2500		1	101	70-130	06/18/2019 1718
Naphthalene	2500	2500		1	101	70-130	06/18/2019 1718
Styrene	2500	2900		1	116	70-130	06/18/2019 1718
1,1,2,2-Tetrachloroethane	2500	2800		1	113	70-130	06/18/2019 1718
Tetrachloroethene	2500	3000		1	121	70-130	06/18/2019 1718
Toluene	2500	2900		1	116	70-130	06/18/2019 1718
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3100		1	122	70-130	06/18/2019 1718

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19924-002
Batch: 19924
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2800		1	113	70-130	06/18/2019 1718
1,2,4-Trichlorobenzene	2500	2900		1	115	70-130	06/18/2019 1718
1,1,1-Trichloroethane	2500	2900		1	114	70-130	06/18/2019 1718
1,1,2-Trichloroethane	2500	2800		1	111	70-130	06/18/2019 1718
Trichloroethene	2500	2800		1	112	70-130	06/18/2019 1718
Trichlorofluoromethane	2500	2900		1	118	70-130	06/18/2019 1718
Vinyl chloride	2500	2400		1	97	70-130	06/18/2019 1718
Xylenes (total)	5000	5800		1	117	70-130	06/18/2019 1718
m+p - Xylenes	2500	3000		1	118	70-130	06/18/2019 1718
o - Xylenes	2500	2900		1	115	70-130	06/18/2019 1718

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		108	53-142
Bromofluorobenzene		110	47-138
Toluene-d8		111	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20120-001
Batch: 20120
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	4.0	ug/kg	06/19/2019 0947
Benzene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Bromochloromethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Bromoform	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Bromomethane (Methyl bromide)	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	06/19/2019 0947
Carbon disulfide	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Chlorobenzene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Chloroethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Chloroform	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Chloromethane (Methyl chloride)	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Cyclohexane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Dichlorodifluoromethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,4-Dioxane	ND		1	250	25	ug/kg	06/19/2019 0947
Ethylbenzene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
2-Hexanone	ND		1	10	4.0	ug/kg	06/19/2019 0947
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Methyl acetate	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	06/19/2019 0947
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Methylene chloride	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Naphthalene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Styrene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Toluene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20120-001
Batch: 20120
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Trichloroethene	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Vinyl chloride	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
Xylenes (total)	ND		1	10	4.0	ug/kg	06/19/2019 0947
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	06/19/2019 0947
o - Xylenes	ND		1	5.0	2.0	ug/kg	06/19/2019 0947

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		101	53-142
Bromofluorobenzene		114	47-138
Toluene-d8		111	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20120-002
Batch: 20120
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	110		1	106	60-140	06/19/2019 0925
Benzene	50	56		1	111	70-130	06/19/2019 0925
Bromochloromethane	50	52		1	104	70-130	06/19/2019 0925
Bromodichloromethane	50	54		1	108	70-130	06/19/2019 0925
Bromoform	50	53		1	107	70-130	06/19/2019 0925
Bromomethane (Methyl bromide)	50	59		1	119	70-130	06/19/2019 0925
2-Butanone (MEK)	100	110		1	113	60-140	06/19/2019 0925
Carbon disulfide	50	60		1	121	70-130	06/19/2019 0925
Carbon tetrachloride	50	59		1	119	70-130	06/19/2019 0925
Chlorobenzene	50	54		1	107	70-130	06/19/2019 0925
Chloroethane	50	64		1	128	70-130	06/19/2019 0925
Chloroform	50	55		1	109	70-130	06/19/2019 0925
Chloromethane (Methyl chloride)	50	54		1	109	60-140	06/19/2019 0925
Cyclohexane	50	57		1	114	70-130	06/19/2019 0925
1,2-Dibromo-3-chloropropane (DBCP)	50	52		1	104	70-130	06/19/2019 0925
Dibromochloromethane	50	55		1	109	70-130	06/19/2019 0925
1,2-Dibromoethane (EDB)	50	55		1	111	70-130	06/19/2019 0925
1,2-Dichlorobenzene	50	53		1	107	70-130	06/19/2019 0925
1,3-Dichlorobenzene	50	54		1	107	70-130	06/19/2019 0925
1,4-Dichlorobenzene	50	54		1	108	70-130	06/19/2019 0925
Dichlorodifluoromethane	50	61		1	122	60-140	06/19/2019 0925
1,1-Dichloroethane	50	56		1	111	70-130	06/19/2019 0925
1,2-Dichloroethane	50	53		1	106	70-130	06/19/2019 0925
1,1-Dichloroethene	50	65	N	1	131	70-130	06/19/2019 0925
cis-1,2-Dichloroethene	50	56		1	111	70-130	06/19/2019 0925
trans-1,2-Dichloroethene	50	60		1	120	70-130	06/19/2019 0925
1,2-Dichloropropane	50	54		1	107	70-130	06/19/2019 0925
cis-1,3-Dichloropropene	50	55		1	110	70-130	06/19/2019 0925
trans-1,3-Dichloropropene	50	56		1	112	70-130	06/19/2019 0925
1,4-Dioxane	500	560		1	111	60-140	06/19/2019 0925
Ethylbenzene	50	56		1	113	70-130	06/19/2019 0925
2-Hexanone	100	120		1	117	70-130	06/19/2019 0925
Isopropylbenzene	50	58		1	116	70-130	06/19/2019 0925
Methyl acetate	50	44		1	88	70-130	06/19/2019 0925
Methyl tertiary butyl ether (MTBE)	50	52		1	105	70-130	06/19/2019 0925
4-Methyl-2-pentanone	100	110		1	108	70-130	06/19/2019 0925
Methylcyclohexane	50	60		1	120	70-130	06/19/2019 0925
Methylene chloride	50	53		1	107	70-130	06/19/2019 0925
Naphthalene	50	55		1	110	70-130	06/19/2019 0925
Styrene	50	57		1	113	70-130	06/19/2019 0925
1,1,2,2-Tetrachloroethane	50	55		1	109	70-130	06/19/2019 0925
Tetrachloroethene	50	58		1	117	70-130	06/19/2019 0925
Toluene	50	57		1	114	70-130	06/19/2019 0925
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	55		1	111	70-130	06/19/2019 0925

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20120-002
Batch: 20120
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	57		1	115	70-130	06/19/2019 0925
1,2,4-Trichlorobenzene	50	58		1	116	70-130	06/19/2019 0925
1,1,1-Trichloroethane	50	55		1	111	70-130	06/19/2019 0925
1,1,2-Trichloroethane	50	55		1	110	70-130	06/19/2019 0925
Trichloroethene	50	55		1	110	70-130	06/19/2019 0925
Trichlorofluoromethane	50	69	N	1	138	70-130	06/19/2019 0925
Vinyl chloride	50	56		1	111	70-130	06/19/2019 0925
Xylenes (total)	100	110		1	114	70-130	06/19/2019 0925
m+p - Xylenes	50	57		1	114	70-130	06/19/2019 0925
o - Xylenes	50	57		1	114	70-130	06/19/2019 0925

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		101	53-142
Bromofluorobenzene		115	47-138
Toluene-d8		112	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20121-001
Batch: 20121
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	06/17/2019 1617
Benzene	ND		1	250	100	ug/kg	06/17/2019 1617
Bromochloromethane	ND		1	250	100	ug/kg	06/17/2019 1617
Bromodichloromethane	ND		1	250	100	ug/kg	06/17/2019 1617
Bromoform	ND		1	250	100	ug/kg	06/17/2019 1617
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	06/17/2019 1617
2-Butanone (MEK)	ND		1	1000	200	ug/kg	06/17/2019 1617
Carbon disulfide	ND		1	250	100	ug/kg	06/17/2019 1617
Carbon tetrachloride	ND		1	250	100	ug/kg	06/17/2019 1617
Chlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
Chloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
Chloroform	ND		1	250	100	ug/kg	06/17/2019 1617
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	06/17/2019 1617
Cyclohexane	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	06/17/2019 1617
Dibromochloromethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
Dichlorodifluoromethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,1-Dichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,1-Dichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dichloropropane	ND		1	250	100	ug/kg	06/17/2019 1617
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/17/2019 1617
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/17/2019 1617
1,4-Dioxane	ND		1	13000	1300	ug/kg	06/17/2019 1617
Ethylbenzene	ND		1	250	100	ug/kg	06/17/2019 1617
2-Hexanone	ND		1	500	200	ug/kg	06/17/2019 1617
Isopropylbenzene	ND		1	250	100	ug/kg	06/17/2019 1617
Methyl acetate	ND		1	250	100	ug/kg	06/17/2019 1617
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	06/17/2019 1617
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	06/17/2019 1617
Methylcyclohexane	ND		1	250	100	ug/kg	06/17/2019 1617
Methylene chloride	ND		1	250	100	ug/kg	06/17/2019 1617
Naphthalene	ND		1	250	100	ug/kg	06/17/2019 1617
Styrene	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
Tetrachloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
Toluene	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	06/17/2019 1617

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20121-001
Batch: 20121
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
Trichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
Trichlorofluoromethane	ND		1	250	100	ug/kg	06/17/2019 1617
Vinyl chloride	ND		1	250	100	ug/kg	06/17/2019 1617
Xylenes (total)	ND		1	500	200	ug/kg	06/17/2019 1617
m+p - Xylenes	ND		1	250	100	ug/kg	06/17/2019 1617
o - Xylenes	ND		1	250	100	ug/kg	06/17/2019 1617

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		106	53-142
Bromofluorobenzene		109	47-138
Toluene-d8		110	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20121-002
Batch: 20121
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	4900		1	97	60-140	06/18/2019 1718
Benzene	2500	2800		1	112	70-130	06/18/2019 1718
Bromochloromethane	2500	2700		1	109	70-130	06/18/2019 1718
Bromodichloromethane	2500	2700		1	109	70-130	06/18/2019 1718
Bromoform	2500	2600		1	104	70-130	06/18/2019 1718
Bromomethane (Methyl bromide)	2500	2200		1	88	70-130	06/18/2019 1718
2-Butanone (MEK)	5000	4700		1	95	60-140	06/18/2019 1718
Carbon disulfide	2500	2500		1	101	70-130	06/18/2019 1718
Carbon tetrachloride	2500	2900		1	117	70-130	06/18/2019 1718
Chlorobenzene	2500	2800		1	111	70-130	06/18/2019 1718
Chloroethane	2500	2600		1	106	70-130	06/18/2019 1718
Chloroform	2500	2800		1	113	70-130	06/18/2019 1718
Chloromethane (Methyl chloride)	2500	2300		1	93	60-140	06/18/2019 1718
Cyclohexane	2500	3000		1	122	70-130	06/18/2019 1718
1,2-Dibromo-3-chloropropane (DBCP)	2500	2400		1	96	70-130	06/18/2019 1718
Dibromochloromethane	2500	2800		1	112	70-130	06/18/2019 1718
1,2-Dibromoethane (EDB)	2500	2800		1	111	70-130	06/18/2019 1718
1,2-Dichlorobenzene	2500	2700		1	109	70-130	06/18/2019 1718
1,3-Dichlorobenzene	2500	2800		1	113	70-130	06/18/2019 1718
1,4-Dichlorobenzene	2500	2800		1	111	70-130	06/18/2019 1718
Dichlorodifluoromethane	2500	2400		1	97	60-140	06/18/2019 1718
1,1-Dichloroethane	2500	2700		1	110	70-130	06/18/2019 1718
1,2-Dichloroethane	2500	2700		1	108	70-130	06/18/2019 1718
1,1-Dichloroethene	2500	3000		1	119	70-130	06/18/2019 1718
cis-1,2-Dichloroethene	2500	2700		1	108	70-130	06/18/2019 1718
trans-1,2-Dichloroethene	2500	3000		1	118	70-130	06/18/2019 1718
1,2-Dichloropropane	2500	2800		1	111	70-130	06/18/2019 1718
cis-1,3-Dichloropropene	2500	2800		1	113	70-130	06/18/2019 1718
trans-1,3-Dichloropropene	2500	2900		1	115	70-130	06/18/2019 1718
1,4-Dioxane	25000	24000		1	95	60-140	06/18/2019 1718
Ethylbenzene	2500	2900		1	115	70-130	06/18/2019 1718
2-Hexanone	5000	5400		1	108	70-130	06/18/2019 1718
Isopropylbenzene	2500	2900		1	118	70-130	06/18/2019 1718
Methyl acetate	2500	2100		1	85	70-130	06/18/2019 1718
Methyl tertiary butyl ether (MTBE)	2500	2600		1	104	70-130	06/18/2019 1718
4-Methyl-2-pentanone	5000	5100		1	102	70-130	06/18/2019 1718
Methylcyclohexane	2500	3400	N	1	137	70-130	06/18/2019 1718
Methylene chloride	2500	2500		1	101	70-130	06/18/2019 1718
Naphthalene	2500	2500		1	101	70-130	06/18/2019 1718
Styrene	2500	2900		1	116	70-130	06/18/2019 1718
1,1,2,2-Tetrachloroethane	2500	2800		1	113	70-130	06/18/2019 1718
Tetrachloroethene	2500	3000		1	121	70-130	06/18/2019 1718
Toluene	2500	2900		1	116	70-130	06/18/2019 1718
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3100		1	122	70-130	06/18/2019 1718

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20121-002
Batch: 20121
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2800		1	113	70-130	06/18/2019 1718
1,2,4-Trichlorobenzene	2500	2900		1	115	70-130	06/18/2019 1718
1,1,1-Trichloroethane	2500	2900		1	114	70-130	06/18/2019 1718
1,1,2-Trichloroethane	2500	2800		1	111	70-130	06/18/2019 1718
Trichloroethene	2500	2800		1	112	70-130	06/18/2019 1718
Trichlorofluoromethane	2500	2900		1	118	70-130	06/18/2019 1718
Vinyl chloride	2500	2400		1	97	70-130	06/18/2019 1718
Xylenes (total)	5000	5800		1	117	70-130	06/18/2019 1718
m+p - Xylenes	2500	3000		1	118	70-130	06/18/2019 1718
o - Xylenes	2500	2900		1	115	70-130	06/18/2019 1718

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		108	53-142
Bromofluorobenzene		110	47-138
Toluene-d8		111	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20424-001
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/22/2019 1531
Benzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromoform	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/22/2019 1531
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloroform	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Cyclohexane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/22/2019 1531
1,4-Dioxane	ND		1	20	13	ug/L	06/22/2019 1531
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
2-Hexanone	ND		1	10	2.0	ug/L	06/22/2019 1531
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Methyl acetate	ND		1	1.0	0.40	ug/L	06/22/2019 1531
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/22/2019 1531
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/22/2019 1531
Methylene chloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Naphthalene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Styrene	ND		1	0.50	0.41	ug/L	06/22/2019 1531
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Toluene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/22/2019 1531

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20424-001
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Trichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/22/2019 1531
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/22/2019 1531
o - Xylenes	ND		1	0.50	0.40	ug/L	06/22/2019 1531

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		106	70-130
Bromofluorobenzene		106	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20424-002
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	63		1	63	60-140	06/22/2019 1428
Benzene	50	55		1	110	70-130	06/22/2019 1428
Bromochloromethane	50	49		1	98	70-130	06/22/2019 1428
Bromodichloromethane	50	56		1	112	70-130	06/22/2019 1428
Bromoform	50	49		1	97	70-130	06/22/2019 1428
Bromomethane (Methyl bromide)	50	46		1	93	70-130	06/22/2019 1428
2-Butanone (MEK)	100	88		1	88	70-130	06/22/2019 1428
Carbon disulfide	50	47		1	94	70-130	06/22/2019 1428
Carbon tetrachloride	50	50		1	100	70-130	06/22/2019 1428
Chlorobenzene	50	49		1	99	70-130	06/22/2019 1428
Chloroethane	50	50		1	101	70-130	06/22/2019 1428
Chloroform	50	49		1	98	70-130	06/22/2019 1428
Chloromethane (Methyl chloride)	50	55		1	109	60-140	06/22/2019 1428
Cyclohexane	50	46		1	93	70-130	06/22/2019 1428
1,2-Dibromo-3-chloropropane (DBCP)	50	55		1	111	70-130	06/22/2019 1428
Dibromochloromethane	50	53		1	107	70-130	06/22/2019 1428
1,2-Dibromoethane (EDB)	50	52		1	105	70-130	06/22/2019 1428
1,2-Dichlorobenzene	50	48		1	97	70-130	06/22/2019 1428
1,3-Dichlorobenzene	50	48		1	97	70-130	06/22/2019 1428
1,4-Dichlorobenzene	50	47		1	94	70-130	06/22/2019 1428
Dichlorodifluoromethane	50	52		1	105	60-140	06/22/2019 1428
1,1-Dichloroethane	50	49		1	99	70-130	06/22/2019 1428
1,2-Dichloroethane	50	56		1	112	70-130	06/22/2019 1428
1,1-Dichloroethene	50	51		1	101	70-130	06/22/2019 1428
cis-1,2-Dichloroethene	50	50		1	100	70-130	06/22/2019 1428
trans-1,2-Dichloroethene	50	53		1	106	70-130	06/22/2019 1428
1,2-Dichloropropane	50	55		1	110	70-130	06/22/2019 1428
cis-1,3-Dichloropropene	50	60		1	120	70-130	06/22/2019 1428
trans-1,3-Dichloropropene	50	53		1	106	70-130	06/22/2019 1428
1,4-Dioxane	500	530		1	107	60-140	06/22/2019 1428
Ethylbenzene	50	52		1	104	70-130	06/22/2019 1428
2-Hexanone	100	110		1	107	70-130	06/22/2019 1428
Isopropylbenzene	50	51		1	101	70-130	06/22/2019 1428
Methyl acetate	50	41		1	81	70-130	06/22/2019 1428
Methyl tertiary butyl ether (MTBE)	50	47		1	94	70-130	06/22/2019 1428
4-Methyl-2-pentanone	100	120		1	118	70-130	06/22/2019 1428
Methylcyclohexane	50	56		1	112	70-130	06/22/2019 1428
Methylene chloride	50	46		1	93	70-130	06/22/2019 1428
Naphthalene	50	57		1	115	70-130	06/22/2019 1428
Styrene	50	52		1	104	70-130	06/22/2019 1428
1,1,2,2-Tetrachloroethane	50	50		1	100	70-130	06/22/2019 1428
Tetrachloroethene	50	50		1	101	70-130	06/22/2019 1428
Toluene	50	50		1	101	70-130	06/22/2019 1428
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	44		1	88	70-130	06/22/2019 1428

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20424-002
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	56		1	112	70-130	06/22/2019 1428
1,2,4-Trichlorobenzene	50	54		1	108	70-130	06/22/2019 1428
1,1,1-Trichloroethane	50	48		1	96	70-130	06/22/2019 1428
1,1,2-Trichloroethane	50	51		1	102	70-130	06/22/2019 1428
Trichloroethene	50	53		1	107	70-130	06/22/2019 1428
Trichlorofluoromethane	50	49		1	97	70-130	06/22/2019 1428
Vinyl chloride	50	46		1	93	70-130	06/22/2019 1428
Xylenes (total)	100	100		1	101	70-130	06/22/2019 1428
m+p - Xylenes	50	52		1	103	70-130	06/22/2019 1428
o - Xylenes	50	50		1	100	70-130	06/22/2019 1428

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		105	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Shealy Environmental Services, Inc.
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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ20424-003
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acetone	100	54	N	1	54	15	60-140	20	06/23/2019 0039
Benzene	50	50		1	100	9.2	70-130	20	06/23/2019 0039
Bromochloromethane	50	49		1	98	0.067	70-130	20	06/23/2019 0039
Bromodichloromethane	50	48		1	96	15	70-130	20	06/23/2019 0039
Bromoform	50	46		1	91	6.4	70-130	20	06/23/2019 0039
Bromomethane (Methyl bromide)	50	45		1	90	3.2	70-130	20	06/23/2019 0039
2-Butanone (MEK)	100	86		1	86	2.6	70-130	20	06/23/2019 0039
Carbon disulfide	50	42		1	85	9.8	70-130	20	06/23/2019 0039
Carbon tetrachloride	50	46		1	92	8.7	70-130	20	06/23/2019 0039
Chlorobenzene	50	50		1	99	0.48	70-130	20	06/23/2019 0039
Chloroethane	50	47		1	93	7.4	70-130	20	06/23/2019 0039
Chloroform	50	49		1	97	0.92	70-130	20	06/23/2019 0039
Chloromethane (Methyl chloride)	50	51		1	103	6.4	60-140	20	06/23/2019 0039
Cyclohexane	50	41		1	82	13	70-130	20	06/23/2019 0039
1,2-Dibromo-3-chloropropane (DBCP)	50	51		1	102	7.8	70-130	20	06/23/2019 0039
Dibromochloromethane	50	51		1	102	4.2	70-130	20	06/23/2019 0039
1,2-Dibromoethane (EDB)	50	53		1	105	0.55	70-130	20	06/23/2019 0039
1,2-Dichlorobenzene	50	46		1	92	4.9	70-130	20	06/23/2019 0039
1,3-Dichlorobenzene	50	49		1	97	0.84	70-130	20	06/23/2019 0039
1,4-Dichlorobenzene	50	46		1	92	2.1	70-130	20	06/23/2019 0039
Dichlorodifluoromethane	50	49		1	99	5.9	60-140	20	06/23/2019 0039
1,1-Dichloroethane	50	46		1	93	5.8	70-130	20	06/23/2019 0039
1,2-Dichloroethane	50	47		1	95	17	70-130	20	06/23/2019 0039
1,1-Dichloroethene	50	47		1	94	7.2	70-130	20	06/23/2019 0039
cis-1,2-Dichloroethene	50	49		1	98	1.4	70-130	20	06/23/2019 0039
trans-1,2-Dichloroethene	50	49		1	99	7.4	70-130	20	06/23/2019 0039
1,2-Dichloropropane	50	46		1	92	18	70-130	20	06/23/2019 0039
cis-1,3-Dichloropropene	50	43	+	1	87	32	70-130	20	06/23/2019 0039
trans-1,3-Dichloropropene	50	48		1	96	9.8	70-130	20	06/23/2019 0039
1,4-Dioxane	500	470		1	94	13	60-140	20	06/23/2019 0039
Ethylbenzene	50	52		1	104	0.37	70-130	20	06/23/2019 0039
2-Hexanone	100	110		1	107	0.11	70-130	20	06/23/2019 0039
Isopropylbenzene	50	54		1	107	5.3	70-130	20	06/23/2019 0039
Methyl acetate	50	40		1	80	2.2	70-130	20	06/23/2019 0039
Methyl tertiary butyl ether (MTBE)	50	47		1	95	0.71	70-130	20	06/23/2019 0039
4-Methyl-2-pentanone	100	100		1	104	12	70-130	20	06/23/2019 0039
Methylcyclohexane	50	43	+	1	86	26	70-130	20	06/23/2019 0039
Methylene chloride	50	45		1	90	3.0	70-130	20	06/23/2019 0039
Naphthalene	50	49		1	97	16	70-130	20	06/23/2019 0039
Styrene	50	55		1	111	6.2	70-130	20	06/23/2019 0039
1,1,2,2-Tetrachloroethane	50	55		1	109	8.5	70-130	20	06/23/2019 0039
Tetrachloroethene	50	49		1	98	3.0	70-130	20	06/23/2019 0039
Toluene	50	48		1	95	5.9	70-130	20	06/23/2019 0039
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	40		1	80	9.8	70-130	20	06/23/2019 0039

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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ20424-003
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
1,2,3-Trichlorobenzene	50	48		1	95	17	70-130	20	06/23/2019 0039
1,2,4-Trichlorobenzene	50	44	+	1	87	22	70-130	20	06/23/2019 0039
1,1,1-Trichloroethane	50	46		1	91	4.7	70-130	20	06/23/2019 0039
1,1,2-Trichloroethane	50	52		1	104	1.3	70-130	20	06/23/2019 0039
Trichloroethene	50	48		1	96	10	70-130	20	06/23/2019 0039
Trichlorofluoromethane	50	44		1	89	8.7	70-130	20	06/23/2019 0039
Vinyl chloride	50	43		1	86	7.3	70-130	20	06/23/2019 0039
Xylenes (total)	100	100		1	105	3.2	70-130	20	06/23/2019 0039
m+p - Xylenes	50	52		1	104	1.2	70-130	20	06/23/2019 0039
o - Xylenes	50	53		1	105	5.2	70-130	20	06/23/2019 0039

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		89	70-130
Bromofluorobenzene		107	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19960-001
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	06/20/2019 1159
Acenaphthylene	ND		1	2.7	0.95	ug/kg	06/20/2019 1159
Anthracene	ND		1	2.7	0.51	ug/kg	06/20/2019 1159
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	06/20/2019 1159
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	06/20/2019 1159
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	06/20/2019 1159
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	06/20/2019 1159
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	06/20/2019 1159
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
Carbazole	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Chlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
Chrysene	ND		1	2.7	0.45	ug/kg	06/20/2019 1159
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	06/20/2019 1159
Dibenzofuran	ND		1	13	5.0	ug/kg	06/20/2019 1159
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	06/20/2019 1159
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Diethylphthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
Dimethyl phthalate	ND		1	13	7.4	ug/kg	06/20/2019 1159
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	06/20/2019 1159
2,4-Dinitrophenol	ND		1	67	25	ug/kg	06/20/2019 1159
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	06/20/2019 1159
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	06/20/2019 1159
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	06/20/2019 1159
Fluoranthene	ND		1	2.7	0.42	ug/kg	06/20/2019 1159
Fluorene	ND		1	2.7	0.57	ug/kg	06/20/2019 1159
Hexachlorobenzene	ND		1	13	5.0	ug/kg	06/20/2019 1159
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	06/20/2019 1159
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	06/20/2019 1159
Hexachloroethane	ND		1	13	5.0	ug/kg	06/20/2019 1159
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	06/20/2019 1159
Isophorone	ND		1	13	5.0	ug/kg	06/20/2019 1159

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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19960-001
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	06/20/2019 1159
2-Methylphenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
3+4-Methylphenol	ND		1	27	10	ug/kg	06/20/2019 1159
Naphthalene	ND		1	2.7	0.97	ug/kg	06/20/2019 1159
2-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
3-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
4-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
Nitrobenzene	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Nitrophenol	ND		1	27	10	ug/kg	06/20/2019 1159
4-Nitrophenol	ND		1	67	25	ug/kg	06/20/2019 1159
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	06/20/2019 1159
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	06/20/2019 1159
Pentachlorophenol	ND		1	67	25	ug/kg	06/20/2019 1159
Phenanthrene	ND		1	2.7	0.72	ug/kg	06/20/2019 1159
Phenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Pyrene	ND		1	2.7	0.50	ug/kg	06/20/2019 1159
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	06/20/2019 1159
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	06/20/2019 1159
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		48	33-102
2-Fluorophenol		53	35-115
Nitrobenzene-d5		50	22-109
Phenol-d5		57	33-122
Terphenyl-d14		66	41-120
2,4,6-Tribromophenol		60	30-117

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19960-002
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	78		1	59	12-111	06/22/2019 1824
Acenaphthylene	130	88		1	66	44-122	06/22/2019 1824
Anthracene	130	89		1	67	16-122	06/22/2019 1824
Benzo(a)anthracene	130	91		1	68	40-121	06/22/2019 1824
Benzo(a)pyrene	130	88		1	66	36-114	06/22/2019 1824
Benzo(b)fluoranthene	130	83		1	62	38-123	06/22/2019 1824
Benzo(g,h,i)perylene	130	100		1	75	43-120	06/22/2019 1824
Benzo(k)fluoranthene	130	90		1	68	40-126	06/22/2019 1824
4-Bromophenyl phenyl ether	130	82		1	62	30-130	06/22/2019 1824
Butyl benzyl phthalate	130	110		1	81	48-124	06/22/2019 1824
Carbazole	130	94		1	70	47-125	06/22/2019 1824
bis (2-Chloro-1-methylethyl) ether	130	78		1	59	41-113	06/22/2019 1824
4-Chloro-3-methyl phenol	130	88		1	66	48-120	06/22/2019 1824
bis(2-Chloroethoxy)methane	130	80		1	60	38-115	06/22/2019 1824
bis(2-Chloroethyl)ether	130	74		1	55	46-122	06/22/2019 1824
2-Chloronaphthalene	130	81		1	61	37-106	06/22/2019 1824
2-Chlorophenol	130	75		1	56	44-122	06/22/2019 1824
4-Chlorophenyl phenyl ether	130	84		1	63	32-107	06/22/2019 1824
Chrysene	130	90		1	68	41-124	06/22/2019 1824
Dibenzo(a,h)anthracene	130	95		1	72	38-125	06/22/2019 1824
Dibenzofuran	130	84		1	63	45-128	06/22/2019 1824
1,2-Dichlorobenzene	130	69		1	52	39-94	06/22/2019 1824
1,3-Dichlorobenzene	130	71		1	53	30-130	06/22/2019 1824
1,4-Dichlorobenzene	130	69		1	52	39-92	06/22/2019 1824
3,3'-Dichlorobenzidine	130	58		1	44	10-119	06/22/2019 1824
2,4-Dichlorophenol	130	79		1	59	30-96	06/22/2019 1824
Diethylphthalate	130	90		1	68	30-130	06/22/2019 1824
Dimethyl phthalate	130	89		1	67	24-127	06/22/2019 1824
2,4-Dimethylphenol	130	120		1	92	30-130	06/22/2019 1824
Di-n-butyl phthalate	130	95		1	71	35-108	06/22/2019 1824
4,6-Dinitro-2-methylphenol	130	79		1	59	53-150	06/22/2019 1824
2,4-Dinitrophenol	270	150		1	55	32-115	06/22/2019 1824
2,4-Dinitrotoluene	130	98		1	74	40-130	06/22/2019 1824
2,6-Dinitrotoluene	130	90		1	67	46-118	06/22/2019 1824
Di-n-octylphthalate	130	90		1	68	49-118	06/22/2019 1824
bis(2-Ethylhexyl)phthalate	130	98		1	74	33-123	06/22/2019 1824
Fluoranthene	130	94		1	71	26-133	06/22/2019 1824
Fluorene	130	84		1	63	19-108	06/22/2019 1824
Hexachlorobenzene	130	84		1	63	10-125	06/22/2019 1824
Hexachlorobutadiene	130	69		1	52	47-116	06/22/2019 1824
Hexachlorocyclopentadiene	670	300	N	1	46	48-127	06/22/2019 1824
Hexachloroethane	130	73		1	55	18-154	06/22/2019 1824
Indeno(1,2,3-c,d)pyrene	130	99		1	74	42-123	06/22/2019 1824
Isophorone	130	85		1	64	30-130	06/22/2019 1824

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19960-002
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	81		1	61	10-107	06/22/2019 1824
2-Methylphenol	130	75		1	57	33-103	06/22/2019 1824
3+4-Methylphenol	130	90		1	68	18-121	06/22/2019 1824
Naphthalene	130	79		1	59	10-112	06/22/2019 1824
2-Nitroaniline	130	98		1	74	46-128	06/22/2019 1824
3-Nitroaniline	130	33	N	1	25	30-130	06/22/2019 1824
4-Nitroaniline	130	67		1	51	51-129	06/22/2019 1824
Nitrobenzene	130	81		1	61	49-142	06/22/2019 1824
2-Nitrophenol	130	79		1	60	33-114	06/22/2019 1824
4-Nitrophenol	270	170		1	62	27-138	06/22/2019 1824
N-Nitrosodi-n-propylamine	130	85		1	64	45-112	06/22/2019 1824
N-Nitrosodiphenylamine (Diphenylamine)	130	89		1	67	49-123	06/22/2019 1824
Pentachlorophenol	270	120		1	45	36-108	06/22/2019 1824
Phenanthrene	130	86		1	65	16-123	06/22/2019 1824
Phenol	130	78		1	59	39-108	06/22/2019 1824
Pyrene	130	96		1	72	34-121	06/22/2019 1824
1,2,4,5-Tetrachlorobenzene	130	71		1	53	30-130	06/22/2019 1824
2,3,4,6-Tetrachlorophenol	130	84		1	64	53-125	06/22/2019 1824
1,2,4-Trichlorobenzene	130	74		1	55	30-130	06/22/2019 1824
2,4,5-Trichlorophenol	130	84		1	63	32-105	06/22/2019 1824
2,4,6-Trichlorophenol	130	81		1	61	31-102	06/22/2019 1824

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		55	33-102
2-Fluorophenol		54	35-115
Nitrobenzene-d5		57	22-109
Phenol-d5		56	33-122
Terphenyl-d14		78	41-120
2,4,6-Tribromophenol		68	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ19756-001
Batch: 19756
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/17/2019 1329

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/20/2019 1754
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/20/2019 1754

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		85	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ19756-002
Batch: 19756
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/17/2019 1329

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	36		1	89	40-140	06/20/2019 1824
C9 - C18 Aliphatics	30	17		1	58	40-140	06/20/2019 1824

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		84	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ19757-001
Batch: 19757
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/17/2019 1329

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/21/2019 0151

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		91	40-140
2-Fluorobiphenyl (fractionation 1)		103	40-140
o - Terphenyl (aromatic)		88	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ19757-002
Batch: 19757
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/17/2019 1329

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	76		1	90	40-140	06/21/2019 0221

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		107	40-140
2-Fluorobiphenyl (fractionation 1)		110	40-140
o - Terphenyl (aromatic)		95	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20678-001
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	07/06/2019 1238
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	07/06/2019 1238

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20678-002
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	40-140	07/06/2019 1308
C9 - C18 Aliphatics	30	19		1	65	40-140	07/06/2019 1308

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		75	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20678-003
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	0.64	40-140	25	07/06/2019 1338
C9 - C18 Aliphatics	30	19		1	64	2.1	40-140	25	07/06/2019 1338

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20679-001
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	07/06/2019 2036

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		72	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		85	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20679-002
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	68		1	81	40-140	07/06/2019 2105

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		92	40-140
o - Terphenyl (aromatic)		91	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20679-003
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	56		1	66	20	40-140	25	07/06/2019 2135

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		71	40-140
2-Fluorobiphenyl (fractionation 1)		73	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ20073-001
Batch: 20073
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ20073-002
Batch: 20073
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	19		1	100	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ20074-001
Batch: 20074
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	06/18/2019 1601
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/18/2019 1601
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/18/2019 1601
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/18/2019 1601
Naphthalene	ND		1	0.25	0.13	mg/kg	06/18/2019 1601
Toluene	ND		1	0.25	0.040	mg/kg	06/18/2019 1601
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/18/2019 1601
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ20074-002
Batch: 20074
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	06/18/2019 1533
C9 - C10 Aromatics	1.3	1.3		1	104	70-130	06/18/2019 1533
Ethylbenzene	1.3	1.2		1	96	70-130	06/18/2019 1533
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	06/18/2019 1533
Naphthalene	1.3	1.1		1	88	70-130	06/18/2019 1533
Toluene	1.3	1.2		1	96	70-130	06/18/2019 1533
m+p - Xylenes	2.5	2.4		1	96	70-130	06/18/2019 1533
o - Xylenes	1.3	1.2		1	96	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ20075-001
Batch: 20075
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/18/2019 1601
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ20075-002
Batch: 20075
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	4.6		1	92	70-130	06/18/2019 1533
C9 - C12 Aliphatics, Adjusted	3.8	3.6		1	95	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20301-001
Batch: 20301
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/22/2019 957

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	0.40	J	1	0.50	0.20	mg/kg	06/23/2019 2011
Arsenic	ND		1	0.50	0.20	mg/kg	06/23/2019 2011
Barium	ND		1	1.3	0.31	mg/kg	06/23/2019 2011
Beryllium	0.035	J	1	0.10	0.034	mg/kg	06/23/2019 2011
Cadmium	ND		1	0.13	0.025	mg/kg	06/23/2019 2011
Chromium	0.92	J	1	1.3	0.55	mg/kg	06/23/2019 2011
Cobalt	ND		1	1.3	0.30	mg/kg	06/23/2019 2011
Copper	ND		1	1.3	0.33	mg/kg	06/23/2019 2011
Lead	ND		1	0.25	0.068	mg/kg	06/23/2019 2011
Nickel	ND		1	1.3	0.30	mg/kg	06/23/2019 2011
Selenium	ND		1	1.3	0.47	mg/kg	06/23/2019 2011
Silver	ND		1	0.25	0.060	mg/kg	06/23/2019 2011
Vanadium	ND		1	1.3	0.25	mg/kg	06/23/2019 2011
Zinc	ND		1	2.5	0.50	mg/kg	06/23/2019 2011

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - LCS

Sample ID: UQ20301-002
Batch: 20301
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/22/2019 957

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	50		1	100	80-120	06/23/2019 2017
Arsenic	50	51		1	101	80-120	06/23/2019 2017
Barium	50	50		1	100	80-120	06/23/2019 2017
Beryllium	50	60		1	120	80-120	06/23/2019 2017
Cadmium	50	50		1	100	80-120	06/23/2019 2017
Chromium	50	52		1	104	80-120	06/23/2019 2017
Cobalt	50	50		1	99	80-120	06/23/2019 2017
Copper	50	51		1	102	80-120	06/23/2019 2017
Lead	50	51		1	101	80-120	06/23/2019 2017
Nickel	50	49		1	98	80-120	06/23/2019 2017
Selenium	50	49		1	99	80-120	06/23/2019 2017
Silver	50	52		1	104	80-120	06/23/2019 2017
Vanadium	50	50		1	100	80-120	06/23/2019 2017
Zinc	50	50		1	101	80-120	06/23/2019 2017

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - MB

Sample ID: UQ19617-001
Batch: 19617
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/19/2019 2108

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/20/2019 1554

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - LCS

Sample ID: UQ19617-002
Batch: 19617
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/19/2019 2108

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.81		1	97	80-120	06/20/2019 1556

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Chain of Custody

and

Miscellaneous Documents

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

SHEALY

Chain of Custody Record

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

Number

Client	Report to Contact	Telephone No. / E-mail	Quote No.
Ramboll US Corporation	Daniel Price/Michael Wilson	(314) 338-2373/dprice@ramboll.com (816) 442-7305/mwilson@ramboll.com	

Address	Sampler's Signature	Analysis (Attach list if more space is needed)	Page
500 College Boulevard Suite 1905	X Elizabeth Borucki/Andrew F. Hardwick		1 of 1

City	State	Zip Code
Overland Park	KS	66210

Project Name: CMR RIAIM East Rail

Project Number: 690012344-003

P.O No.:

UF13022

KMN2

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	C=Grab D=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	Matrix:	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH					Remarks / Cooler I.D.
CMR-EB03-0.0-1.0-190612	6/12/2019	14:05	G		X			2					1	2	X	X	X	X	X					Cooler 001
CMR-EB03-4.0-4.5-190612	6/12/2019	14:30	G		X			2					1	2	X	X	X	X	X					Cooler 001
CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	14:35	G		X			2					1	2	X	X	X	X	X					Cooler 001
CMR-EB03-5.0-6.0-190612	6/12/2019	14:15	G	X				2		1	7				X	X	X	X	X					Cooler 001
CMR-EB03-9.0-10.0-190612	6/12/2019	15:00	G	X				2		1	7				X	X	X	X	X					~~Cooler 001- 24 hour turn on VOCs~~ 4PH
TB-09	NA	NA	G	X							2				X									Trip Blank/Cooler 001

Turn Around Time Required (Prior lab approval required for expedited TAT): [X] Standard [ ] Rush (Please Specify)

Sample Disposal: [ ] Return to Client [ ] Disposal by Lab

Possible Hazard Identification: (List any known hazards in the remarks) [ ] Non-Hazardous [ ] Flammable [ ] Skin Irritant [ ] RCRA pH<2 [X] Unknown

QC Requirements

Relinquished by	Date	Time	Received by	Date	Time
1. Ramboll	6/12/2019	1745	1.		
2.			2.		
3.			3.		
4. FedEx	6/13/19	0950	4. Laboratory Received by	6/13/19	0950

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check): [X] Y [ ] N [ ] Ice Pack

Receipt Temp. 3.6 °C

Document Number: ME002OW-0

Chain of Custody Record

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

Number

Client	Ramboll US Corporation
Address	7500 College Boulevard Suite 1005
City / State / Zip Code	Overland Park / KS / 66210
Project Name	CMR RIAIM East Rail
Project Number	1690012344-003
Report to Contact	Daniel Price/Michael Wilson
Sampler's Signature	x Elizabeth Borucki/Andrew F. Hardwick
Telephone No. / E-mail	
Quote No.	
Page	1 of 1
P.O. No.	
Laboratory Lot Number	

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Aqueous	Solid	Non-Aqueous		Unpres	H2SO4	HNO3	HCl	NaOH	5035 kit	MeOH	VOCs	VPH	SVOC	Metals	EPH	Remarks / Cooler I.D.
CMR-EB03-0.0-1.0-190612	6/12/2019	14:05	G		X			2						2	X	X	X	X	X	Cooler 001
CMR-EB03-4.0-4.5-190612	6/12/2019	14:30	G		X			2					1	2	X	X	X	X	X	Cooler 001
CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	14:35	G		X			2					1	2	X	X	X	X	X	Cooler 001
CMR-EB03-5.0-6.0-190612	6/12/2019	14:15	G		X			2					1	2	X	X	X	X	X	Cooler 001
CMR-EB03-9.0-10.0-190612	6/12/2019	15:00	G		X			2					1	2	X	X	X	X	X	Cooler 001. ~~24-hour turn on VOCs~~
TB-09	NA	NA	G	X							2				X					Trip Blank/Cooler 001

Turn Around Time Required (Prior lab approval required for expedited TAT)

Rush (Please Specify)

Sample Disposal: ☐ Return to Client ☐ Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks): ☐ Non-hazardous ☐ Flammable ☐ Skin Irritant ☐ SDS provided ☒ Unknown

QC Requirements

	Date	Time		Date	Time
Relinquished by	6/12/2019		1. Received by		
			2. Received by		
			3. Received by		
			4. Laboratory Received by		

LAB USE ONLY
Received on Ice (Check) ☐ Y ☐ N ☐ Ice Pack

Receipt Temp. ______ °C

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

Document Number: ME002OW

Sample Receipt Checklist (SRC)

Client: Ramboll Cooler Inspected by/date: JSH / 06/13/19 Lot #: UF13022

Means of receipt: ☐ SESI ☑ Client ☐ UPS ☐ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

3.6 / 3.6 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☐ Yes	☑ No		10. Did all container label information (ID, date, time) agree with the COC? See comments
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote #: NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA

Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L. (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JSH Date: 06/13/19

Comments: UF13022-004,-005 are recorded as aqueous on COC but samples are solid. Revised COC was provided by the client.

MEMO

Date: **July 19, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF14018, 3 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF14018 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB04-0.0-1.0-190613	UF14018-001
CMR-EB04-4.0-5.0-190613	UF14018-002
CMR-EB04-8.0-8.5-190613	UF14018-003
TB-10-20190613	UF14018-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of methylcyclohexane, hexachlorocyclopentadiene, and 3-nitroaniline. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methylcyclohexane, hexachlorocyclopentadiene, and 3-nitroaniline results have been validated as estimated.

Blank Detections
During analysis, antimnoy, beryllium, and chromium was detected in equipment blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All antimony, beryllium, and chromium results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF14018

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 12, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Antimony, beryllium, and chromium detected in method blank sample. All antimony, beryllium, and chromium project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All antimony, beryllium, and chromium project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.

SDG No. UF14018

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 12, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	Acetone detected below the RL in the trip blank sample. Project sample detections above the RL, no action taken.	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Several surrogates were out of criteria due to matrix issues. No action taken.	Several surrogates were out of criteria due to dilutions. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with sample results. No action taken.	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	Recoveries out for methylcyclohexane, hexachlorocyclopentadiene, and 3-nitroaniline. Hexachlorocyclopentadiene, acetone, and 3-nitroaniline biased low. All hexachlorocyclopentadiene, acetone, and 3-nitroaniline results validated as estimated (J, UJ). Methylcyclohexane biased high with detections. All methylcyclohexane detections validated as estimated (J).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by lab.	N/A
Other Non-conformances	No other non-conformances noted during review.	No other non-conformances noted during review.
Overall Assessment of Data	All methylcyclohexane detections validated as estimated (J). All hexachlorocyclopentadiene, acetone, and 3-nitroaniline results validated as estimated (J, UJ).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF14018**

Date Completed:07/08/2019

07/10/2019 5:33 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF14018

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 19822 had methylcyclohexane recovered marginally outside of the acceptance limits. The laboratory control sample duplicate (LCSD) associated with batch 20424 had acetone recovered marginally outside of the acceptance limits a number of RPDs exceeded the acceptance limits. The LCS associated with batch 20869 had methyl acetate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Sample -001 had internal standards recovered below the acceptance limits due to confirmed matrix interference.

Sample -003 had surrogates recovered outside of the acceptance limits due to confirmed matrix interference.

Semivolatiles
The LCS associated with batch 19960 had hexachlorocyclopentadiene and 3-nitroaniline recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Sample -001 was diluted 10X due to the sample matrix. The reporting limits have been raised accordingly. The associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Due to high concentrations of target compounds, amples -002 and -003 were diluted 100X, 2500X and 20X, 500X, respectively. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana EPH
Samples -002 and -003 were diluted 10X and 5X, respectively, due to high concentrations of the target compounds. As a result, the associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
Samples -002 and -003 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS. Samples -002 and -003 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The method blank associated with batch 20301 had antimony, beryllium, and chromium detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for these metals have been flagged with a “B” qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF14018

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB04-0.0-1.0-190613	Solid	06/13/2019 1420	06/14/2019
002	CMR-EB04-4.0-5.0-190613	Solid	06/13/2019 1435	06/14/2019
003	CMR-EB04-8.0-8.5-190613	Solid	06/13/2019 1440	06/14/2019
004	TB-10-20190613	Aqueous	06/13/2019	06/14/2019

(4 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF14018

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB04-0.0-1.0-190613	Solid	Acetone	8260B	29		ug/kg	9
001	CMR-EB04-0.0-1.0-190613	Solid	Naphthalene	8260B	4.5	J	ug/kg	9
001	CMR-EB04-0.0-1.0-190613	Solid	Toluene	8260B	5.4		ug/kg	9
001	CMR-EB04-0.0-1.0-190613	Solid	Anthracene	8270D	54		ug/kg	11
001	CMR-EB04-0.0-1.0-190613	Solid	Benzo(a)pyrene	8270D	45		ug/kg	11
001	CMR-EB04-0.0-1.0-190613	Solid	Benzo(b)fluoranthene	8270D	88		ug/kg	11
001	CMR-EB04-0.0-1.0-190613	Solid	Benzo(g,h,i)perylene	8270D	65		ug/kg	11
001	CMR-EB04-0.0-1.0-190613	Solid	Fluoranthene	8270D	53		ug/kg	11
001	CMR-EB04-0.0-1.0-190613	Solid	2-Methylnaphthalene	8270D	290		ug/kg	12
001	CMR-EB04-0.0-1.0-190613	Solid	Naphthalene	8270D	69		ug/kg	12
001	CMR-EB04-0.0-1.0-190613	Solid	Phenanthrene	8270D	100		ug/kg	12
001	CMR-EB04-0.0-1.0-190613	Solid	Pyrene	8270D	110		ug/kg	12
001	CMR-EB04-0.0-1.0-190613	Solid	C19 - C36 Aliphatics	Montana EPH	220		mg/kg	13
001	CMR-EB04-0.0-1.0-190613	Solid	C9 - C18 Aliphatics	Montana EPH	48		mg/kg	13
001	CMR-EB04-0.0-1.0-190613	Solid	C11 - C22 Aromatics	Montana EPH	140		mg/kg	14
001	CMR-EB04-0.0-1.0-190613	Solid	Naphthalene	Montana VPH	0.20	J	mg/kg	16
001	CMR-EB04-0.0-1.0-190613	Solid	m+p - Xylenes	Montana VPH	0.084	J	mg/kg	16
001	CMR-EB04-0.0-1.0-190613	Solid	Antimony	6020B	0.36	BJ	mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Arsenic	6020B	8.3		mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Barium	6020B	330		mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Beryllium	6020B	0.49	B	mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Cadmium	6020B	0.51		mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Chromium	6020B	12	B	mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Cobalt	6020B	4.1		mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Copper	6020B	38		mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Lead	6020B	58		mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Mercury	7471B	0.19		mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Nickel	6020B	10		mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Silver	6020B	0.11	J	mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Vanadium	6020B	29		mg/kg	18
001	CMR-EB04-0.0-1.0-190613	Solid	Zinc	6020B	190		mg/kg	18
002	CMR-EB04-4.0-5.0-190613	Solid	Cyclohexane	8260B	1100	J	ug/kg	19
002	CMR-EB04-4.0-5.0-190613	Solid	Ethylbenzene	8260B	3900		ug/kg	19
002	CMR-EB04-4.0-5.0-190613	Solid	Isopropylbenzene	8260B	2100		ug/kg	19
002	CMR-EB04-4.0-5.0-190613	Solid	Methylcyclohexane	8260B	5300		ug/kg	19
002	CMR-EB04-4.0-5.0-190613	Solid	Naphthalene	8260B	120000		ug/kg	19
002	CMR-EB04-4.0-5.0-190613	Solid	Xylenes (total)	8260B	8400		ug/kg	20
002	CMR-EB04-4.0-5.0-190613	Solid	m+p - Xylenes	8260B	4900		ug/kg	20
002	CMR-EB04-4.0-5.0-190613	Solid	o - Xylenes	8260B	3500		ug/kg	20
002	CMR-EB04-4.0-5.0-190613	Solid	Acenaphthene	8270D	16000		ug/kg	21
002	CMR-EB04-4.0-5.0-190613	Solid	Anthracene	8270D	3400		ug/kg	21
002	CMR-EB04-4.0-5.0-190613	Solid	Benzo(a)anthracene	8270D	520		ug/kg	21
002	CMR-EB04-4.0-5.0-190613	Solid	Benzo(a)pyrene	8270D	82	J	ug/kg	21
002	CMR-EB04-4.0-5.0-190613	Solid	Benzo(b)fluoranthene	8270D	220	J	ug/kg	21
002	CMR-EB04-4.0-5.0-190613	Solid	Chrysene	8270D	230	J	ug/kg	21

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-EB04-4.0-5.0-190613	Solid	Dibenzofuran	8270D	8500		ug/kg	21
002	CMR-EB04-4.0-5.0-190613	Solid	Fluoranthene	8270D	210	J	ug/kg	21
002	CMR-EB04-4.0-5.0-190613	Solid	Fluorene	8270D	14000		ug/kg	21
002	CMR-EB04-4.0-5.0-190613	Solid	2-Methylnaphthalene	8270D	650000		ug/kg	22
002	CMR-EB04-4.0-5.0-190613	Solid	Naphthalene	8270D	70000		ug/kg	22
002	CMR-EB04-4.0-5.0-190613	Solid	Phenanthrene	8270D	14000		ug/kg	22
002	CMR-EB04-4.0-5.0-190613	Solid	Pyrene	8270D	630		ug/kg	22
002	CMR-EB04-4.0-5.0-190613	Solid	C19 - C36 Aliphatics	Montana EPH	3300		mg/kg	23
002	CMR-EB04-4.0-5.0-190613	Solid	C9 - C18 Aliphatics	Montana EPH	6500		mg/kg	23
002	CMR-EB04-4.0-5.0-190613	Solid	C11 - C22 Aromatics	Montana EPH	8600		mg/kg	24
002	CMR-EB04-4.0-5.0-190613	Solid	C5 - C8 Aliphatics,	Montana VPH	49		mg/kg	25
002	CMR-EB04-4.0-5.0-190613	Solid	C9 - C12 Aliphatics,	Montana VPH	580		mg/kg	25
002	CMR-EB04-4.0-5.0-190613	Solid	C9 - C10 Aromatics	Montana VPH	370		mg/kg	26
002	CMR-EB04-4.0-5.0-190613	Solid	Ethylbenzene	Montana VPH	1.3	J	mg/kg	26
002	CMR-EB04-4.0-5.0-190613	Solid	Naphthalene	Montana VPH	41		mg/kg	26
002	CMR-EB04-4.0-5.0-190613	Solid	m+p - Xylenes	Montana VPH	0.74	J	mg/kg	26
002	CMR-EB04-4.0-5.0-190613	Solid	o - Xylenes	Montana VPH	6.6		mg/kg	26
002	CMR-EB04-4.0-5.0-190613	Solid	TPH	Montana VPH	960		mg/kg	27
002	CMR-EB04-4.0-5.0-190613	Solid	Antimony	6020B	0.28	BJ	mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Arsenic	6020B	9.3		mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Barium	6020B	170		mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Beryllium	6020B	0.82	B	mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Cadmium	6020B	0.33		mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Chromium	6020B	14	B	mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Cobalt	6020B	4.8		mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Copper	6020B	32		mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Lead	6020B	43		mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Mercury	7471B	0.21		mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Nickel	6020B	12		mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Silver	6020B	0.14	J	mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Vanadium	6020B	34		mg/kg	28
002	CMR-EB04-4.0-5.0-190613	Solid	Zinc	6020B	73		mg/kg	28
003	CMR-EB04-8.0-8.5-190613	Solid	Benzene	8260B	1100		ug/kg	29
003	CMR-EB04-8.0-8.5-190613	Solid	Cyclohexane	8260B	1100		ug/kg	29
003	CMR-EB04-8.0-8.5-190613	Solid	Ethylbenzene	8260B	2700		ug/kg	29
003	CMR-EB04-8.0-8.5-190613	Solid	Isopropylbenzene	8260B	2200		ug/kg	29
003	CMR-EB04-8.0-8.5-190613	Solid	Methylcyclohexane	8260B	8100		ug/kg	29
003	CMR-EB04-8.0-8.5-190613	Solid	Naphthalene	8260B	120000		ug/kg	29
003	CMR-EB04-8.0-8.5-190613	Solid	Xylenes (total)	8260B	1100	J	ug/kg	30
003	CMR-EB04-8.0-8.5-190613	Solid	m+p - Xylenes	8260B	510	J	ug/kg	30
003	CMR-EB04-8.0-8.5-190613	Solid	o - Xylenes	8260B	550	J	ug/kg	30
003	CMR-EB04-8.0-8.5-190613	Solid	Acenaphthene	8270D	1200		ug/kg	31
003	CMR-EB04-8.0-8.5-190613	Solid	Anthracene	8270D	610		ug/kg	31
003	CMR-EB04-8.0-8.5-190613	Solid	Benzo(a)anthracene	8270D	25	J	ug/kg	31
003	CMR-EB04-8.0-8.5-190613	Solid	Benzo(b)fluoranthene	8270D	20	J	ug/kg	31
003	CMR-EB04-8.0-8.5-190613	Solid	Chrysene	8270D	58	J	ug/kg	31
003	CMR-EB04-8.0-8.5-190613	Solid	Dibenzofuran	8270D	950		ug/kg	31
003	CMR-EB04-8.0-8.5-190613	Solid	Fluoranthene	8270D	52	J	ug/kg	31

Detection Summary (Continued)

Lot Number: UF14018

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-EB04-8.0-8.5-190613	Solid	Fluorene	8270D	2100		ug/kg	31
003	CMR-EB04-8.0-8.5-190613	Solid	2-Methylnaphthalene	8270D	130000		ug/kg	32
003	CMR-EB04-8.0-8.5-190613	Solid	Naphthalene	8270D	19000		ug/kg	32
003	CMR-EB04-8.0-8.5-190613	Solid	Phenanthrene	8270D	1800		ug/kg	32
003	CMR-EB04-8.0-8.5-190613	Solid	Pyrene	8270D	170		ug/kg	32
003	CMR-EB04-8.0-8.5-190613	Solid	C19 - C36 Aliphatics	Montana EPH	820		mg/kg	33
003	CMR-EB04-8.0-8.5-190613	Solid	C9 - C18 Aliphatics	Montana EPH	4100		mg/kg	33
003	CMR-EB04-8.0-8.5-190613	Solid	C11 - C22 Aromatics	Montana EPH	3000		mg/kg	34
003	CMR-EB04-8.0-8.5-190613	Solid	C5 - C8 Aliphatics,	Montana VPH	240		mg/kg	35
003	CMR-EB04-8.0-8.5-190613	Solid	C9 - C12 Aliphatics,	Montana VPH	880		mg/kg	35
003	CMR-EB04-8.0-8.5-190613	Solid	Benzene	Montana VPH	0.61	J	mg/kg	36
003	CMR-EB04-8.0-8.5-190613	Solid	C9 - C10 Aromatics	Montana VPH	440		mg/kg	36
003	CMR-EB04-8.0-8.5-190613	Solid	Ethylbenzene	Montana VPH	7.5		mg/kg	36
003	CMR-EB04-8.0-8.5-190613	Solid	Naphthalene	Montana VPH	120		mg/kg	36
003	CMR-EB04-8.0-8.5-190613	Solid	o - Xylenes	Montana VPH	9.0		mg/kg	36
003	CMR-EB04-8.0-8.5-190613	Solid	TPH	Montana VPH	1700		mg/kg	37
003	CMR-EB04-8.0-8.5-190613	Solid	Arsenic	6020B	4.5		mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Barium	6020B	170		mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Beryllium	6020B	0.51	B	mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Cadmium	6020B	0.13		mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Chromium	6020B	11	B	mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Cobalt	6020B	4.1		mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Copper	6020B	7.7		mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Lead	6020B	5.8		mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Mercury	7471B	0.024	J	mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Nickel	6020B	9.6		mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Silver	6020B	0.054	J	mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Vanadium	6020B	21		mg/kg	38
003	CMR-EB04-8.0-8.5-190613	Solid	Zinc	6020B	29		mg/kg	38
004	TB-10-20190613	Aqueous	Acetone	8260B	2.2	J	ug/L	39

(123 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-001
Description: CMR-EB04-0.0-1.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1420
% Solids: 95.3 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	06/26/2019 1734	JM1		20869	5.66

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	29		19	7.4	ug/kg	2
Benzene	71-43-2	8260B	ND		4.6	1.9	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		4.6	1.9	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		4.6	1.9	ug/kg	2
Bromoform	75-25-2	8260B	ND		4.6	1.9	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.6	2.8	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.7	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		4.6	1.9	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		4.6	1.9	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		4.6	1.9	ug/kg	2
Chloroethane	75-00-3	8260B	ND		4.6	1.9	ug/kg	2
Chloroform	67-66-3	8260B	ND		4.6	1.9	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.6	2.8	ug/kg	2
Cyclohexane	110-82-7	8260B	ND		4.6	1.9	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.6	1.9	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		4.6	1.9	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.6	1.9	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.6	1.9	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.6	1.9	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.6	1.9	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		4.6	2.8	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		4.6	1.9	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		4.6	1.9	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		4.6	1.9	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.6	1.9	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.6	1.9	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		4.6	1.9	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.6	1.9	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.6	1.9	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		230	23	ug/kg	2
Ethylbenzene	100-41-4	8260B	ND		4.6	1.9	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		9.3	3.7	ug/kg	2
Isopropylbenzene	98-82-8	8260B	ND		4.6	1.9	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		4.6	1.9	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.6	1.9	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.3	3.7	ug/kg	2
Methylcyclohexane	108-87-2	8260B	ND		4.6	1.9	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		4.6	1.9	ug/kg	2
Naphthalene	91-20-3	8260B	4.5	J	4.6	1.9	ug/kg	2
Styrene	100-42-5	8260B	ND		4.6	1.9	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.6	1.9	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		4.6	1.9	ug/kg	2
Toluene	108-88-3	8260B	5.4		4.6	1.9	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.6	1.9	ug/kg	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-001
Description: CMR-EB04-0.0-1.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1420
% Solids: 95.3 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	06/26/2019 1734	JM1		20869	5.66

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.6	1.9	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.6	1.9	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.6	1.9	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.6	1.9	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		4.6	1.9	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		4.6	1.9	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		4.6	2.8	ug/kg	2
Xylenes (total)	1330-20-7	8260B	ND		9.3	3.7	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	ND		4.6	1.9	ug/kg	2
o - Xylenes	95-47-6	8260B	ND		4.6	1.9	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		82	47-138
Toluene-d8		94	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-001
Description: CMR-EB04-0.0-1.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1420
% Solids: 95.3 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	06/23/2019 0037	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		28	8.6	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		28	9.8	ug/kg	1
Anthracene	120-12-7	8270D	54		28	5.3	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		28	6.1	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	45		28	6.8	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	88		28	5.2	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	65		28	6.7	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		28	5.0	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		130	52	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		130	52	ug/kg	1
Carbazole	86-74-8	8270D	ND		130	52	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		130	52	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		130	52	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		130	52	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		130	52	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		130	52	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		130	52	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		130	52	ug/kg	1
Chrysene	218-01-9	8270D	ND		28	4.6	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		28	5.3	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		130	52	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		690	260	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		690	260	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		690	260	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		130	52	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		130	52	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		130	52	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		130	76	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		130	52	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		130	52	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		690	260	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		690	260	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		280	100	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		280	100	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		130	52	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		690	260	ug/kg	1
Fluoranthene	206-44-0	8270D	53		28	4.3	ug/kg	1
Fluorene	86-73-7	8270D	ND		28	5.9	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		130	52	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		130	52	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		690	260	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		130	52	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		28	10	ug/kg	1
Isophorone	78-59-1	8270D	ND		130	52	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-001
Description: CMR-EB04-0.0-1.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1420
% Solids: 95.3 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	10	06/23/2019 0037	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	290		28	10	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		130	52	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		280	100	ug/kg	1
Naphthalene	91-20-3	8270D	69		28	10	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		280	100	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		280	100	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		280	100	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		130	52	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		280	100	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		690	260	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		130	52	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		130	52	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		690	260	ug/kg	1
Phenanthrene	85-01-8	8270D	100		28	7.4	ug/kg	1
Phenol	108-95-2	8270D	ND		130	52	ug/kg	1
Pyrene	129-00-0	8270D	110		28	5.2	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		340	100	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		690	100	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		690	260	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		130	52	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		130	52	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		55	33-102
2-Fluorophenol	N	31	35-115
Nitrobenzene-d5		49	22-109
Phenol-d5	N	29	33-122
Terphenyl-d14		73	41-120
2,4,6-Tribromophenol		39	30-117

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF14018-001
Description: CMR-EB04-0.0-1.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1420
% Solids: 95.3 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	07/06/2019 1537	DAL1	06/25/2019 1759	20678

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	220		10	10	mg/kg	2
C9 - C18 Aliphatics		Montana EPH	48		10	10	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		46	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Description: CMR-EB04-0.0-1.0-190613
Date Sampled: 06/13/2019 1420
Date Received: 06/14/2019

Laboratory ID: UF14018-001
Matrix: Solid
% Solids: 95.3 06/15/2019 0122

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	07/06/2019 2235	DAL1	06/25/2019 1759	20679

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	140		10	10	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		72	40-140
2-Fluorobiphenyl (fractionation 1)		73	40-140
o - Terphenyl (aromatic)		56	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation	Laboratory ID: UF14018-001
Description: CMR-EB04-0.0-1.0-190613	Matrix: Solid
Date Sampled: 06/13/2019 1420	% Solids: 95.3 06/15/2019 0122
Date Received: 06/14/2019	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1629	JJG		19898

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.4	0.89	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.4	0.89	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		97	70-130

LOQ = Limit of Quantitation	B = Detected in the method blank	E = Quantitation of compound exceeded the calibration range	DL = Detection Limit
ND = Not detected at or above the DL	N = Recovery is out of criteria	P = The RPD between two GC columns exceeds 40%	J = Estimated result < LOQ and ≥ DL
H = Out of holding time	W = Reported on wet weight basis		

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF14018-001
Description: CMR-EB04-0.0-1.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1420
% Solids: 95.3 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1629	JJG		19897

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.30	0.040	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.5	0.59	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.30	0.037	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.30	0.064	mg/kg	1
Naphthalene	91-20-3	Montana VPH	0.20	J	0.30	0.15	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.30	0.047	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	0.084	J	0.30	0.066	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.30	0.033	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		93	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF14018-001
Description: CMR-EB04-0.0-1.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1420
% Solids: 95.3 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1629	JJG		19896

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		98	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB04-0.0-1.0-190613
Date Sampled: 06/13/2019 1420
Date Received: 06/14/2019

Laboratory ID: UF14018-001
Matrix: Solid
% Solids: 95.3 06/15/2019 0122

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/23/2019 2023	LLL	06/22/2019 0957	20301
1	7471B	7471B	1	06/25/2019 0934	TJW	06/24/2019 1815	20448

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.36	BJ	0.49	0.20	mg/kg	1
Arsenic	7440-38-2	6020B	8.3		0.49	0.20	mg/kg	1
Barium	7440-39-3	6020B	330		1.3	0.31	mg/kg	1
Beryllium	7440-41-7	6020B	0.49	B	0.099	0.034	mg/kg	1
Cadmium	7440-43-9	6020B	0.51		0.13	0.025	mg/kg	1
Chromium	7440-47-3	6020B	12	B	1.3	0.55	mg/kg	1
Cobalt	7440-48-4	6020B	4.1		1.3	0.30	mg/kg	1
Copper	7440-50-8	6020B	38		1.3	0.32	mg/kg	1
Lead	7439-92-1	6020B	58		0.25	0.067	mg/kg	1
Mercury	7439-97-6	7471B	0.19		0.084	0.020	mg/kg	1
Nickel	7440-02-0	6020B	10		1.3	0.30	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.3	0.47	mg/kg	1
Silver	7440-22-4	6020B	0.11	J	0.25	0.059	mg/kg	1
Vanadium	7440-62-2	6020B	29		1.3	0.25	mg/kg	1
Zinc	7440-66-6	6020B	190		2.5	0.49	mg/kg	1

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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-002
Description: CMR-EB04-4.0-5.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1435
% Solids: 83.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	4	06/17/2019 1814	JM1		19822	4.96
2	5035 High	8260B	20	06/19/2019 1746	JM1		20121	4.96

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		5700	1100	ug/kg	1
Benzene	71-43-2	8260B	ND		1400	570	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		1400	570	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		1400	570	ug/kg	1
Bromoform	75-25-2	8260B	ND		1400	570	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		1400	570	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		5700	1100	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		1400	570	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		1400	570	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		1400	570	ug/kg	1
Chloroethane	75-00-3	8260B	ND		1400	570	ug/kg	1
Chloroform	67-66-3	8260B	ND		1400	570	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		1400	570	ug/kg	1
Cyclohexane	110-82-7	8260B	1100	J	1400	570	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		1400	570	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		1400	570	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		1400	570	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		1400	570	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		1400	570	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		1400	570	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		1400	570	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		1400	570	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		1400	570	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		1400	570	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		1400	570	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		1400	570	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		1400	570	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		1400	570	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		1400	570	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		71000	7100	ug/kg	1
Ethylbenzene	100-41-4	8260B	3900		1400	570	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		2800	1100	ug/kg	1
Isopropylbenzene	98-82-8	8260B	2100		1400	570	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		1400	570	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		1400	570	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		2800	1100	ug/kg	1
Methylcyclohexane	108-87-2	8260B	5300		1400	570	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		1400	570	ug/kg	1
Naphthalene	91-20-3	8260B	120000		7100	2800	ug/kg	2
Styrene	100-42-5	8260B	ND		1400	570	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		1400	570	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		1400	570	ug/kg	1
Toluene	108-88-3	8260B	ND		1400	570	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-002
Description: CMR-EB04-4.0-5.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1435
% Solids: 83.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	4	06/17/2019 1814	JM1		19822	4.96
2	5035 High	8260B	20	06/19/2019 1746	JM1		20121	4.96

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1400	570	ug/kg	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		1400	570	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		1400	570	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		1400	570	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		1400	570	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		1400	570	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		1400	570	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		1400	570	ug/kg	1
Xylenes (total)	1330-20-7	8260B	8400		2800	1100	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	4900		1400	570	ug/kg	1
o - Xylenes	95-47-6	8260B	3500		1400	570	ug/kg	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
1,2-Dichloroethane-d4		110	53-142		115	53-142
Bromofluorobenzene		105	47-138		127	47-138
Toluene-d8		108	68-124		104	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-002
Description: CMR-EB04-4.0-5.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1435
% Solids: 83.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/22/2019 2004	JCG	06/19/2019 1230	19960
2	3546	8270D	2500	06/23/2019 0101	SCD	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	16000		320	99	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		320	110	ug/kg	1
Anthracene	120-12-7	8270D	3400		320	61	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	520		320	71	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	82	J	320	79	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	220	J	320	60	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		320	78	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		320	57	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		1600	600	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		1600	600	ug/kg	1
Carbazole	86-74-8	8270D	ND		1600	600	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		1600	600	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		1600	600	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		1600	600	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		1600	600	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		1600	600	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		1600	600	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		1600	600	ug/kg	1
Chrysene	218-01-9	8270D	230	J	320	54	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		320	61	ug/kg	1
Dibenzofuran	132-64-9	8270D	8500		1600	600	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		8000	3000	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		8000	3000	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		8000	3000	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		1600	600	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1600	600	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		1600	600	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		1600	880	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		1600	600	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		1600	600	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		8000	3000	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		8000	3000	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		3200	1200	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		3200	1200	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		1600	600	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		8000	3000	ug/kg	1
Fluoranthene	206-44-0	8270D	210	J	320	50	ug/kg	1
Fluorene	86-73-7	8270D	14000		320	68	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		1600	600	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		1600	600	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		8000	3000	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		1600	600	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		320	120	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-002
Description: CMR-EB04-4.0-5.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1435
% Solids: 83.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/22/2019 2004	JCG	06/19/2019 1230	19960
2	3546	8270D	2500	06/23/2019 0101	SCD	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		1600	600	ug/kg	1
2-Methylnaphthalene	91-57-6	8270D	650000		8100	3000	ug/kg	2
2-Methylphenol	95-48-7	8270D	ND		1600	600	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		3200	1200	ug/kg	1
Naphthalene	91-20-3	8270D	70000		8100	2900	ug/kg	2
2-Nitroaniline	88-74-4	8270D	ND		3200	1200	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		3200	1200	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		3200	1200	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		1600	600	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		3200	1200	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		8000	3000	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		1600	600	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		1600	600	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		8000	3000	ug/kg	1
Phenanthrene	85-01-8	8270D	14000		320	86	ug/kg	1
Phenol	108-95-2	8270D	ND		1600	600	ug/kg	1
Pyrene	129-00-0	8270D	630		320	60	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		3900	1200	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		8000	1200	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		8000	3000	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		1600	600	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		1600	600	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Run 1 Acceptance Limits	Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl	N	649	33-102	N	192	33-102
2-Fluorophenol		36	35-115	N	0.00	35-115
Nitrobenzene-d5	N	262	22-109	N	1000	22-109
Phenol-d5		34	33-122	N	0.00	33-122
Terphenyl-d14		78	41-120	N	136	41-120
2,4,6-Tribromophenol		108	30-117	N	0.00	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF14018-002
Description: CMR-EB04-4.0-5.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1435
% Solids: 83.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	10	06/27/2019 1637	CHG	06/17/2019 1329	19756

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	3300		120	120	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	6500		120	120	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		41	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF14018-002
Description: CMR-EB04-4.0-5.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1435
% Solids: 83.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	10	06/27/2019 1808	CHG	06/17/2019 1329	19757

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	8600		120	120	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)	N	202	40-140
2-Fluorobiphenyl (fractionation 1)	N	387	40-140
o - Terphenyl (aromatic)	N	184	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF14018-002
Description: CMR-EB04-4.0-5.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1435
% Solids: 83.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	10	06/18/2019 1657	JJG		19898

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	49		47	9.4	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	580		47	9.4	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	5200	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF14018-002
Description: CMR-EB04-4.0-5.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1435
% Solids: 83.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	10	06/18/2019 1657	JJG		19897

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		3.1	0.43	mg/kg	1
C9 - C10 Aromatics		Montana VPH	370		16	6.3	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	1.3	J	3.1	0.39	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		3.1	0.68	mg/kg	1
Naphthalene	91-20-3	Montana VPH	41		3.1	1.6	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		3.1	0.50	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	0.74	J	3.1	0.70	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	6.6		3.1	0.35	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	1410	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF14018-002
Description: CMR-EB04-4.0-5.0-190613
Matrix: Solid
Date Sampled: 06/13/2019 1435
% Solids: 83.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	10	06/18/2019 1657	JJG		19896

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	960		89	18	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	3460	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB04-4.0-5.0-190613
Date Sampled: 06/13/2019 1435
Date Received: 06/14/2019

Laboratory ID: UF14018-002
Matrix: Solid
% Solids: 83.1 06/15/2019 0122

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/23/2019 2029	LLL	06/22/2019 0957	20301
1	7471B	7471B	1	06/25/2019 0936	TJW	06/24/2019 1815	20448

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.28	BJ	0.43	0.17	mg/kg	1
Arsenic	7440-38-2	6020B	9.3		0.43	0.17	mg/kg	1
Barium	7440-39-3	6020B	170		1.1	0.27	mg/kg	1
Beryllium	7440-41-7	6020B	0.82	B	0.087	0.030	mg/kg	1
Cadmium	7440-43-9	6020B	0.33		0.11	0.022	mg/kg	1
Chromium	7440-47-3	6020B	14	B	1.1	0.48	mg/kg	1
Cobalt	7440-48-4	6020B	4.8		1.1	0.26	mg/kg	1
Copper	7440-50-8	6020B	32		1.1	0.28	mg/kg	1
Lead	7439-92-1	6020B	43		0.22	0.059	mg/kg	1
Mercury	7439-97-6	7471B	0.21		0.089	0.021	mg/kg	1
Nickel	7440-02-0	6020B	12		1.1	0.26	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.1	0.41	mg/kg	1
Silver	7440-22-4	6020B	0.14	J	0.22	0.052	mg/kg	1
Vanadium	7440-62-2	6020B	34		1.1	0.22	mg/kg	1
Zinc	7440-66-6	6020B	73		2.2	0.43	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-003
Description: CMR-EB04-8.0-8.5-190613
Matrix: Solid
Date Sampled: 06/13/2019 1440
% Solids: 81.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	2	06/17/2019 1836	JM1		19822	5.14
2	5035 High	8260B	20	06/19/2019 1808	JM1		20121	5.14

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		2900	570	ug/kg	1
Benzene	71-43-2	8260B	1100		720	290	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		720	290	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		720	290	ug/kg	1
Bromoform	75-25-2	8260B	ND		720	290	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		720	290	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		2900	570	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		720	290	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		720	290	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		720	290	ug/kg	1
Chloroethane	75-00-3	8260B	ND		720	290	ug/kg	1
Chloroform	67-66-3	8260B	ND		720	290	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		720	290	ug/kg	1
Cyclohexane	110-82-7	8260B	1100		720	290	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		720	290	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		720	290	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		720	290	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		720	290	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		720	290	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		720	290	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		720	290	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		720	290	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		720	290	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		720	290	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		720	290	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		720	290	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		720	290	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		720	290	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		720	290	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		36000	3600	ug/kg	1
Ethylbenzene	100-41-4	8260B	2700		720	290	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		1400	570	ug/kg	1
Isopropylbenzene	98-82-8	8260B	2200		720	290	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		720	290	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		720	290	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		1400	570	ug/kg	1
Methylcyclohexane	108-87-2	8260B	8100		720	290	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		720	290	ug/kg	1
Naphthalene	91-20-3	8260B	120000		7200	2900	ug/kg	2
Styrene	100-42-5	8260B	ND		720	290	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		720	290	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		720	290	ug/kg	1
Toluene	108-88-3	8260B	ND		720	290	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-003
Description: CMR-EB04-8.0-8.5-190613
Matrix: Solid
Date Sampled: 06/13/2019 1440
% Solids: 81.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	2	06/17/2019 1836	JM1		19822	5.14
2	5035 High	8260B	20	06/19/2019 1808	JM1		20121	5.14

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		720	290	ug/kg	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		720	290	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		720	290	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		720	290	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		720	290	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		720	290	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		720	290	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		720	290	ug/kg	1
Xylenes (total)	1330-20-7	8260B	1100	J	1400	570	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	510	J	720	290	ug/kg	1
o - Xylenes	95-47-6	8260B	550	J	720	290	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4	N	149	53-142		129	53-142
Bromofluorobenzene	N	146	47-138	N	139	47-138
Toluene-d8	N	164	68-124	N	125	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-003
Description: CMR-EB04-8.0-8.5-190613
Matrix: Solid
Date Sampled: 06/13/2019 1440
% Solids: 81.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	20	06/22/2019 2029	JCG	06/19/2019 1230	19960
2	3546	8270D	500	06/23/2019 0126	SCD	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	1200		64	20	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		64	23	ug/kg	1
Anthracene	120-12-7	8270D	610		64	12	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	25	J	64	14	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		64	16	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	20	J	64	12	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		64	15	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		64	11	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		310	120	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		310	120	ug/kg	1
Carbazole	86-74-8	8270D	ND		310	120	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		310	120	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		310	120	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		310	120	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		310	120	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		310	120	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		310	120	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		310	120	ug/kg	1
Chrysene	218-01-9	8270D	58	J	64	11	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		64	12	ug/kg	1
Dibenzofuran	132-64-9	8270D	950		310	120	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		1600	590	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		1600	590	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		1600	590	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		310	120	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		310	120	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		310	120	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		310	180	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		310	120	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		310	120	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		1600	590	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		1600	590	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		640	240	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		640	240	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		310	120	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		1600	590	ug/kg	1
Fluoranthene	206-44-0	8270D	52	J	64	10	ug/kg	1
Fluorene	86-73-7	8270D	2100		64	14	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		310	120	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		310	120	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		1600	590	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		310	120	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		64	24	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-003
Description: CMR-EB04-8.0-8.5-190613
Matrix: Solid
Date Sampled: 06/13/2019 1440
% Solids: 81.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	20	06/22/2019 2029	JCG	06/19/2019 1230	19960
2	3546	8270D	500	06/23/2019 0126	SCD	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		310	120	ug/kg	1
2-Methylnaphthalene	91-57-6	8270D	130000		1600	590	ug/kg	2
2-Methylphenol	95-48-7	8270D	ND		310	120	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		640	240	ug/kg	1
Naphthalene	91-20-3	8270D	19000		1600	580	ug/kg	2
2-Nitroaniline	88-74-4	8270D	ND		640	240	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		640	240	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		640	240	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		310	120	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		640	240	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		1600	590	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		310	120	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		310	120	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		1600	590	ug/kg	1
Phenanthrene	85-01-8	8270D	1800		64	17	ug/kg	1
Phenol	108-95-2	8270D	ND		310	120	ug/kg	1
Pyrene	129-00-0	8270D	170		64	12	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		780	240	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		1600	240	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		1600	590	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		310	120	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		310	120	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Run 1 Acceptance Limits	Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		51	33-102		47	33-102
2-Fluorophenol	N	19	35-115	N	0.00	35-115
Nitrobenzene-d5		104	22-109		82	22-109
Phenol-d5		41	33-122	N	0.00	33-122
Terphenyl-d14	N	29	41-120		52	41-120
2,4,6-Tribromophenol		55	30-117	N	0.00	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF14018-003
Description: CMR-EB04-8.0-8.5-190613
Matrix: Solid
Date Sampled: 06/13/2019 1440
% Solids: 81.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	5	06/27/2019 1707	CHG	06/17/2019 1329	19756

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	820		58	58	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	4100		58	58	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		50	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF14018-003
Description: CMR-EB04-8.0-8.5-190613
Matrix: Solid
Date Sampled: 06/13/2019 1440
% Solids: 81.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	5	06/27/2019 1838	CHG	06/17/2019 1329	19757

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	3000		58	58	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		95	40-140
2-Fluorobiphenyl (fractionation 1)	N	179	40-140
o - Terphenyl (aromatic)		135	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF14018-003
Description: CMR-EB04-8.0-8.5-190613
Matrix: Solid
Date Sampled: 06/13/2019 1440
% Solids: 81.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	20	06/19/2019 1410	JJG		20075

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	240		100	20	mg/kg	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	880		100	20	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	11300	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF14018-003
Description: CMR-EB04-8.0-8.5-190613
Matrix: Solid
Date Sampled: 06/13/2019 1440
% Solids: 81.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	4	06/18/2019 1725	JJG		19897
2	VPH	Montana VPH	20	06/19/2019 1410	JJG		20074

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	0.61	J	1.3	0.18	mg/kg	1
C9 - C10 Aromatics		Montana VPH	440		6.6	2.7	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	7.5		1.3	0.16	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		1.3	0.29	mg/kg	1
Naphthalene	91-20-3	Montana VPH	120		6.6	3.4	mg/kg	2
Toluene	108-88-3	Montana VPH	ND		1.3	0.21	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		1.3	0.30	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	9.0		1.3	0.15	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	6440	70-130	N	307	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF14018-003
Description: CMR-EB04-8.0-8.5-190613
Matrix: Solid
Date Sampled: 06/13/2019 1440
% Solids: 81.1 06/15/2019 0122
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	20	06/19/2019 1410	JJG		20073

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1700		180	35	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	13900	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB04-8.0-8.5-190613
Date Sampled: 06/13/2019 1440
Date Received: 06/14/2019

Laboratory ID: UF14018-003
Matrix: Solid
% Solids: 81.1 06/15/2019 0122

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/23/2019 2034	LLL	06/22/2019 0957	20301
1	7471B	7471B	1	06/25/2019 0939	TJW	06/24/2019 1815	20448

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.45	0.18	mg/kg	1
Arsenic	7440-38-2	6020B	4.5		0.45	0.18	mg/kg	1
Barium	7440-39-3	6020B	170		1.2	0.28	mg/kg	1
Beryllium	7440-41-7	6020B	0.51	B	0.089	0.030	mg/kg	1
Cadmium	7440-43-9	6020B	0.13		0.12	0.022	mg/kg	1
Chromium	7440-47-3	6020B	11	B	1.2	0.49	mg/kg	1
Cobalt	7440-48-4	6020B	4.1		1.2	0.27	mg/kg	1
Copper	7440-50-8	6020B	7.7		1.2	0.29	mg/kg	1
Lead	7439-92-1	6020B	5.8		0.22	0.061	mg/kg	1
Mercury	7439-97-6	7471B	0.024	J	0.10	0.024	mg/kg	1
Nickel	7440-02-0	6020B	9.6		1.2	0.27	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.2	0.42	mg/kg	1
Silver	7440-22-4	6020B	0.054	J	0.22	0.054	mg/kg	1
Vanadium	7440-62-2	6020B	21		1.2	0.22	mg/kg	1
Zinc	7440-66-6	6020B	29		2.2	0.45	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-004
Description: TB-10-20190613
Matrix: Aqueous
Date Sampled: 06/13/2019
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/22/2019 1623	STM		20424

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	2.2	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14018-004
Description: TB-10-20190613
Matrix: Aqueous
Date Sampled: 06/13/2019
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/22/2019 1623	STM		20424

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		108	70-130
Bromofluorobenzene		110	70-130
Toluene-d8		104	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19822-001
Batch: 19822
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	06/17/2019 1617
Benzene	ND		1	250	100	ug/kg	06/17/2019 1617
Bromochloromethane	ND		1	250	100	ug/kg	06/17/2019 1617
Bromodichloromethane	ND		1	250	100	ug/kg	06/17/2019 1617
Bromoform	ND		1	250	100	ug/kg	06/17/2019 1617
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	06/17/2019 1617
2-Butanone (MEK)	ND		1	1000	200	ug/kg	06/17/2019 1617
Carbon disulfide	ND		1	250	100	ug/kg	06/17/2019 1617
Carbon tetrachloride	ND		1	250	100	ug/kg	06/17/2019 1617
Chlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
Chloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
Chloroform	ND		1	250	100	ug/kg	06/17/2019 1617
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	06/17/2019 1617
Cyclohexane	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	06/17/2019 1617
Dibromochloromethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
Dichlorodifluoromethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,1-Dichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,1-Dichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
1,2-Dichloropropane	ND		1	250	100	ug/kg	06/17/2019 1617
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/17/2019 1617
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/17/2019 1617
1,4-Dioxane	ND		1	13000	1300	ug/kg	06/17/2019 1617
Ethylbenzene	ND		1	250	100	ug/kg	06/17/2019 1617
2-Hexanone	ND		1	500	200	ug/kg	06/17/2019 1617
Isopropylbenzene	ND		1	250	100	ug/kg	06/17/2019 1617
Methyl acetate	ND		1	250	100	ug/kg	06/17/2019 1617
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	06/17/2019 1617
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	06/17/2019 1617
Methylcyclohexane	ND		1	250	100	ug/kg	06/17/2019 1617
Methylene chloride	ND		1	250	100	ug/kg	06/17/2019 1617
Styrene	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
Tetrachloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
Toluene	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19822-001
Batch: 19822
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	06/17/2019 1617
Trichloroethene	ND		1	250	100	ug/kg	06/17/2019 1617
Trichlorofluoromethane	ND		1	250	100	ug/kg	06/17/2019 1617
Vinyl chloride	ND		1	250	100	ug/kg	06/17/2019 1617
Xylenes (total)	ND		1	500	200	ug/kg	06/17/2019 1617
m+p - Xylenes	ND		1	250	100	ug/kg	06/17/2019 1617
o - Xylenes	ND		1	250	100	ug/kg	06/17/2019 1617

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		106	53-142
Bromofluorobenzene		109	47-138
Toluene-d8		110	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19822-002
Batch: 19822
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	4900		1	97	60-140	06/18/2019 1718
Benzene	2500	2800		1	112	70-130	06/18/2019 1718
Bromochloromethane	2500	2700		1	109	70-130	06/18/2019 1718
Bromodichloromethane	2500	2700		1	109	70-130	06/18/2019 1718
Bromoform	2500	2600		1	104	70-130	06/18/2019 1718
Bromomethane (Methyl bromide)	2500	2200		1	88	70-130	06/18/2019 1718
2-Butanone (MEK)	5000	4700		1	95	60-140	06/18/2019 1718
Carbon disulfide	2500	2500		1	101	70-130	06/18/2019 1718
Carbon tetrachloride	2500	2900		1	117	70-130	06/18/2019 1718
Chlorobenzene	2500	2800		1	111	70-130	06/18/2019 1718
Chloroethane	2500	2600		1	106	70-130	06/18/2019 1718
Chloroform	2500	2800		1	113	70-130	06/18/2019 1718
Chloromethane (Methyl chloride)	2500	2300		1	93	60-140	06/18/2019 1718
Cyclohexane	2500	3000		1	122	70-130	06/18/2019 1718
1,2-Dibromo-3-chloropropane (DBCP)	2500	2400		1	96	70-130	06/18/2019 1718
Dibromochloromethane	2500	2800		1	112	70-130	06/18/2019 1718
1,2-Dibromoethane (EDB)	2500	2800		1	111	70-130	06/18/2019 1718
1,2-Dichlorobenzene	2500	2700		1	109	70-130	06/18/2019 1718
1,3-Dichlorobenzene	2500	2800		1	113	70-130	06/18/2019 1718
1,4-Dichlorobenzene	2500	2800		1	111	70-130	06/18/2019 1718
Dichlorodifluoromethane	2500	2400		1	97	60-140	06/18/2019 1718
1,1-Dichloroethane	2500	2700		1	110	70-130	06/18/2019 1718
1,2-Dichloroethane	2500	2700		1	108	70-130	06/18/2019 1718
1,1-Dichloroethene	2500	3000		1	119	70-130	06/18/2019 1718
cis-1,2-Dichloroethene	2500	2700		1	108	70-130	06/18/2019 1718
trans-1,2-Dichloroethene	2500	3000		1	118	70-130	06/18/2019 1718
1,2-Dichloropropane	2500	2800		1	111	70-130	06/18/2019 1718
cis-1,3-Dichloropropene	2500	2800		1	113	70-130	06/18/2019 1718
trans-1,3-Dichloropropene	2500	2900		1	115	70-130	06/18/2019 1718
1,4-Dioxane	25000	24000		1	95	60-140	06/18/2019 1718
Ethylbenzene	2500	2900		1	115	70-130	06/18/2019 1718
2-Hexanone	5000	5400		1	108	70-130	06/18/2019 1718
Isopropylbenzene	2500	2900		1	118	70-130	06/18/2019 1718
Methyl acetate	2500	2100		1	85	70-130	06/18/2019 1718
Methyl tertiary butyl ether (MTBE)	2500	2600		1	104	70-130	06/18/2019 1718
4-Methyl-2-pentanone	5000	5100		1	102	70-130	06/18/2019 1718
Methylcyclohexane	2500	3400	N	1	137	70-130	06/18/2019 1718
Methylene chloride	2500	2500		1	101	70-130	06/18/2019 1718
Styrene	2500	2900		1	116	70-130	06/18/2019 1718
1,1,2,2-Tetrachloroethane	2500	2800		1	113	70-130	06/18/2019 1718
Tetrachloroethene	2500	3000		1	121	70-130	06/18/2019 1718
Toluene	2500	2900		1	116	70-130	06/18/2019 1718
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3100		1	122	70-130	06/18/2019 1718
1,2,3-Trichlorobenzene	2500	2800		1	113	70-130	06/18/2019 1718

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19822-002
Batch: 19822
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,4-Trichlorobenzene	2500	2900		1	115	70-130	06/18/2019 1718
1,1,1-Trichloroethane	2500	2900		1	114	70-130	06/18/2019 1718
1,1,2-Trichloroethane	2500	2800		1	111	70-130	06/18/2019 1718
Trichloroethene	2500	2800		1	112	70-130	06/18/2019 1718
Trichlorofluoromethane	2500	2900		1	118	70-130	06/18/2019 1718
Vinyl chloride	2500	2400		1	97	70-130	06/18/2019 1718
Xylenes (total)	5000	5800		1	117	70-130	06/18/2019 1718
m+p - Xylenes	2500	3000		1	118	70-130	06/18/2019 1718
o - Xylenes	2500	2900		1	115	70-130	06/18/2019 1718

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		108	53-142
Bromofluorobenzene		110	47-138
Toluene-d8		111	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20121-001
Batch: 20121
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Naphthalene	ND		1	250	100	ug/kg	06/17/2019 1617

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		106	53-142
Bromofluorobenzene		109	47-138
Toluene-d8		110	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20121-002
Batch: 20121
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Naphthalene	2500	2500		1	101	70-130	06/18/2019 1718

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		108	53-142
Bromofluorobenzene		110	47-138
Toluene-d8		111	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20424-001
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/22/2019 1531
Benzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromoform	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/22/2019 1531
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloroform	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Cyclohexane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/22/2019 1531
1,4-Dioxane	ND		1	20	13	ug/L	06/22/2019 1531
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
2-Hexanone	ND		1	10	2.0	ug/L	06/22/2019 1531
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Methyl acetate	ND		1	1.0	0.40	ug/L	06/22/2019 1531
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/22/2019 1531
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/22/2019 1531
Methylene chloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Naphthalene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Styrene	ND		1	0.50	0.41	ug/L	06/22/2019 1531
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Toluene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/22/2019 1531

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20424-001
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Trichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/22/2019 1531
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/22/2019 1531
o - Xylenes	ND		1	0.50	0.40	ug/L	06/22/2019 1531

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		106	70-130
Bromofluorobenzene		106	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20424-002
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	63		1	63	60-140	06/22/2019 1428
Benzene	50	55		1	110	70-130	06/22/2019 1428
Bromochloromethane	50	49		1	98	70-130	06/22/2019 1428
Bromodichloromethane	50	56		1	112	70-130	06/22/2019 1428
Bromoform	50	49		1	97	70-130	06/22/2019 1428
Bromomethane (Methyl bromide)	50	46		1	93	70-130	06/22/2019 1428
2-Butanone (MEK)	100	88		1	88	70-130	06/22/2019 1428
Carbon disulfide	50	47		1	94	70-130	06/22/2019 1428
Carbon tetrachloride	50	50		1	100	70-130	06/22/2019 1428
Chlorobenzene	50	49		1	99	70-130	06/22/2019 1428
Chloroethane	50	50		1	101	70-130	06/22/2019 1428
Chloroform	50	49		1	98	70-130	06/22/2019 1428
Chloromethane (Methyl chloride)	50	55		1	109	60-140	06/22/2019 1428
Cyclohexane	50	46		1	93	70-130	06/22/2019 1428
1,2-Dibromo-3-chloropropane (DBCP)	50	55		1	111	70-130	06/22/2019 1428
Dibromochloromethane	50	53		1	107	70-130	06/22/2019 1428
1,2-Dibromoethane (EDB)	50	52		1	105	70-130	06/22/2019 1428
1,2-Dichlorobenzene	50	48		1	97	70-130	06/22/2019 1428
1,3-Dichlorobenzene	50	48		1	97	70-130	06/22/2019 1428
1,4-Dichlorobenzene	50	47		1	94	70-130	06/22/2019 1428
Dichlorodifluoromethane	50	52		1	105	60-140	06/22/2019 1428
1,1-Dichloroethane	50	49		1	99	70-130	06/22/2019 1428
1,2-Dichloroethane	50	56		1	112	70-130	06/22/2019 1428
1,1-Dichloroethene	50	51		1	101	70-130	06/22/2019 1428
cis-1,2-Dichloroethene	50	50		1	100	70-130	06/22/2019 1428
trans-1,2-Dichloroethene	50	53		1	106	70-130	06/22/2019 1428
1,2-Dichloropropane	50	55		1	110	70-130	06/22/2019 1428
cis-1,3-Dichloropropene	50	60		1	120	70-130	06/22/2019 1428
trans-1,3-Dichloropropene	50	53		1	106	70-130	06/22/2019 1428
1,4-Dioxane	500	530		1	107	60-140	06/22/2019 1428
Ethylbenzene	50	52		1	104	70-130	06/22/2019 1428
2-Hexanone	100	110		1	107	70-130	06/22/2019 1428
Isopropylbenzene	50	51		1	101	70-130	06/22/2019 1428
Methyl acetate	50	41		1	81	70-130	06/22/2019 1428
Methyl tertiary butyl ether (MTBE)	50	47		1	94	70-130	06/22/2019 1428
4-Methyl-2-pentanone	100	120		1	118	70-130	06/22/2019 1428
Methylcyclohexane	50	56		1	112	70-130	06/22/2019 1428
Methylene chloride	50	46		1	93	70-130	06/22/2019 1428
Naphthalene	50	57		1	115	70-130	06/22/2019 1428
Styrene	50	52		1	104	70-130	06/22/2019 1428
1,1,2,2-Tetrachloroethane	50	50		1	100	70-130	06/22/2019 1428
Tetrachloroethene	50	50		1	101	70-130	06/22/2019 1428
Toluene	50	50		1	101	70-130	06/22/2019 1428
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	44		1	88	70-130	06/22/2019 1428

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20424-002
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	56		1	112	70-130	06/22/2019 1428
1,2,4-Trichlorobenzene	50	54		1	108	70-130	06/22/2019 1428
1,1,1-Trichloroethane	50	48		1	96	70-130	06/22/2019 1428
1,1,2-Trichloroethane	50	51		1	102	70-130	06/22/2019 1428
Trichloroethene	50	53		1	107	70-130	06/22/2019 1428
Trichlorofluoromethane	50	49		1	97	70-130	06/22/2019 1428
Vinyl chloride	50	46		1	93	70-130	06/22/2019 1428
Xylenes (total)	100	100		1	101	70-130	06/22/2019 1428
m+p - Xylenes	50	52		1	103	70-130	06/22/2019 1428
o - Xylenes	50	50		1	100	70-130	06/22/2019 1428

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		105	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ20424-003
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acetone	100	54	N	1	54	15	60-140	20	06/23/2019 0039
Benzene	50	50		1	100	9.2	70-130	20	06/23/2019 0039
Bromochloromethane	50	49		1	98	0.067	70-130	20	06/23/2019 0039
Bromodichloromethane	50	48		1	96	15	70-130	20	06/23/2019 0039
Bromoform	50	46		1	91	6.4	70-130	20	06/23/2019 0039
Bromomethane (Methyl bromide)	50	45		1	90	3.2	70-130	20	06/23/2019 0039
2-Butanone (MEK)	100	86		1	86	2.6	70-130	20	06/23/2019 0039
Carbon disulfide	50	42		1	85	9.8	70-130	20	06/23/2019 0039
Carbon tetrachloride	50	46		1	92	8.7	70-130	20	06/23/2019 0039
Chlorobenzene	50	50		1	99	0.48	70-130	20	06/23/2019 0039
Chloroethane	50	47		1	93	7.4	70-130	20	06/23/2019 0039
Chloroform	50	49		1	97	0.92	70-130	20	06/23/2019 0039
Chloromethane (Methyl chloride)	50	51		1	103	6.4	60-140	20	06/23/2019 0039
Cyclohexane	50	41		1	82	13	70-130	20	06/23/2019 0039
1,2-Dibromo-3-chloropropane (DBCP)	50	51		1	102	7.8	70-130	20	06/23/2019 0039
Dibromochloromethane	50	51		1	102	4.2	70-130	20	06/23/2019 0039
1,2-Dibromoethane (EDB)	50	53		1	105	0.55	70-130	20	06/23/2019 0039
1,2-Dichlorobenzene	50	46		1	92	4.9	70-130	20	06/23/2019 0039
1,3-Dichlorobenzene	50	49		1	97	0.84	70-130	20	06/23/2019 0039
1,4-Dichlorobenzene	50	46		1	92	2.1	70-130	20	06/23/2019 0039
Dichlorodifluoromethane	50	49		1	99	5.9	60-140	20	06/23/2019 0039
1,1-Dichloroethane	50	46		1	93	5.8	70-130	20	06/23/2019 0039
1,2-Dichloroethane	50	47		1	95	17	70-130	20	06/23/2019 0039
1,1-Dichloroethene	50	47		1	94	7.2	70-130	20	06/23/2019 0039
cis-1,2-Dichloroethene	50	49		1	98	1.4	70-130	20	06/23/2019 0039
trans-1,2-Dichloroethene	50	49		1	99	7.4	70-130	20	06/23/2019 0039
1,2-Dichloropropane	50	46		1	92	18	70-130	20	06/23/2019 0039
cis-1,3-Dichloropropene	50	43	+	1	87	32	70-130	20	06/23/2019 0039
trans-1,3-Dichloropropene	50	48		1	96	9.8	70-130	20	06/23/2019 0039
1,4-Dioxane	500	470		1	94	13	60-140	20	06/23/2019 0039
Ethylbenzene	50	52		1	104	0.37	70-130	20	06/23/2019 0039
2-Hexanone	100	110		1	107	0.11	70-130	20	06/23/2019 0039
Isopropylbenzene	50	54		1	107	5.3	70-130	20	06/23/2019 0039
Methyl acetate	50	40		1	80	2.2	70-130	20	06/23/2019 0039
Methyl tertiary butyl ether (MTBE)	50	47		1	95	0.71	70-130	20	06/23/2019 0039
4-Methyl-2-pentanone	100	100		1	104	12	70-130	20	06/23/2019 0039
Methylcyclohexane	50	43	+	1	86	26	70-130	20	06/23/2019 0039
Methylene chloride	50	45		1	90	3.0	70-130	20	06/23/2019 0039
Naphthalene	50	49		1	97	16	70-130	20	06/23/2019 0039
Styrene	50	55		1	111	6.2	70-130	20	06/23/2019 0039
1,1,2,2-Tetrachloroethane	50	55		1	109	8.5	70-130	20	06/23/2019 0039
Tetrachloroethene	50	49		1	98	3.0	70-130	20	06/23/2019 0039
Toluene	50	48		1	95	5.9	70-130	20	06/23/2019 0039
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	40		1	80	9.8	70-130	20	06/23/2019 0039

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ20424-003
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
1,2,3-Trichlorobenzene	50	48		1	95	17	70-130	20	06/23/2019 0039
1,2,4-Trichlorobenzene	50	44	+	1	87	22	70-130	20	06/23/2019 0039
1,1,1-Trichloroethane	50	46		1	91	4.7	70-130	20	06/23/2019 0039
1,1,2-Trichloroethane	50	52		1	104	1.3	70-130	20	06/23/2019 0039
Trichloroethene	50	48		1	96	10	70-130	20	06/23/2019 0039
Trichlorofluoromethane	50	44		1	89	8.7	70-130	20	06/23/2019 0039
Vinyl chloride	50	43		1	86	7.3	70-130	20	06/23/2019 0039
Xylenes (total)	100	100		1	105	3.2	70-130	20	06/23/2019 0039
m+p - Xylenes	50	52		1	104	1.2	70-130	20	06/23/2019 0039
o - Xylenes	50	53		1	105	5.2	70-130	20	06/23/2019 0039

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		89	70-130
Bromofluorobenzene		107	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20869-001
Batch: 20869
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	06/26/2019 1112
Benzene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Bromochloromethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Bromoform	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	06/26/2019 1112
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	06/26/2019 1112
Carbon disulfide	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Chlorobenzene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Chloroethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Chloroform	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	06/26/2019 1112
Cyclohexane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	06/26/2019 1112
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,4-Dioxane	ND		1	250	25	ug/kg	06/26/2019 1112
Ethylbenzene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
2-Hexanone	ND		1	10	4.0	ug/kg	06/26/2019 1112
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Methyl acetate	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	06/26/2019 1112
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Methylene chloride	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Naphthalene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Styrene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Toluene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20869-001
Batch: 20869
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Trichloroethene	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
Vinyl chloride	ND		1	5.0	3.0	ug/kg	06/26/2019 1112
Xylenes (total)	ND		1	10	4.0	ug/kg	06/26/2019 1112
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	06/26/2019 1112
o - Xylenes	ND		1	5.0	2.0	ug/kg	06/26/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		93	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		103	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20869-002
Batch: 20869
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	67		1	67	60-140	06/26/2019 1254
Benzene	50	46		1	92	70-130	06/26/2019 1254
Bromochloromethane	50	44		1	88	70-130	06/26/2019 1254
Bromodichloromethane	50	46		1	92	70-130	06/26/2019 1254
Bromoform	50	47		1	94	70-130	06/26/2019 1254
Bromomethane (Methyl bromide)	50	36		1	71	70-130	06/26/2019 1254
2-Butanone (MEK)	100	72		1	72	60-140	06/26/2019 1254
Carbon disulfide	50	45		1	90	70-130	06/26/2019 1254
Carbon tetrachloride	50	48		1	95	70-130	06/26/2019 1254
Chlorobenzene	50	50		1	100	70-130	06/26/2019 1254
Chloroethane	50	57		1	114	70-130	06/26/2019 1254
Chloroform	50	46		1	92	70-130	06/26/2019 1254
Chloromethane (Methyl chloride)	50	39		1	78	60-140	06/26/2019 1254
Cyclohexane	50	45		1	91	70-130	06/26/2019 1254
1,2-Dibromo-3-chloropropane (DBCP)	50	48		1	97	70-130	06/26/2019 1254
Dibromochloromethane	50	48		1	95	70-130	06/26/2019 1254
1,2-Dibromoethane (EDB)	50	47		1	94	70-130	06/26/2019 1254
1,2-Dichlorobenzene	50	51		1	103	70-130	06/26/2019 1254
1,3-Dichlorobenzene	50	52		1	104	70-130	06/26/2019 1254
1,4-Dichlorobenzene	50	52		1	104	70-130	06/26/2019 1254
Dichlorodifluoromethane	50	59		1	118	60-140	06/26/2019 1254
1,1-Dichloroethane	50	45		1	90	70-130	06/26/2019 1254
1,2-Dichloroethane	50	43		1	85	70-130	06/26/2019 1254
1,1-Dichloroethene	50	45		1	91	70-130	06/26/2019 1254
cis-1,2-Dichloroethene	50	45		1	90	70-130	06/26/2019 1254
trans-1,2-Dichloroethene	50	46		1	92	70-130	06/26/2019 1254
1,2-Dichloropropane	50	46		1	91	70-130	06/26/2019 1254
cis-1,3-Dichloropropene	50	47		1	94	70-130	06/26/2019 1254
trans-1,3-Dichloropropene	50	48		1	97	70-130	06/26/2019 1254
1,4-Dioxane	500	460		1	91	60-140	06/26/2019 1254
Ethylbenzene	50	52		1	103	70-130	06/26/2019 1254
2-Hexanone	100	81		1	81	70-130	06/26/2019 1254
Isopropylbenzene	50	53		1	106	70-130	06/26/2019 1254
Methyl acetate	50	31	N	1	62	70-130	06/26/2019 1254
Methyl tertiary butyl ether (MTBE)	50	45		1	90	70-130	06/26/2019 1254
4-Methyl-2-pentanone	100	81		1	81	70-130	06/26/2019 1254
Methylcyclohexane	50	50		1	100	70-130	06/26/2019 1254
Methylene chloride	50	44		1	87	70-130	06/26/2019 1254
Naphthalene	50	49		1	99	70-130	06/26/2019 1254
Styrene	50	51		1	101	70-130	06/26/2019 1254
1,1,2,2-Tetrachloroethane	50	47		1	93	70-130	06/26/2019 1254
Tetrachloroethene	50	53		1	105	70-130	06/26/2019 1254
Toluene	50	47		1	93	70-130	06/26/2019 1254
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	98	70-130	06/26/2019 1254

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20869-002
Batch: 20869
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	54		1	108	70-130	06/26/2019 1254
1,2,4-Trichlorobenzene	50	55		1	110	70-130	06/26/2019 1254
1,1,1-Trichloroethane	50	47		1	93	70-130	06/26/2019 1254
1,1,2-Trichloroethane	50	47		1	95	70-130	06/26/2019 1254
Trichloroethene	50	48		1	97	70-130	06/26/2019 1254
Trichlorofluoromethane	50	55		1	111	70-130	06/26/2019 1254
Vinyl chloride	50	41		1	82	70-130	06/26/2019 1254
Xylenes (total)	100	100		1	103	70-130	06/26/2019 1254
m+p - Xylenes	50	52		1	104	70-130	06/26/2019 1254
o - Xylenes	50	51		1	103	70-130	06/26/2019 1254

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		100	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19960-001
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	06/20/2019 1159
Acenaphthylene	ND		1	2.7	0.95	ug/kg	06/20/2019 1159
Anthracene	ND		1	2.7	0.51	ug/kg	06/20/2019 1159
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	06/20/2019 1159
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	06/20/2019 1159
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	06/20/2019 1159
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	06/20/2019 1159
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	06/20/2019 1159
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
Carbazole	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Chlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
Chrysene	ND		1	2.7	0.45	ug/kg	06/20/2019 1159
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	06/20/2019 1159
Dibenzofuran	ND		1	13	5.0	ug/kg	06/20/2019 1159
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	06/20/2019 1159
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Diethylphthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
Dimethyl phthalate	ND		1	13	7.4	ug/kg	06/20/2019 1159
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	06/20/2019 1159
2,4-Dinitrophenol	ND		1	67	25	ug/kg	06/20/2019 1159
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	06/20/2019 1159
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	06/20/2019 1159
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	06/20/2019 1159
Fluoranthene	ND		1	2.7	0.42	ug/kg	06/20/2019 1159
Fluorene	ND		1	2.7	0.57	ug/kg	06/20/2019 1159
Hexachlorobenzene	ND		1	13	5.0	ug/kg	06/20/2019 1159
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	06/20/2019 1159
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	06/20/2019 1159
Hexachloroethane	ND		1	13	5.0	ug/kg	06/20/2019 1159
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	06/20/2019 1159
Isophorone	ND		1	13	5.0	ug/kg	06/20/2019 1159

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19960-001
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	06/20/2019 1159
2-Methylphenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
3+4-Methylphenol	ND		1	27	10	ug/kg	06/20/2019 1159
Naphthalene	ND		1	2.7	0.97	ug/kg	06/20/2019 1159
2-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
3-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
4-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
Nitrobenzene	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Nitrophenol	ND		1	27	10	ug/kg	06/20/2019 1159
4-Nitrophenol	ND		1	67	25	ug/kg	06/20/2019 1159
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	06/20/2019 1159
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	06/20/2019 1159
Pentachlorophenol	ND		1	67	25	ug/kg	06/20/2019 1159
Phenanthrene	ND		1	2.7	0.72	ug/kg	06/20/2019 1159
Phenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Pyrene	ND		1	2.7	0.50	ug/kg	06/20/2019 1159
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	06/20/2019 1159
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	06/20/2019 1159
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		48	33-102
2-Fluorophenol		53	35-115
Nitrobenzene-d5		50	22-109
Phenol-d5		57	33-122
Terphenyl-d14		66	41-120
2,4,6-Tribromophenol		60	30-117

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19960-002
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	78		1	59	12-111	06/22/2019 1824
Acenaphthylene	130	88		1	66	44-122	06/22/2019 1824
Anthracene	130	89		1	67	16-122	06/22/2019 1824
Benzo(a)anthracene	130	91		1	68	40-121	06/22/2019 1824
Benzo(a)pyrene	130	88		1	66	36-114	06/22/2019 1824
Benzo(b)fluoranthene	130	83		1	62	38-123	06/22/2019 1824
Benzo(g,h,i)perylene	130	100		1	75	43-120	06/22/2019 1824
Benzo(k)fluoranthene	130	90		1	68	40-126	06/22/2019 1824
4-Bromophenyl phenyl ether	130	82		1	62	30-130	06/22/2019 1824
Butyl benzyl phthalate	130	110		1	81	48-124	06/22/2019 1824
Carbazole	130	94		1	70	47-125	06/22/2019 1824
bis (2-Chloro-1-methylethyl) ether	130	78		1	59	41-113	06/22/2019 1824
4-Chloro-3-methyl phenol	130	88		1	66	48-120	06/22/2019 1824
bis(2-Chloroethoxy)methane	130	80		1	60	38-115	06/22/2019 1824
bis(2-Chloroethyl)ether	130	74		1	55	46-122	06/22/2019 1824
2-Chloronaphthalene	130	81		1	61	37-106	06/22/2019 1824
2-Chlorophenol	130	75		1	56	44-122	06/22/2019 1824
4-Chlorophenyl phenyl ether	130	84		1	63	32-107	06/22/2019 1824
Chrysene	130	90		1	68	41-124	06/22/2019 1824
Dibenzo(a,h)anthracene	130	95		1	72	38-125	06/22/2019 1824
Dibenzofuran	130	84		1	63	45-128	06/22/2019 1824
1,2-Dichlorobenzene	130	69		1	52	39-94	06/22/2019 1824
1,3-Dichlorobenzene	130	71		1	53	30-130	06/22/2019 1824
1,4-Dichlorobenzene	130	69		1	52	39-92	06/22/2019 1824
3,3'-Dichlorobenzidine	130	58		1	44	10-119	06/22/2019 1824
2,4-Dichlorophenol	130	79		1	59	30-96	06/22/2019 1824
Diethylphthalate	130	90		1	68	30-130	06/22/2019 1824
Dimethyl phthalate	130	89		1	67	24-127	06/22/2019 1824
2,4-Dimethylphenol	130	120		1	92	30-130	06/22/2019 1824
Di-n-butyl phthalate	130	95		1	71	35-108	06/22/2019 1824
4,6-Dinitro-2-methylphenol	130	79		1	59	53-150	06/22/2019 1824
2,4-Dinitrophenol	270	150		1	55	32-115	06/22/2019 1824
2,4-Dinitrotoluene	130	98		1	74	40-130	06/22/2019 1824
2,6-Dinitrotoluene	130	90		1	67	46-118	06/22/2019 1824
Di-n-octylphthalate	130	90		1	68	49-118	06/22/2019 1824
bis(2-Ethylhexyl)phthalate	130	98		1	74	33-123	06/22/2019 1824
Fluoranthene	130	94		1	71	26-133	06/22/2019 1824
Fluorene	130	84		1	63	19-108	06/22/2019 1824
Hexachlorobenzene	130	84		1	63	10-125	06/22/2019 1824
Hexachlorobutadiene	130	69		1	52	47-116	06/22/2019 1824
Hexachlorocyclopentadiene	670	300	N	1	46	48-127	06/22/2019 1824
Hexachloroethane	130	73		1	55	18-154	06/22/2019 1824
Indeno(1,2,3-c,d)pyrene	130	99		1	74	42-123	06/22/2019 1824
Isophorone	130	85		1	64	30-130	06/22/2019 1824

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19960-002
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	81		1	61	10-107	06/22/2019 1824
2-Methylphenol	130	75		1	57	33-103	06/22/2019 1824
3+4-Methylphenol	130	90		1	68	18-121	06/22/2019 1824
Naphthalene	130	79		1	59	10-112	06/22/2019 1824
2-Nitroaniline	130	98		1	74	46-128	06/22/2019 1824
3-Nitroaniline	130	33	N	1	25	30-130	06/22/2019 1824
4-Nitroaniline	130	67		1	51	51-129	06/22/2019 1824
Nitrobenzene	130	81		1	61	49-142	06/22/2019 1824
2-Nitrophenol	130	79		1	60	33-114	06/22/2019 1824
4-Nitrophenol	270	170		1	62	27-138	06/22/2019 1824
N-Nitrosodi-n-propylamine	130	85		1	64	45-112	06/22/2019 1824
N-Nitrosodiphenylamine (Diphenylamine)	130	89		1	67	49-123	06/22/2019 1824
Pentachlorophenol	270	120		1	45	36-108	06/22/2019 1824
Phenanthrene	130	86		1	65	16-123	06/22/2019 1824
Phenol	130	78		1	59	39-108	06/22/2019 1824
Pyrene	130	96		1	72	34-121	06/22/2019 1824
1,2,4,5-Tetrachlorobenzene	130	71		1	53	30-130	06/22/2019 1824
2,3,4,6-Tetrachlorophenol	130	84		1	64	53-125	06/22/2019 1824
1,2,4-Trichlorobenzene	130	74		1	55	30-130	06/22/2019 1824
2,4,5-Trichlorophenol	130	84		1	63	32-105	06/22/2019 1824
2,4,6-Trichlorophenol	130	81		1	61	31-102	06/22/2019 1824

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		55	33-102
2-Fluorophenol		54	35-115
Nitrobenzene-d5		57	22-109
Phenol-d5		56	33-122
Terphenyl-d14		78	41-120
2,4,6-Tribromophenol		68	30-117

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Montana EPH (aliphatics) - MB

Sample ID: UQ19756-001
Batch: 19756
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/17/2019 1329

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/20/2019 1754
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/20/2019 1754

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		85	40-140

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ19756-002
Batch: 19756
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/17/2019 1329

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	36		1	89	40-140	06/20/2019 1824
C9 - C18 Aliphatics	30	17		1	58	40-140	06/20/2019 1824

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		84	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana EPH (aromatics) - MB

Sample ID: UQ19757-001
Batch: 19757
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/17/2019 1329

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/21/2019 0151

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		91	40-140
2-Fluorobiphenyl (fractionation 1)		103	40-140
o - Terphenyl (aromatic)		88	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ19757-002
Batch: 19757
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/17/2019 1329

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	76		1	90	40-140	06/21/2019 0221

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		107	40-140
2-Fluorobiphenyl (fractionation 1)		110	40-140
o - Terphenyl (aromatic)		95	40-140

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20678-001
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	07/06/2019 1238
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	07/06/2019 1238

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20678-002
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	40-140	07/06/2019 1308
C9 - C18 Aliphatics	30	19		1	65	40-140	07/06/2019 1308

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		75	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20678-003
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	0.64	40-140	25	07/06/2019 1338
C9 - C18 Aliphatics	30	19		1	64	2.1	40-140	25	07/06/2019 1338

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20679-001
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	07/06/2019 2036

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		72	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		85	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20679-002
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	68		1	81	40-140	07/06/2019 2105

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		92	40-140
o - Terphenyl (aromatic)		91	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20679-003
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	56		1	66	20	40-140	25	07/06/2019 2135

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		71	40-140
2-Fluorobiphenyl (fractionation 1)		73	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - MB

Sample ID: UQ19896-001
Batch: 19896
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ19896-002
Batch: 19896
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	19		1	100	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ19897-001
Batch: 19897
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	06/18/2019 1601
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/18/2019 1601
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/18/2019 1601
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/18/2019 1601
Naphthalene	ND		1	0.25	0.13	mg/kg	06/18/2019 1601
Toluene	ND		1	0.25	0.040	mg/kg	06/18/2019 1601
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/18/2019 1601
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ19897-002
Batch: 19897
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	06/18/2019 1533
C9 - C10 Aromatics	1.3	1.3		1	104	70-130	06/18/2019 1533
Ethylbenzene	1.3	1.2		1	96	70-130	06/18/2019 1533
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	06/18/2019 1533
Naphthalene	1.3	1.1		1	88	70-130	06/18/2019 1533
Toluene	1.3	1.2		1	96	70-130	06/18/2019 1533
m+p - Xylenes	2.5	2.4		1	96	70-130	06/18/2019 1533
o - Xylenes	1.3	1.2		1	96	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ19898-001
Batch: 19898
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/18/2019 1601
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ19898-002
Batch: 19898
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	4.6		1	92	70-130	06/18/2019 1533
C9 - C12 Aliphatics, Adjusted	3.8	3.6		1	95	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ20073-001
Batch: 20073
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ20073-002
Batch: 20073
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	19		1	100	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ20074-001
Batch: 20074
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Naphthalene	ND		1	0.25	0.13	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ20074-002
Batch: 20074
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Naphthalene	1.3	1.1		1	88	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ20075-001
Batch: 20075
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/18/2019 1601
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ20075-002
Batch: 20075
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	4.6		1	92	70-130	06/18/2019 1533
C9 - C12 Aliphatics, Adjusted	3.8	3.6		1	95	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20301-001
Batch: 20301
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/22/2019 957

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	0.40	J	1	0.50	0.20	mg/kg	06/23/2019 2011
Arsenic	ND		1	0.50	0.20	mg/kg	06/23/2019 2011
Barium	ND		1	1.3	0.31	mg/kg	06/23/2019 2011
Beryllium	0.035	J	1	0.10	0.034	mg/kg	06/23/2019 2011
Cadmium	ND		1	0.13	0.025	mg/kg	06/23/2019 2011
Chromium	0.92	J	1	1.3	0.55	mg/kg	06/23/2019 2011
Cobalt	ND		1	1.3	0.30	mg/kg	06/23/2019 2011
Copper	ND		1	1.3	0.33	mg/kg	06/23/2019 2011
Lead	ND		1	0.25	0.068	mg/kg	06/23/2019 2011
Nickel	ND		1	1.3	0.30	mg/kg	06/23/2019 2011
Selenium	ND		1	1.3	0.47	mg/kg	06/23/2019 2011
Silver	ND		1	0.25	0.060	mg/kg	06/23/2019 2011
Vanadium	ND		1	1.3	0.25	mg/kg	06/23/2019 2011
Zinc	ND		1	2.5	0.50	mg/kg	06/23/2019 2011

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20301-002
Batch: 20301
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/22/2019 957

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	50		1	100	80-120	06/23/2019 2017
Arsenic	50	51		1	101	80-120	06/23/2019 2017
Barium	50	50		1	100	80-120	06/23/2019 2017
Beryllium	50	60		1	120	80-120	06/23/2019 2017
Cadmium	50	50		1	100	80-120	06/23/2019 2017
Chromium	50	52		1	104	80-120	06/23/2019 2017
Cobalt	50	50		1	99	80-120	06/23/2019 2017
Copper	50	51		1	102	80-120	06/23/2019 2017
Lead	50	51		1	101	80-120	06/23/2019 2017
Nickel	50	49		1	98	80-120	06/23/2019 2017
Selenium	50	49		1	99	80-120	06/23/2019 2017
Silver	50	52		1	104	80-120	06/23/2019 2017
Vanadium	50	50		1	100	80-120	06/23/2019 2017
Zinc	50	50		1	101	80-120	06/23/2019 2017

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20448-001
Batch: 20448
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1815

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/25/2019 0926

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20448-002
Batch: 20448
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1815

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.83		1	100	80-120	06/25/2019 0929

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody

and

Miscellaneous Documents

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Telephone No. (803) 791-9700 Fax No. (803) 791-9111
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Chain of Custody Record

Number

Client: Ramboll US Corporation	Report to Contact: Daniel Price/Michael Wilson	Telephone No. / E-mail: (314) 690-1970/dprice@ramboll.com (215) 446-7500/mwilson@ramboll.com	Quote No.
Address: 7500 College Boulevard Suite 1905	Sampler's Signature: x Elizabeth Borucki	Analysis (Attach list if more space is needed)	Page: 1 of 1
City: Overland Park / State: KS / Zip Code: 66210			
Project Name: CMR RIAIM East Rail			

UF14018

KM N2

Project Number: 1690012344-003	P.O No.			Matrix				No of Containers by Preservative Type															Remarks / Cooler ID
Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Aqueous	Solid	Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH				
CMR-EB04-0.0-1.0-190613	6/13/2019	14:20	G		X			2					1	2	X	X	X	X	X					Cooler 001
CMR-EB04-4.0-5.0-190613	6/13/2019	14:35	G		X			2					1	2	X	X	X	X	X					Cooler 001
CMR-EB04-8.0-8.5-190613	6/13/2019	14:40	G		X			2					1	2	X	X	X	X	X					Cooler 001
TB-10	NA	NA	G	X							2				X									Trip Blank/Cooler 001

Turn Around Time Required (Prior lab approval required for expedited TAT)
☐ Standard ☐ Rush (Please Specify)

Sample Disposal
☐ Return to Client ☐ Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks)
☐ Non-Hazardous ☐ Flammable ☐ Skin Irritant ☒ SDS provided ☐ Unknown

QC Requirements

1. Relinquished by: Elizabeth Borucki	Date: 6/13/2019	Time: 17:45	1. Received by	Date	Time
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by: Fed EX	Date: 6-14-19	Time: 1030	4. Laboratory Received by: L Hite	Date: 6-14-19	Time: 1036

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) ☒ Y ☐ N ☐ Ice Pack

Receipt Temp. 4.3 °C

Document Number: ME0020W-01

SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 06-14-2019 Lot #: UF14018

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other:			
☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

4.3 / 4.3 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H_2SO_4, HNO_3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) 04(2) were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JSH Date: 06-14-2019

Comments:

MEMO

Date: **July 19, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF14020, 2 Groundwater Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF14020 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB07-190613-GW	UF14020-001
CMR-EB14-190613-GW	UF14020-002
TB-11-20190613	UF14020-003

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of acetone. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all acetone results have been validated as estimated.

Blank Detections
During analysis, zinc and bis(2-ethylhexyl)phthalate were detected in method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All zinc and bis(2-ethylhexyl)phthalate results below the RL or below 5x the blank result have been validated as non-detect (U).

Hold Time
All samples were analyzed by the lab within their hold time requirements. However, due to QC issues during the initial analysis some samples were reanalyzed outside of hold time. While these out of hold time results are generally usable, the results within hold time should be used preferentially.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF14020

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 2 GW, 1 Water

Reviewer Name R Huening

Completion Date July 12, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Zinc detected in method blank sample. All zinc project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All zinc project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.

SDG No. UF14020

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 2 GW, 1 Water

Reviewer Name R Huening

Completion Date July 12, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	One VPH/EPH sample reanalysed out of hold time with similar results. Both sets of results are usable.
Blanks	Bis(2-ethylhexyl)phthalate detected in method blank sample. All project sample detections of bis(2-ethylhexyl)phthalate validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Several surrogates were out of criteria due to matrix issues. No action taken.	Several surrogates were out of criteria due to dilutions. No action taken.
Matrix Spike/Matrix Spike Duplicate	Several SVOC non-COC analytes recovered out of criteria. No action taken.	No MS/MSD results reported with sample results. No action taken.
Laboratory Control Sample	Recoveries out for acetone. Acetone results validated as estimated (J, UJ). Several SVOC non-COC analytes recovered out of criteria. No action taken.	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by lab.	N/A
Other Non-conformances	No other non-conformances noted during review.	No other non-conformances noted during review.
Overall Assessment of Data	All project sample detections of bis(2-ethylhexyl)phthalate validated as non-detect (U). Recoveries out for acetone. Acetone results validated as estimated (J, UJ).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF14020**

Date Completed:07/11/2019

07/12/2019 10:12 AM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF14020

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample duplicate (LCSD) associated with batch 20424 had acetone recovered marginally outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Semivolatiles
The method blank associated with batch 19825 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for bis(2-ethylhexyl)phthalate have been flagged with a “B” qualifier.

The laboratory control sample (LCS) associated with batch 19825 had 2-chlorophenol, 3+4-methylphenol, and N-nitrosdi-n-propylamine recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -002 had multiple compounds and one surrogate recovered outside of the acceptance limits. Additionally, one RPD exceeded the acceptance limit. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Montana EPH
Sample -002 had the surrogate recovered outside of the acceptance limits. The sample was re-extracted and re-analyzed outside of the holding time for confirmation. Both sets of data are reported.

Montana VPH
Sample -001 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene,

making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS. Sample -001 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The method blank associated with batch 19719 had zinc detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for zinc have been flagged with a “B” qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF14020

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB07-190613-GW	Aqueous	06/13/2019 0918	06/14/2019
002	CMR-EB14-190613-GW	Aqueous	06/13/2019 1045	06/14/2019
003	TB-11-20190613	Aqueous	06/13/2019	06/14/2019

(3 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF14020

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB07-190613-GW	Aqueous	Acetone	8260B	11		ug/L	7
001	CMR-EB07-190613-GW	Aqueous	Benzene	8260B	41		ug/L	7
001	CMR-EB07-190613-GW	Aqueous	2-Butanone (MEK)	8260B	3.3	J	ug/L	7
001	CMR-EB07-190613-GW	Aqueous	Cyclohexane	8260B	2.9		ug/L	7
001	CMR-EB07-190613-GW	Aqueous	Ethylbenzene	8260B	1.8		ug/L	7
001	CMR-EB07-190613-GW	Aqueous	Isopropylbenzene	8260B	1.0		ug/L	7
001	CMR-EB07-190613-GW	Aqueous	Methylcyclohexane	8260B	1.9	J	ug/L	7
001	CMR-EB07-190613-GW	Aqueous	Naphthalene	8260B	160		ug/L	7
001	CMR-EB07-190613-GW	Aqueous	Toluene	8260B	0.88		ug/L	7
001	CMR-EB07-190613-GW	Aqueous	Xylenes (total)	8260B	4.8		ug/L	8
001	CMR-EB07-190613-GW	Aqueous	m+p - Xylenes	8260B	1.5		ug/L	8
001	CMR-EB07-190613-GW	Aqueous	o - Xylenes	8260B	3.3		ug/L	8
001	CMR-EB07-190613-GW	Aqueous	Acenaphthene	8270D	2.3		ug/L	9
001	CMR-EB07-190613-GW	Aqueous	Carbazole	8270D	1.1		ug/L	9
001	CMR-EB07-190613-GW	Aqueous	Dibenzofuran	8270D	1.3		ug/L	9
001	CMR-EB07-190613-GW	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.71	BJ	ug/L	9
001	CMR-EB07-190613-GW	Aqueous	Fluorene	8270D	1.9		ug/L	9
001	CMR-EB07-190613-GW	Aqueous	2-Methylnaphthalene	8270D	100		ug/L	10
001	CMR-EB07-190613-GW	Aqueous	Naphthalene	8270D	52		ug/L	10
001	CMR-EB07-190613-GW	Aqueous	C11 - C22 Aromatics	Montana EPH	360		ug/L	12
001	CMR-EB07-190613-GW	Aqueous	C5 - C8 Aliphatics,	Montana VPH	49	J	ug/L	13
001	CMR-EB07-190613-GW	Aqueous	C9 - C12 Aliphatics,	Montana VPH	180		ug/L	13
001	CMR-EB07-190613-GW	Aqueous	Benzene	Montana VPH	38		ug/L	14
001	CMR-EB07-190613-GW	Aqueous	C9 - C10 Aromatics	Montana VPH	220		ug/L	14
001	CMR-EB07-190613-GW	Aqueous	Ethylbenzene	Montana VPH	9.3		ug/L	14
001	CMR-EB07-190613-GW	Aqueous	Naphthalene	Montana VPH	150		ug/L	14
001	CMR-EB07-190613-GW	Aqueous	Toluene	Montana VPH	1.2	J	ug/L	14
001	CMR-EB07-190613-GW	Aqueous	o - Xylenes	Montana VPH	5.0		ug/L	14
001	CMR-EB07-190613-GW	Aqueous	TPH	Montana VPH	530		ug/L	15
001	CMR-EB07-190613-GW	Aqueous	Barium	6020B	430		ug/L	16
001	CMR-EB07-190613-GW	Aqueous	Cobalt	6020B	1.3	J	ug/L	16
001	CMR-EB07-190613-GW	Aqueous	Copper	6020B	3.3	J	ug/L	16
001	CMR-EB07-190613-GW	Aqueous	Nickel	6020B	9.8		ug/L	16
001	CMR-EB07-190613-GW	Aqueous	Zinc	6020B	7.6	BJ	ug/L	16
002	CMR-EB14-190613-GW	Aqueous	Acetone	8260B	13		ug/L	17
002	CMR-EB14-190613-GW	Aqueous	2-Butanone (MEK)	8260B	4.8	J	ug/L	17
002	CMR-EB14-190613-GW	Aqueous	1,2-Dichloroethane	8260B	19		ug/L	17
002	CMR-EB14-190613-GW	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.43	BJ	ug/L	19
002	CMR-EB14-190613-GW	Aqueous	2-Methylphenol	8270D	0.30	J	ug/L	20
002	CMR-EB14-190613-GW	Aqueous	C9 - C18 Aliphatics	Montana EPH	120		ug/L	21
002	CMR-EB14-190613-GW	Aqueous	C5 - C8 Aliphatics,	Montana VPH	17	J	ug/L	25
002	CMR-EB14-190613-GW	Aqueous	Arsenic	6020B	1.9	J	ug/L	28
002	CMR-EB14-190613-GW	Aqueous	Barium	6020B	34		ug/L	28
002	CMR-EB14-190613-GW	Aqueous	Copper	6020B	5.5		ug/L	28
002	CMR-EB14-190613-GW	Aqueous	Nickel	6020B	6.5		ug/L	28

Detection Summary (Continued)

Lot Number: UF14020

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-EB14-190613-GW	Aqueous	Selenium	6020B	2.0	J	ug/L	28
002	CMR-EB14-190613-GW	Aqueous	Vanadium	6020B	5.9		ug/L	28
002	CMR-EB14-190613-GW	Aqueous	Zinc	6020B	8.3	BJ	ug/L	28

(48 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-001
Description: CMR-EB07-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 0918
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/22/2019 1709	STM		20424

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	11		10	2.0	ug/L	1
Benzene	71-43-2	8260B	41		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	3.3	J	10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	2.9		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	1.8		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	1.0		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	1.9	J	5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	160		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	0.88		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-001
Description: CMR-EB07-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 0918
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/22/2019 1709	STM		20424

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	4.8		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	1.5		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	3.3		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		103	70-130
Bromofluorobenzene		109	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-001
Description: CMR-EB07-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 0918
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/19/2019 1643	SCD	06/17/2019 1910	19825
2	3520C	8270D	20	06/20/2019 1550	SCD	06/17/2019 1910	19825

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	2.3		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	1.1		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	1.3		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.71	BJ	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	1.9		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-001
Description: CMR-EB07-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 0918
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/19/2019 1643	SCD	06/17/2019 1910	19825
2	3520C	8270D	20	06/20/2019 1550	SCD	06/17/2019 1910	19825

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1
2-Methylnaphthalene	91-57-6	8270D	100		3.2	0.80	ug/L	2
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	52		3.2	0.80	ug/L	2
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		53	37-129		43	37-129
2-Fluorophenol		47	24-127		26	24-127
Nitrobenzene-d5		68	38-127		52	38-127
Phenol-d5		54	28-128		33	28-128
Terphenyl-d14		75	10-148		60	10-148
2,4,6-Tribromophenol		91	35-144		64	35-144

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF14020-001
Description: CMR-EB07-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 0918
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1142	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		42	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF14020-001
Description: CMR-EB07-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 0918
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0012	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	360		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		45	40-140
2-Fluorobiphenyl (fractionation 1)		60	40-140
o - Terphenyl (aromatic)		46	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF14020-001
Description: CMR-EB07-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 0918
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/18/2019 1505	JJG		19890

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	49	J	75	15	ug/L	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	180		75	15	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	744	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF14020-001
Description: CMR-EB07-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 0918
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/18/2019 1505	JJG		19891

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	38		5.0	0.51	ug/L	2
C9 - C10 Aromatics		Montana VPH	220		25	5.0	ug/L	2
Ethylbenzene	100-41-4	Montana VPH	9.3		5.0	0.62	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	2
Naphthalene	91-20-3	Montana VPH	150		5.0	0.70	ug/L	2
Toluene	108-88-3	Montana VPH	1.2	J	5.0	0.53	ug/L	2
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	2
o - Xylenes	95-47-6	Montana VPH	5.0		5.0	0.58	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	536	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF14020-001
Description: CMR-EB07-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 0918
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/18/2019 1505	JJG		19894

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	530		180	35	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	764	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-001
Description: CMR-EB07-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 0918
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/17/2019 1253	JMH	06/16/2019 1505	19703
1	3005A	6020B	1	06/18/2019 1057	LLL	06/16/2019 1941	19719
2	3005A	6020B	1	06/21/2019 2300	BNW	06/16/2019 1941	19719

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	ND		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	430		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	1.3	J	5.0	1.3	ug/L	2
Copper	7440-50-8	6020B	3.3	J	5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	9.8		5.0	1.3	ug/L	2
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	7.6	BJ	10	2.5	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/19/2019 0020	STM		19941

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	13		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	4.8	J	10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	19		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.40	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/19/2019 0020	STM		19941

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		105	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/19/2019 1708	SCD	06/17/2019 1910	19825

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.43	BJ	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/19/2019 1708	SCD	06/17/2019 1910	19825

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	0.30	J	0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		52	37-129
2-Fluorophenol		42	24-127
Nitrobenzene-d5		61	38-127
Phenol-d5		75	28-128
Terphenyl-d14		68	10-148
2,4,6-Tribromophenol		87	35-144

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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1213	CHG	06/26/2019 0946	20744
2	Montana EPH	Montana EPH	1	07/10/2019 1718	DAL1	07/09/2019 2101	22051

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	120		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		42	40-140	H	53	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1213	CHG	06/26/2019 0946	20744
2	Montana EPH	Montana EPH	1	07/10/2019 1718	DAL1	07/09/2019 2101	22051

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND	H	110	110	ug/L	2
C9 - C18 Aliphatics		Montana EPH	120	H	110	110	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		42	40-140	H	53	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0042	CHG	06/26/2019 0946	20745
2	Montana EPH	Montana EPH	1	07/10/2019 2051	DAL1	07/09/2019 2101	22052

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)	N	37	40-140	H	55	40-140
2-Fluorobiphenyl (fractionation 1)		49	40-140	H	108	40-140
o - Terphenyl (aromatic)		44	40-140	H	69	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0042	CHG	06/26/2019 0946	20745
2	Montana EPH	Montana EPH	1	07/10/2019 2051	DAL1	07/09/2019 2101	22052

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND	H	110	110	ug/L	2

Surrogate	Q	Run 1 % Recovery	Acceptance Limits	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)	N	37	40-140	H	55	40-140
2-Fluorobiphenyl (fractionation 1)		49	40-140	H	108	40-140
o - Terphenyl (aromatic)		44	40-140	H	69	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1437	JJG		19890

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	17	J	75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1437	JJG		19891

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		94	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1437	JJG		19894

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-002
Description: CMR-EB14-190613-GW
Matrix: Aqueous
Date Sampled: 06/13/2019 1045
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/17/2019 1255	JMH	06/16/2019 1505	19703
1	3005A	6020B	1	06/18/2019 1102	LLL	06/16/2019 1941	19719
2	3005A	6020B	1	06/21/2019 2306	BNW	06/16/2019 1941	19719

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	1.9	J	2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	34		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	ND		5.0	1.3	ug/L	2
Copper	7440-50-8	6020B	5.5		5.0	1.3	ug/L	2
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	6.5		5.0	1.3	ug/L	2
Selenium	7782-49-2	6020B	2.0	J	5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	5.9		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	8.3	BJ	10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-003
Description: TB-11-20190613
Matrix: Aqueous
Date Sampled: 06/13/2019
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/22/2019 1646	STM		20424

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF14020-003
Description: TB-11-20190613
Matrix: Aqueous
Date Sampled: 06/13/2019
Date Received: 06/14/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/22/2019 1646	STM		20424

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		105	70-130
Bromofluorobenzene		106	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19941-001
Batch: 19941
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/18/2019 2335
Benzene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Bromoform	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/18/2019 2335
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/18/2019 2335
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Chloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Chloroform	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Cyclohexane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
trans-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,4-Dioxane	ND		1	20	13	ug/L	06/18/2019 2335
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
2-Hexanone	ND		1	10	2.0	ug/L	06/18/2019 2335
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Methyl acetate	ND		1	1.0	0.40	ug/L	06/18/2019 2335
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/18/2019 2335
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/18/2019 2335
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/18/2019 2335
Methylene chloride	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Naphthalene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Styrene	ND		1	0.50	0.41	ug/L	06/18/2019 2335
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Toluene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/18/2019 2335

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19941-001
Batch: 19941
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Trichloroethene	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/18/2019 2335
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/18/2019 2335
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/18/2019 2335
o - Xylenes	ND		1	0.50	0.40	ug/L	06/18/2019 2335

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		105	70-130
Toluene-d8		99	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19941-002
Batch: 19941
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	82		1	82	60-140	06/18/2019 2232
Benzene	50	49		1	99	70-130	06/18/2019 2232
Bromochloromethane	50	48		1	96	70-130	06/18/2019 2232
Bromodichloromethane	50	48		1	96	70-130	06/18/2019 2232
Bromoform	50	49		1	99	70-130	06/18/2019 2232
Bromomethane (Methyl bromide)	50	43		1	85	70-130	06/18/2019 2232
2-Butanone (MEK)	100	99		1	99	70-130	06/18/2019 2232
Carbon disulfide	50	43		1	85	70-130	06/18/2019 2232
Carbon tetrachloride	50	46		1	91	70-130	06/18/2019 2232
Chlorobenzene	50	48		1	96	70-130	06/18/2019 2232
Chloroethane	50	44		1	87	70-130	06/18/2019 2232
Chloroform	50	47		1	95	70-130	06/18/2019 2232
Chloromethane (Methyl chloride)	50	48		1	95	60-140	06/18/2019 2232
Cyclohexane	50	42		1	83	70-130	06/18/2019 2232
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	93	70-130	06/18/2019 2232
Dibromochloromethane	50	52		1	103	70-130	06/18/2019 2232
1,2-Dibromoethane (EDB)	50	51		1	101	70-130	06/18/2019 2232
1,2-Dichlorobenzene	50	49		1	98	70-130	06/18/2019 2232
1,3-Dichlorobenzene	50	48		1	96	70-130	06/18/2019 2232
1,4-Dichlorobenzene	50	46		1	93	70-130	06/18/2019 2232
Dichlorodifluoromethane	50	44		1	88	60-140	06/18/2019 2232
1,1-Dichloroethane	50	47		1	93	70-130	06/18/2019 2232
1,2-Dichloroethane	50	48		1	95	70-130	06/18/2019 2232
1,1-Dichloroethene	50	47		1	94	70-130	06/18/2019 2232
cis-1,2-Dichloroethene	50	48		1	96	70-130	06/18/2019 2232
trans-1,2-Dichloroethene	50	49		1	98	70-130	06/18/2019 2232
1,2-Dichloropropane	50	48		1	97	70-130	06/18/2019 2232
cis-1,3-Dichloropropene	50	52		1	104	70-130	06/18/2019 2232
trans-1,3-Dichloropropene	50	53		1	107	70-130	06/18/2019 2232
1,4-Dioxane	500	490		1	97	60-140	06/18/2019 2232
Ethylbenzene	50	50		1	100	70-130	06/18/2019 2232
2-Hexanone	100	100		1	103	70-130	06/18/2019 2232
Isopropylbenzene	50	52		1	104	70-130	06/18/2019 2232
Methyl acetate	50	37		1	74	70-130	06/18/2019 2232
Methyl tertiary butyl ether (MTBE)	50	46		1	92	70-130	06/18/2019 2232
4-Methyl-2-pentanone	100	100		1	101	70-130	06/18/2019 2232
Methylcyclohexane	50	47		1	95	70-130	06/18/2019 2232
Methylene chloride	50	43		1	86	70-130	06/18/2019 2232
Naphthalene	50	52		1	104	70-130	06/18/2019 2232
Styrene	50	54		1	107	70-130	06/18/2019 2232
1,1,2,2-Tetrachloroethane	50	49		1	98	70-130	06/18/2019 2232
Tetrachloroethene	50	48		1	97	70-130	06/18/2019 2232
Toluene	50	48		1	97	70-130	06/18/2019 2232
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	41		1	82	70-130	06/18/2019 2232

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19941-002
Batch: 19941
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	51		1	101	70-130	06/18/2019 2232
1,2,4-Trichlorobenzene	50	50		1	100	70-130	06/18/2019 2232
1,1,1-Trichloroethane	50	44		1	88	70-130	06/18/2019 2232
1,1,2-Trichloroethane	50	50		1	99	70-130	06/18/2019 2232
Trichloroethene	50	48		1	96	70-130	06/18/2019 2232
Trichlorofluoromethane	50	43		1	86	70-130	06/18/2019 2232
Vinyl chloride	50	42		1	83	70-130	06/18/2019 2232
Xylenes (total)	100	100		1	102	70-130	06/18/2019 2232
m+p - Xylenes	50	51		1	101	70-130	06/18/2019 2232
o - Xylenes	50	51		1	102	70-130	06/18/2019 2232

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		87	70-130
Bromofluorobenzene		109	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20424-001
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/22/2019 1531
Benzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromoform	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/22/2019 1531
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloroform	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Cyclohexane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/22/2019 1531
1,4-Dioxane	ND		1	20	13	ug/L	06/22/2019 1531
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
2-Hexanone	ND		1	10	2.0	ug/L	06/22/2019 1531
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Methyl acetate	ND		1	1.0	0.40	ug/L	06/22/2019 1531
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/22/2019 1531
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/22/2019 1531
Methylene chloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Naphthalene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Styrene	ND		1	0.50	0.41	ug/L	06/22/2019 1531
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Toluene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/22/2019 1531

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20424-001
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Trichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/22/2019 1531
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/22/2019 1531
o - Xylenes	ND		1	0.50	0.40	ug/L	06/22/2019 1531

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		106	70-130
Bromofluorobenzene		106	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20424-002
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	63		1	63	60-140	06/22/2019 1428
Benzene	50	55		1	110	70-130	06/22/2019 1428
Bromochloromethane	50	49		1	98	70-130	06/22/2019 1428
Bromodichloromethane	50	56		1	112	70-130	06/22/2019 1428
Bromoform	50	49		1	97	70-130	06/22/2019 1428
Bromomethane (Methyl bromide)	50	46		1	93	70-130	06/22/2019 1428
2-Butanone (MEK)	100	88		1	88	70-130	06/22/2019 1428
Carbon disulfide	50	47		1	94	70-130	06/22/2019 1428
Carbon tetrachloride	50	50		1	100	70-130	06/22/2019 1428
Chlorobenzene	50	49		1	99	70-130	06/22/2019 1428
Chloroethane	50	50		1	101	70-130	06/22/2019 1428
Chloroform	50	49		1	98	70-130	06/22/2019 1428
Chloromethane (Methyl chloride)	50	55		1	109	60-140	06/22/2019 1428
Cyclohexane	50	46		1	93	70-130	06/22/2019 1428
1,2-Dibromo-3-chloropropane (DBCP)	50	55		1	111	70-130	06/22/2019 1428
Dibromochloromethane	50	53		1	107	70-130	06/22/2019 1428
1,2-Dibromoethane (EDB)	50	52		1	105	70-130	06/22/2019 1428
1,2-Dichlorobenzene	50	48		1	97	70-130	06/22/2019 1428
1,3-Dichlorobenzene	50	48		1	97	70-130	06/22/2019 1428
1,4-Dichlorobenzene	50	47		1	94	70-130	06/22/2019 1428
Dichlorodifluoromethane	50	52		1	105	60-140	06/22/2019 1428
1,1-Dichloroethane	50	49		1	99	70-130	06/22/2019 1428
1,2-Dichloroethane	50	56		1	112	70-130	06/22/2019 1428
1,1-Dichloroethene	50	51		1	101	70-130	06/22/2019 1428
cis-1,2-Dichloroethene	50	50		1	100	70-130	06/22/2019 1428
trans-1,2-Dichloroethene	50	53		1	106	70-130	06/22/2019 1428
1,2-Dichloropropane	50	55		1	110	70-130	06/22/2019 1428
cis-1,3-Dichloropropene	50	60		1	120	70-130	06/22/2019 1428
trans-1,3-Dichloropropene	50	53		1	106	70-130	06/22/2019 1428
1,4-Dioxane	500	530		1	107	60-140	06/22/2019 1428
Ethylbenzene	50	52		1	104	70-130	06/22/2019 1428
2-Hexanone	100	110		1	107	70-130	06/22/2019 1428
Isopropylbenzene	50	51		1	101	70-130	06/22/2019 1428
Methyl acetate	50	41		1	81	70-130	06/22/2019 1428
Methyl tertiary butyl ether (MTBE)	50	47		1	94	70-130	06/22/2019 1428
4-Methyl-2-pentanone	100	120		1	118	70-130	06/22/2019 1428
Methylcyclohexane	50	56		1	112	70-130	06/22/2019 1428
Methylene chloride	50	46		1	93	70-130	06/22/2019 1428
Naphthalene	50	57		1	115	70-130	06/22/2019 1428
Styrene	50	52		1	104	70-130	06/22/2019 1428
1,1,2,2-Tetrachloroethane	50	50		1	100	70-130	06/22/2019 1428
Tetrachloroethene	50	50		1	101	70-130	06/22/2019 1428
Toluene	50	50		1	101	70-130	06/22/2019 1428
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	44		1	88	70-130	06/22/2019 1428

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20424-002
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	56		1	112	70-130	06/22/2019 1428
1,2,4-Trichlorobenzene	50	54		1	108	70-130	06/22/2019 1428
1,1,1-Trichloroethane	50	48		1	96	70-130	06/22/2019 1428
1,1,2-Trichloroethane	50	51		1	102	70-130	06/22/2019 1428
Trichloroethene	50	53		1	107	70-130	06/22/2019 1428
Trichlorofluoromethane	50	49		1	97	70-130	06/22/2019 1428
Vinyl chloride	50	46		1	93	70-130	06/22/2019 1428
Xylenes (total)	100	100		1	101	70-130	06/22/2019 1428
m+p - Xylenes	50	52		1	103	70-130	06/22/2019 1428
o - Xylenes	50	50		1	100	70-130	06/22/2019 1428

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		105	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ20424-003
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acetone	100	54	N	1	54	15	60-140	20	06/23/2019 0039
Benzene	50	50		1	100	9.2	70-130	20	06/23/2019 0039
Bromochloromethane	50	49		1	98	0.067	70-130	20	06/23/2019 0039
Bromodichloromethane	50	48		1	96	15	70-130	20	06/23/2019 0039
Bromoform	50	46		1	91	6.4	70-130	20	06/23/2019 0039
Bromomethane (Methyl bromide)	50	45		1	90	3.2	70-130	20	06/23/2019 0039
2-Butanone (MEK)	100	86		1	86	2.6	70-130	20	06/23/2019 0039
Carbon disulfide	50	42		1	85	9.8	70-130	20	06/23/2019 0039
Carbon tetrachloride	50	46		1	92	8.7	70-130	20	06/23/2019 0039
Chlorobenzene	50	50		1	99	0.48	70-130	20	06/23/2019 0039
Chloroethane	50	47		1	93	7.4	70-130	20	06/23/2019 0039
Chloroform	50	49		1	97	0.92	70-130	20	06/23/2019 0039
Chloromethane (Methyl chloride)	50	51		1	103	6.4	60-140	20	06/23/2019 0039
Cyclohexane	50	41		1	82	13	70-130	20	06/23/2019 0039
1,2-Dibromo-3-chloropropane (DBCP)	50	51		1	102	7.8	70-130	20	06/23/2019 0039
Dibromochloromethane	50	51		1	102	4.2	70-130	20	06/23/2019 0039
1,2-Dibromoethane (EDB)	50	53		1	105	0.55	70-130	20	06/23/2019 0039
1,2-Dichlorobenzene	50	46		1	92	4.9	70-130	20	06/23/2019 0039
1,3-Dichlorobenzene	50	49		1	97	0.84	70-130	20	06/23/2019 0039
1,4-Dichlorobenzene	50	46		1	92	2.1	70-130	20	06/23/2019 0039
Dichlorodifluoromethane	50	49		1	99	5.9	60-140	20	06/23/2019 0039
1,1-Dichloroethane	50	46		1	93	5.8	70-130	20	06/23/2019 0039
1,2-Dichloroethane	50	47		1	95	17	70-130	20	06/23/2019 0039
1,1-Dichloroethene	50	47		1	94	7.2	70-130	20	06/23/2019 0039
cis-1,2-Dichloroethene	50	49		1	98	1.4	70-130	20	06/23/2019 0039
trans-1,2-Dichloroethene	50	49		1	99	7.4	70-130	20	06/23/2019 0039
1,2-Dichloropropane	50	46		1	92	18	70-130	20	06/23/2019 0039
cis-1,3-Dichloropropene	50	43	+	1	87	32	70-130	20	06/23/2019 0039
trans-1,3-Dichloropropene	50	48		1	96	9.8	70-130	20	06/23/2019 0039
1,4-Dioxane	500	470		1	94	13	60-140	20	06/23/2019 0039
Ethylbenzene	50	52		1	104	0.37	70-130	20	06/23/2019 0039
2-Hexanone	100	110		1	107	0.11	70-130	20	06/23/2019 0039
Isopropylbenzene	50	54		1	107	5.3	70-130	20	06/23/2019 0039
Methyl acetate	50	40		1	80	2.2	70-130	20	06/23/2019 0039
Methyl tertiary butyl ether (MTBE)	50	47		1	95	0.71	70-130	20	06/23/2019 0039
4-Methyl-2-pentanone	100	100		1	104	12	70-130	20	06/23/2019 0039
Methylcyclohexane	50	43	+	1	86	26	70-130	20	06/23/2019 0039
Methylene chloride	50	45		1	90	3.0	70-130	20	06/23/2019 0039
Naphthalene	50	49		1	97	16	70-130	20	06/23/2019 0039
Styrene	50	55		1	111	6.2	70-130	20	06/23/2019 0039
1,1,2,2-Tetrachloroethane	50	55		1	109	8.5	70-130	20	06/23/2019 0039
Tetrachloroethene	50	49		1	98	3.0	70-130	20	06/23/2019 0039
Toluene	50	48		1	95	5.9	70-130	20	06/23/2019 0039
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	40		1	80	9.8	70-130	20	06/23/2019 0039

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ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ20424-003
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
1,2,3-Trichlorobenzene	50	48		1	95	17	70-130	20	06/23/2019 0039
1,2,4-Trichlorobenzene	50	44	+	1	87	22	70-130	20	06/23/2019 0039
1,1,1-Trichloroethane	50	46		1	91	4.7	70-130	20	06/23/2019 0039
1,1,2-Trichloroethane	50	52		1	104	1.3	70-130	20	06/23/2019 0039
Trichloroethene	50	48		1	96	10	70-130	20	06/23/2019 0039
Trichlorofluoromethane	50	44		1	89	8.7	70-130	20	06/23/2019 0039
Vinyl chloride	50	43		1	86	7.3	70-130	20	06/23/2019 0039
Xylenes (total)	100	100		1	105	3.2	70-130	20	06/23/2019 0039
m+p - Xylenes	50	52		1	104	1.2	70-130	20	06/23/2019 0039
o - Xylenes	50	53		1	105	5.2	70-130	20	06/23/2019 0039

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		89	70-130
Bromofluorobenzene		107	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19825-001
Batch: 19825
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/17/2019 1910

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Acenaphthylene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Anthracene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	06/19/2019 1259
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	06/19/2019 1259
Carbazole	ND		1	0.80	0.040	ug/L	06/19/2019 1259
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	06/19/2019 1259
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	06/19/2019 1259
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	06/19/2019 1259
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	06/19/2019 1259
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	06/19/2019 1259
2-Chlorophenol	ND		1	0.80	0.15	ug/L	06/19/2019 1259
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	06/19/2019 1259
Chrysene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Dibenzofuran	ND		1	0.80	0.16	ug/L	06/19/2019 1259
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	06/19/2019 1259
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	06/19/2019 1259
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	06/19/2019 1259
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	06/19/2019 1259
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	06/19/2019 1259
Diethylphthalate	ND		1	4.0	0.19	ug/L	06/19/2019 1259
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	06/19/2019 1259
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	06/19/2019 1259
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	06/19/2019 1259
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	06/19/2019 1259
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	06/19/2019 1259
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	06/19/2019 1259
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	06/19/2019 1259
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	06/19/2019 1259
bis(2-Ethylhexyl)phthalate	0.40	J	1	4.0	0.38	ug/L	06/19/2019 1259
Fluoranthene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Fluorene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	06/19/2019 1259
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	06/19/2019 1259
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	06/19/2019 1259
Hexachloroethane	ND		1	0.80	0.17	ug/L	06/19/2019 1259
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Isophorone	ND		1	0.80	0.22	ug/L	06/19/2019 1259

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19825-001
Batch: 19825
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/17/2019 1910

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
2-Methylphenol	ND		1	0.80	0.21	ug/L	06/19/2019 1259
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	06/19/2019 1259
Naphthalene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
2-Nitroaniline	ND		1	1.6	0.66	ug/L	06/19/2019 1259
3-Nitroaniline	ND		1	1.6	0.15	ug/L	06/19/2019 1259
4-Nitroaniline	ND		1	1.6	1.3	ug/L	06/19/2019 1259
Nitrobenzene	ND		1	0.80	0.17	ug/L	06/19/2019 1259
2-Nitrophenol	ND		1	1.6	0.44	ug/L	06/19/2019 1259
4-Nitrophenol	ND		1	4.0	2.1	ug/L	06/19/2019 1259
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	06/19/2019 1259
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	06/19/2019 1259
Pentachlorophenol	ND		1	4.0	1.3	ug/L	06/19/2019 1259
Phenanthrene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
Phenol	ND		1	0.80	0.19	ug/L	06/19/2019 1259
Pyrene	ND		1	0.16	0.040	ug/L	06/19/2019 1259
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	06/19/2019 1259
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	06/19/2019 1259
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	06/19/2019 1259
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	06/19/2019 1259
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	06/19/2019 1259

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		46	37-129
2-Fluorophenol		42	24-127
Nitrobenzene-d5		55	38-127
Phenol-d5		49	28-128
Terphenyl-d14		62	10-148
2,4,6-Tribromophenol		48	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19825-002
Batch: 19825
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/17/2019 1910

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.3		1	54	30-122	06/19/2019 1145
Acenaphthylene	8.0	4.5		1	56	30-130	06/19/2019 1145
Anthracene	8.0	4.7		1	59	30-123	06/19/2019 1145
Benzo(a)anthracene	8.0	5.4		1	67	40-125	06/19/2019 1145
Benzo(a)pyrene	8.0	5.3		1	66	40-128	06/19/2019 1145
Benzo(b)fluoranthene	8.0	5.3		1	66	30-130	06/19/2019 1145
Benzo(g,h,i)perylene	8.0	5.3		1	67	30-130	06/19/2019 1145
Benzo(k)fluoranthene	8.0	5.0		1	62	30-130	06/19/2019 1145
4-Bromophenyl phenyl ether	8.0	4.6		1	58	30-124	06/19/2019 1145
Butyl benzyl phthalate	8.0	5.8		1	72	54-135	06/19/2019 1145
Carbazole	8.0	5.2		1	65	45-101	06/19/2019 1145
bis (2-Chloro-1-methylethyl) ether	8.0	3.9		1	49	42-124	06/19/2019 1145
4-Chloro-3-methyl phenol	8.0	4.9		1	61	30-123	06/19/2019 1145
bis(2-Chloroethoxy)methane	8.0	4.6		1	57	44-127	06/19/2019 1145
bis(2-Chloroethyl)ether	8.0	3.8		1	47	46-120	06/19/2019 1145
2-Chloronaphthalene	8.0	4.0		1	50	46-100	06/19/2019 1145
2-Chlorophenol	8.0	3.9	N	1	49	50-117	06/19/2019 1145
4-Chlorophenyl phenyl ether	8.0	4.2		1	53	30-121	06/19/2019 1145
Chrysene	8.0	5.1		1	64	30-130	06/19/2019 1145
Dibenzo(a,h)anthracene	8.0	5.3		1	67	30-130	06/19/2019 1145
Dibenzofuran	8.0	4.2		1	53	30-118	06/19/2019 1145
1,2-Dichlorobenzene	8.0	3.6		1	44	32-111	06/19/2019 1145
1,3-Dichlorobenzene	8.0	3.6		1	45	28-110	06/19/2019 1145
1,4-Dichlorobenzene	8.0	3.6		1	44	29-112	06/19/2019 1145
3,3'-Dichlorobenzidine	8.0	2.7		1	33	10-126	06/19/2019 1145
2,4-Dichlorophenol	8.0	4.3		1	54	30-121	06/19/2019 1145
Diethylphthalate	8.0	4.5		1	56	40-125	06/19/2019 1145
Dimethyl phthalate	8.0	4.9		1	61	40-127	06/19/2019 1145
2,4-Dimethylphenol	8.0	5.4		1	67	20-125	06/19/2019 1145
Di-n-butyl phthalate	8.0	5.6		1	70	40-127	06/19/2019 1145
4,6-Dinitro-2-methylphenol	8.0	5.2		1	65	56-128	06/19/2019 1145
2,4-Dinitrophenol	16	8.9		1	55	11-126	06/19/2019 1145
2,4-Dinitrotoluene	8.0	4.9		1	61	59-127	06/19/2019 1145
2,6-Dinitrotoluene	8.0	4.9		1	62	59-126	06/19/2019 1145
Di-n-octylphthalate	8.0	5.3		1	66	50-136	06/19/2019 1145
bis(2-Ethylhexyl)phthalate	8.0	6.2		1	78	56-128	06/19/2019 1145
Fluoranthene	8.0	5.5		1	68	40-128	06/19/2019 1145
Fluorene	8.0	4.4		1	55	30-124	06/19/2019 1145
Hexachlorobenzene	8.0	4.6		1	58	30-125	06/19/2019 1145
Hexachlorobutadiene	8.0	3.3		1	42	24-110	06/19/2019 1145
Hexachlorocyclopentadiene	40	13		1	34	16-96	06/19/2019 1145
Hexachloroethane	8.0	3.4		1	43	31-110	06/19/2019 1145
Indeno(1,2,3-c,d)pyrene	8.0	5.3		1	66	30-130	06/19/2019 1145
Isophorone	8.0	4.8		1	61	57-123	06/19/2019 1145

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19825-002
Batch: 19825
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/17/2019 1910

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.1		1	52	40-132	06/19/2019 1145
2-Methylphenol	8.0	5.6		1	70	56-119	06/19/2019 1145
3+4-Methylphenol	8.0	4.1	N	1	51	53-119	06/19/2019 1145
Naphthalene	8.0	4.1		1	52	30-130	06/19/2019 1145
2-Nitroaniline	8.0	5.1		1	63	60-124	06/19/2019 1145
3-Nitroaniline	8.0	3.5		1	44	43-123	06/19/2019 1145
4-Nitroaniline	8.0	4.6		1	57	30-135	06/19/2019 1145
Nitrobenzene	8.0	4.4		1	54	51-122	06/19/2019 1145
2-Nitrophenol	8.0	4.4		1	54	51-118	06/19/2019 1145
4-Nitrophenol	16	11		1	67	53-130	06/19/2019 1145
N-Nitrosodi-n-propylamine	8.0	4.2	N	1	52	54-127	06/19/2019 1145
N-Nitrosodiphenylamine (Diphenylamine)	8.0	4.7		1	59	30-123	06/19/2019 1145
Pentachlorophenol	16	11		1	69	42-131	06/19/2019 1145
Phenanthrene	8.0	5.0		1	63	40-123	06/19/2019 1145
Phenol	8.0	4.4		1	54	49-117	06/19/2019 1145
Pyrene	8.0	4.6		1	57	40-126	06/19/2019 1145
1,2,4,5-Tetrachlorobenzene	8.0	3.6		1	46	30-130	06/19/2019 1145
2,3,4,6-Tetrachlorophenol	8.0	4.4		1	56	30-130	06/19/2019 1145
1,2,4-Trichlorobenzene	8.0	3.7		1	46	20-90	06/19/2019 1145
2,4,5-Trichlorophenol	8.0	4.7		1	59	30-123	06/19/2019 1145
2,4,6-Trichlorophenol	8.0	4.7		1	58	30-125	06/19/2019 1145

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		52	37-129
2-Fluorophenol		47	24-127
Nitrobenzene-d5		57	38-127
Phenol-d5		51	28-128
Terphenyl-d14		66	10-148
2,4,6-Tribromophenol		65	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF14020-002MS
Batch: 19825
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/17/2019 1910

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	ND	16	8.8		1	55	30-122	06/19/2019 1733
Acenaphthylene	ND	16	9.7		1	60	30-130	06/19/2019 1733
Anthracene	ND	16	11		1	70	30-123	06/19/2019 1733
Benzo(a)anthracene	ND	16	11		1	72	40-125	06/19/2019 1733
Benzo(a)pyrene	ND	16	11		1	70	40-128	06/19/2019 1733
Benzo(b)fluoranthene	ND	16	12		1	75	30-130	06/19/2019 1733
Benzo(g,h,i)perylene	ND	16	7.4		1	47	30-130	06/19/2019 1733
Benzo(k)fluoranthene	ND	16	12		1	75	30-130	06/19/2019 1733
4-Bromophenyl phenyl ether	ND	16	9.9		1	62	30-124	06/19/2019 1733
Butyl benzyl phthalate	ND	16	12		1	74	54-135	06/19/2019 1733
Carbazole	ND	16	12		1	78	45-101	06/19/2019 1733
bis (2-Chloro-1-methylethyl) ether	ND	16	8.1		1	51	42-124	06/19/2019 1733
4-Chloro-3-methyl phenol	ND	16	11		1	69	30-123	06/19/2019 1733
bis(2-Chloroethoxy)methane	ND	16	9.1		1	57	44-127	06/19/2019 1733
bis(2-Chloroethyl)ether	ND	16	7.1	N	1	44	46-120	06/19/2019 1733
2-Chloronaphthalene	ND	16	8.6		1	54	46-100	06/19/2019 1733
2-Chlorophenol	ND	16	7.9	N	1	49	50-117	06/19/2019 1733
4-Chlorophenyl phenyl ether	ND	16	9.1		1	57	30-121	06/19/2019 1733
Chrysene	ND	16	11		1	69	30-130	06/19/2019 1733
Dibenzo(a,h)anthracene	ND	16	8.8		1	55	30-130	06/19/2019 1733
Dibenzofuran	ND	16	9.8		1	61	30-118	06/19/2019 1733
1,2-Dichlorobenzene	ND	16	7.2		1	45	32-111	06/19/2019 1733
1,3-Dichlorobenzene	ND	16	7.1		1	44	28-110	06/19/2019 1733
1,4-Dichlorobenzene	ND	16	7.0		1	44	29-112	06/19/2019 1733
3,3'-Dichlorobenzidine	ND	16	ND	N	1	0.00	10-126	06/19/2019 1733
2,4-Dichlorophenol	ND	16	9.3		1	58	30-121	06/19/2019 1733
Diethylphthalate	ND	16	11		1	71	40-125	06/19/2019 1733
Dimethyl phthalate	ND	16	9.4		1	59	40-127	06/19/2019 1733
2,4-Dimethylphenol	ND	16	14		1	89	20-125	06/19/2019 1733
Di-n-butyl phthalate	ND	16	14		1	86	40-127	06/19/2019 1733
4,6-Dinitro-2-methylphenol	ND	16	12		1	72	56-128	06/19/2019 1733
2,4-Dinitrophenol	ND	32	28		1	89	30-130	06/19/2019 1733
2,4-Dinitrotoluene	ND	16	12		1	76	59-127	06/19/2019 1733
2,6-Dinitrotoluene	ND	16	9.8		1	61	59-126	06/19/2019 1733
Di-n-octylphthalate	ND	16	10		1	65	50-136	06/19/2019 1733
bis(2-Ethylhexyl)phthalate	0.43	16	11		1	69	56-128	06/19/2019 1733
Fluoranthene	ND	16	13		1	80	40-128	06/19/2019 1733
Fluorene	ND	16	9.5		1	59	30-124	06/19/2019 1733
Hexachlorobenzene	ND	16	9.9		1	62	30-125	06/19/2019 1733
Hexachlorobutadiene	ND	16	7.3		1	46	30-130	06/19/2019 1733
Hexachlorocyclopentadiene	ND	80	31		1	38	16-96	06/19/2019 1733
Hexachloroethane	ND	16	8.1		1	51	31-110	06/19/2019 1733
Indeno(1,2,3-c,d)pyrene	ND	16	8.7		1	54	30-130	06/19/2019 1733
Isophorone	ND	16	10		1	63	57-123	06/19/2019 1733

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF14020-002MS
Batch: 19825
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/17/2019 1910

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	ND	16	9.0		1	56	40-132	06/19/2019 1733
2-Methylphenol	0.30	16	8.3	N	1	50	56-119	06/19/2019 1733
3+4-Methylphenol	ND	16	8.1	N	1	51	53-119	06/19/2019 1733
Naphthalene	ND	16	8.5		1	53	30-130	06/19/2019 1733
2-Nitroaniline	ND	16	11		1	70	60-124	06/19/2019 1733
3-Nitroaniline	ND	16	0.92	N	1	5.7	43-123	06/19/2019 1733
4-Nitroaniline	ND	16	5.0		1	31	30-135	06/19/2019 1733
Nitrobenzene	ND	16	9.0		1	56	51-122	06/19/2019 1733
2-Nitrophenol	ND	16	10		1	65	51-118	06/19/2019 1733
4-Nitrophenol	ND	32	11	N	1	33	53-130	06/19/2019 1733
N-Nitrosodi-n-propylamine	ND	16	9.1		1	57	54-127	06/19/2019 1733
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	10		1	64	30-123	06/19/2019 1733
Pentachlorophenol	ND	32	39		1	123	42-131	06/19/2019 1733
Phenanthrene	ND	16	11		1	70	40-123	06/19/2019 1733
Phenol	ND	16	8.2		1	51	49-117	06/19/2019 1733
Pyrene	ND	16	9.4		1	59	40-126	06/19/2019 1733
1,2,4,5-Tetrachlorobenzene	ND	16	7.8		1	49	30-130	06/19/2019 1733
2,3,4,6-Tetrachlorophenol	ND	16	14		1	87	30-130	06/19/2019 1733
1,2,4-Trichlorobenzene	ND	16	7.7		1	48	20-90	06/19/2019 1733
2,4,5-Trichlorophenol	ND	16	11		1	69	30-123	06/19/2019 1733
2,4,6-Trichlorophenol	ND	16	11		1	68	30-125	06/19/2019 1733

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		54	37-129
2-Fluorophenol		42	24-127
Nitrobenzene-d5		56	38-127
Phenol-d5		62	28-128
Terphenyl-d14		67	10-148
2,4,6-Tribromophenol		86	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF14020-002MD
Batch: 19825
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/17/2019 1910

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acenaphthene	ND	16	9.3		1	58	5.4	30-122	40	06/19/2019 1758
Acenaphthylene	ND	16	9.4		1	59	3.0	30-130	40	06/19/2019 1758
Anthracene	ND	16	11		1	66	5.9	30-123	40	06/19/2019 1758
Benzo(a)anthracene	ND	16	11		1	68	6.0	40-125	40	06/19/2019 1758
Benzo(a)pyrene	ND	16	10		1	64	8.9	40-128	40	06/19/2019 1758
Benzo(b)fluoranthene	ND	16	11		1	69	7.8	30-130	40	06/19/2019 1758
Benzo(g,h,i)perylene	ND	16	6.6		1	41	12	30-130	40	06/19/2019 1758
Benzo(k)fluoranthene	ND	16	11		1	69	7.7	30-130	40	06/19/2019 1758
4-Bromophenyl phenyl ether	ND	16	9.0		1	56	9.4	30-124	40	06/19/2019 1758
Butyl benzyl phthalate	ND	16	11		1	70	6.3	54-135	40	06/19/2019 1758
Carbazole	ND	16	12		1	74	5.4	45-101	40	06/19/2019 1758
bis (2-Chloro-1-methylethyl) ether	ND	16	8.1		1	51	0.34	42-124	40	06/19/2019 1758
4-Chloro-3-methyl phenol	ND	16	11		1	68	1.9	30-123	40	06/19/2019 1758
bis(2-Chloroethoxy)methane	ND	16	8.8		1	55	3.3	44-127	40	06/19/2019 1758
bis(2-Chloroethyl)ether	ND	16	7.3	N	1	45	2.7	46-120	40	06/19/2019 1758
2-Chloronaphthalene	ND	16	9.0		1	56	4.6	46-100	40	06/19/2019 1758
2-Chlorophenol	ND	16	7.8	N	1	49	0.13	50-117	40	06/19/2019 1758
4-Chlorophenyl phenyl ether	ND	16	9.4		1	59	3.0	30-121	40	06/19/2019 1758
Chrysene	ND	16	10		1	65	6.1	30-130	40	06/19/2019 1758
Dibenzo(a,h)anthracene	ND	16	7.8		1	48	12	30-130	40	06/19/2019 1758
Dibenzofuran	ND	16	9.4		1	58	4.9	30-118	40	06/19/2019 1758
1,2-Dichlorobenzene	ND	16	7.0		1	44	2.0	32-111	20	06/19/2019 1758
1,3-Dichlorobenzene	ND	16	7.0		1	44	0.83	28-110	20	06/19/2019 1758
1,4-Dichlorobenzene	ND	16	7.0		1	44	0.90	29-112	20	06/19/2019 1758
3,3'-Dichlorobenzidine	ND	16	ND	N	1	0.00	0.00	10-126	40	06/19/2019 1758
2,4-Dichlorophenol	ND	16	9.0		1	56	3.2	30-121	40	06/19/2019 1758
Diethylphthalate	ND	16	11		1	70	1.1	40-125	40	06/19/2019 1758
Dimethyl phthalate	ND	16	9.4		1	59	0.44	40-127	40	06/19/2019 1758
2,4-Dimethylphenol	ND	16	14		1	86	3.5	20-125	40	06/19/2019 1758
Di-n-butyl phthalate	ND	16	13		1	79	8.3	40-127	40	06/19/2019 1758
4,6-Dinitro-2-methylphenol	ND	16	11		1	67	7.6	56-128	40	06/19/2019 1758
2,4-Dinitrophenol	ND	32	27		1	86	3.5	30-130	40	06/19/2019 1758
2,4-Dinitrotoluene	ND	16	12		1	76	0.28	59-127	40	06/19/2019 1758
2,6-Dinitrotoluene	ND	16	9.8		1	62	0.48	59-126	40	06/19/2019 1758
Di-n-octylphthalate	ND	16	9.3		1	58	11	50-136	40	06/19/2019 1758
bis(2-Ethylhexyl)phthalate	0.43	16	10		1	62	9.5	56-128	40	06/19/2019 1758
Fluoranthene	ND	16	12		1	76	4.7	40-128	40	06/19/2019 1758
Fluorene	ND	16	9.6		1	60	1.2	30-124	40	06/19/2019 1758
Hexachlorobenzene	ND	16	9.5		1	59	4.3	30-125	40	06/19/2019 1758
Hexachlorobutadiene	ND	16	7.1		1	45	2.6	30-130	40	06/19/2019 1758
Hexachlorocyclopentadiene	ND	80	30		1	38	1.0	16-96	40	06/19/2019 1758
Hexachloroethane	ND	16	7.8		1	49	3.7	31-110	40	06/19/2019 1758
Indeno(1,2,3-c,d)pyrene	ND	16	7.6		1	48	13	30-130	40	06/19/2019 1758
Isophorone	ND	16	9.6		1	60	4.1	57-123	40	06/19/2019 1758

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF14020-002MD
Batch: 19825
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/17/2019 1910

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
2-Methylnaphthalene	ND	16	8.7		1	54	3.3	40-132	40	06/19/2019 1758
2-Methylphenol	0.30	16	7.9	N	1	48	4.0	56-119	40	06/19/2019 1758
3+4-Methylphenol	ND	16	7.8	N	1	48	4.6	53-119	40	06/19/2019 1758
Naphthalene	ND	16	8.3		1	52	2.9	30-130	40	06/19/2019 1758
2-Nitroaniline	ND	16	11		1	71	0.39	60-124	40	06/19/2019 1758
3-Nitroaniline	ND	16	1.6	N,+	1	9.7	51	43-123	40	06/19/2019 1758
4-Nitroaniline	ND	16	3.8	N	1	24	26	30-135	40	06/19/2019 1758
Nitrobenzene	ND	16	8.8		1	55	2.2	51-122	40	06/19/2019 1758
2-Nitrophenol	ND	16	10		1	64	1.6	51-118	40	06/19/2019 1758
4-Nitrophenol	ND	32	7.5	N	1	24	33	53-130	40	06/19/2019 1758
N-Nitrosodi-n-propylamine	ND	16	9.0		1	56	0.90	54-127	40	06/19/2019 1758
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	9.5		1	60	7.3	30-123	40	06/19/2019 1758
Pentachlorophenol	ND	32	38		1	120	2.3	42-131	40	06/19/2019 1758
Phenanthrene	ND	16	11		1	67	4.6	40-123	40	06/19/2019 1758
Phenol	ND	16	8.1		1	51	0.67	49-117	40	06/19/2019 1758
Pyrene	ND	16	8.6		1	54	8.3	40-126	40	06/19/2019 1758
1,2,4,5-Tetrachlorobenzene	ND	16	8.1		1	50	3.2	30-130	40	06/19/2019 1758
2,3,4,6-Tetrachlorophenol	ND	16	13		1	84	3.9	30-130	40	06/19/2019 1758
1,2,4-Trichlorobenzene	ND	16	7.4		1	47	3.5	20-90	40	06/19/2019 1758
2,4,5-Trichlorophenol	ND	16	11		1	68	0.46	30-123	40	06/19/2019 1758
2,4,6-Trichlorophenol	ND	16	11		1	68	0.47	30-125	40	06/19/2019 1758

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		57	37-129
2-Fluorophenol		44	24-127
Nitrobenzene-d5		56	38-127
Phenol-d5	N	0.11	28-128
Terphenyl-d14		62	10-148
2,4,6-Tribromophenol		82	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20744-001
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012
C9 - C18 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20744-002
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	260		1	65	40-140	07/08/2019 1042
C9 - C18 Aliphatics	300	140		1	48	40-140	07/08/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		57	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20744-003
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	280		1	69	5.9	40-140	25	07/08/2019 1112
C9 - C18 Aliphatics	300	150		1	51	6.4	40-140	25	07/08/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana EPH (aromatics) - MB

Sample ID: UQ20745-001
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	07/08/2019 2143

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		45	40-140
2-Fluorobiphenyl (fractionation 1)		60	40-140
o - Terphenyl (aromatic)		52	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20745-002
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	460		1	54	40-140	07/08/2019 2213

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		48	40-140
2-Fluorobiphenyl (fractionation 1)		65	40-140
o - Terphenyl (aromatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20745-003
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	410		1	49	10	40-140	25	07/08/2019 2243

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		61	40-140
2-Fluorobiphenyl (fractionation 1)		62	40-140
o - Terphenyl (aromatic)		54	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ22051-001
Batch: 22051
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/09/2019 2101

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	07/10/2019 1548
C9 - C18 Aliphatics	ND		1	100	100	ug/L	07/10/2019 1548

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ22051-002
Batch: 22051
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/09/2019 2101

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	330		1	82	40-140	07/10/2019 1618
C9 - C18 Aliphatics	300	210		1	71	40-140	07/10/2019 1618

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ22051-003
Batch: 22051
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/09/2019 2101

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	320		1	79	4.0	40-140	25	07/10/2019 1648
C9 - C18 Aliphatics	300	210		1	71	0.53	40-140	25	07/10/2019 1648

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		72	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ22052-001
Batch: 22052
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/09/2019 2101

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	07/10/2019 1920

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		84	40-140
2-Fluorobiphenyl (fractionation 1)		106	40-140
o - Terphenyl (aromatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ22052-002
Batch: 22052
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/09/2019 2101

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	560		1	66	40-140	07/10/2019 1950

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		72	40-140
2-Fluorobiphenyl (fractionation 1)		102	40-140
o - Terphenyl (aromatic)		73	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ22052-003
Batch: 22052
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 07/09/2019 2101

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	560		1	66	0.99	40-140	25	07/10/2019 2020

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		78	40-140
2-Fluorobiphenyl (fractionation 1)		109	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ19890-001
Batch: 19890
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/18/2019 1253
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/18/2019 1253

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ19890-002
Batch: 19890
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	110	70-130	06/18/2019 1156
C9 - C12 Aliphatics, Adjusted	75	75		1	100	70-130	06/18/2019 1156

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ19890-003
Batch: 19890
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	107	2.8	70-130	25	06/18/2019 1225
C9 - C12 Aliphatics, Adjusted	75	74		1	99	1.7	70-130	25	06/18/2019 1225

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ19890-001
Batch: 19890
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/18/2019 1253
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/18/2019 1253

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ19890-002
Batch: 19890
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	110	70-130	06/18/2019 1156
C9 - C12 Aliphatics, Adjusted	75	75		1	100	70-130	06/18/2019 1156

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ19890-003
Batch: 19890
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	107	2.8	70-130	25	06/18/2019 1225
C9 - C12 Aliphatics, Adjusted	75	74		1	99	1.7	70-130	25	06/18/2019 1225

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ19891-001
Batch: 19891
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/18/2019 1253
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	06/18/2019 1253
Ethylbenzene	ND		1	5.0	0.62	ug/L	06/18/2019 1253
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/18/2019 1253
Naphthalene	ND		1	5.0	0.70	ug/L	06/18/2019 1253
Toluene	ND		1	5.0	0.53	ug/L	06/18/2019 1253
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/18/2019 1253
o - Xylenes	ND		1	5.0	0.58	ug/L	06/18/2019 1253

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ19891-002
Batch: 19891
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	24		1	95	70-130	06/18/2019 1156
C9 - C10 Aromatics	25	26		1	103	70-130	06/18/2019 1156
Ethylbenzene	25	24		1	98	70-130	06/18/2019 1156
Methyl tertiary butyl ether (MTBE)	25	23		1	93	70-130	06/18/2019 1156
Naphthalene	25	23		1	94	70-130	06/18/2019 1156
Toluene	25	24		1	97	70-130	06/18/2019 1156
m+p - Xylenes	50	50		1	99	70-130	06/18/2019 1156
o - Xylenes	25	24		1	98	70-130	06/18/2019 1156

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ19891-003
Batch: 19891
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	24		1	94	0.84	70-130	25	06/18/2019 1225
C9 - C10 Aromatics	25	25		1	100	2.8	70-130	25	06/18/2019 1225
Ethylbenzene	25	24		1	95	2.5	70-130	25	06/18/2019 1225
Methyl tertiary butyl ether (MTBE)	25	24		1	96	3.8	70-130	25	06/18/2019 1225
Naphthalene	25	23		1	93	0.86	70-130	25	06/18/2019 1225
Toluene	25	23		1	93	3.8	70-130	25	06/18/2019 1225
m+p - Xylenes	50	48		1	96	2.9	70-130	25	06/18/2019 1225
o - Xylenes	25	24		1	96	1.2	70-130	25	06/18/2019 1225

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		93	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ19891-001
Batch: 19891
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/18/2019 1253
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	06/18/2019 1253
Ethylbenzene	ND		1	5.0	0.62	ug/L	06/18/2019 1253
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/18/2019 1253
Naphthalene	ND		1	5.0	0.70	ug/L	06/18/2019 1253
Toluene	ND		1	5.0	0.53	ug/L	06/18/2019 1253
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/18/2019 1253
o - Xylenes	ND		1	5.0	0.58	ug/L	06/18/2019 1253

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ19891-002
Batch: 19891
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	24		1	95	70-130	06/18/2019 1156
C9 - C10 Aromatics	25	26		1	103	70-130	06/18/2019 1156
Ethylbenzene	25	24		1	98	70-130	06/18/2019 1156
Methyl tertiary butyl ether (MTBE)	25	23		1	93	70-130	06/18/2019 1156
Naphthalene	25	23		1	94	70-130	06/18/2019 1156
Toluene	25	24		1	97	70-130	06/18/2019 1156
m+p - Xylenes	50	50		1	99	70-130	06/18/2019 1156
o - Xylenes	25	24		1	98	70-130	06/18/2019 1156

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ19891-003
Batch: 19891
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	24		1	94	0.84	70-130	25	06/18/2019 1225
C9 - C10 Aromatics	25	25		1	100	2.8	70-130	25	06/18/2019 1225
Ethylbenzene	25	24		1	95	2.5	70-130	25	06/18/2019 1225
Methyl tertiary butyl ether (MTBE)	25	24		1	96	3.8	70-130	25	06/18/2019 1225
Naphthalene	25	23		1	93	0.86	70-130	25	06/18/2019 1225
Toluene	25	23		1	93	3.8	70-130	25	06/18/2019 1225
m+p - Xylenes	50	48		1	96	2.9	70-130	25	06/18/2019 1225
o - Xylenes	25	24		1	96	1.2	70-130	25	06/18/2019 1225

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		93	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ19894-001
Batch: 19894
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	06/18/2019 1253

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ19894-002
Batch: 19894
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	390		1	103	70-130	06/18/2019 1156

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ19894-003
Batch: 19894
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	380		1	101	1.8	70-130	25	06/18/2019 1225

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - MB

Sample ID: UQ19894-001
Batch: 19894
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	06/18/2019 1253

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ19894-002
Batch: 19894
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	390		1	103	70-130	06/18/2019 1156

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ19894-003
Batch: 19894
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	380		1	101	1.8	70-130	25	06/18/2019 1225

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-MS - MB

Sample ID: UQ19719-001
Batch: 19719
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/16/2019 1941

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	06/18/2019 0937
Arsenic	ND		1	2.0	1.3	ug/L	06/18/2019 0937
Barium	ND		1	5.0	1.3	ug/L	06/18/2019 0937
Beryllium	ND		1	0.40	0.15	ug/L	06/18/2019 0937
Cadmium	ND		1	0.50	0.13	ug/L	06/18/2019 0937
Chromium	ND		1	5.0	1.3	ug/L	06/18/2019 0937
Cobalt	ND		1	5.0	1.3	ug/L	06/21/2019 2140
Copper	ND		1	5.0	1.3	ug/L	06/21/2019 2140
Lead	ND		1	1.0	0.25	ug/L	06/18/2019 0937
Nickel	ND		1	5.0	1.3	ug/L	06/21/2019 2140
Selenium	ND		1	5.0	1.3	ug/L	06/18/2019 0937
Silver	ND		1	1.0	0.25	ug/L	06/18/2019 0937
Vanadium	ND		1	5.0	2.5	ug/L	06/18/2019 0937
Zinc	2.7	J	1	10	2.5	ug/L	06/18/2019 0937

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ19719-002
Batch: 19719
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/16/2019 1941

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	83		1	83	80-120	06/18/2019 0942
Arsenic	100	81		1	81	80-120	06/18/2019 0942
Barium	100	84		1	84	80-120	06/18/2019 0942
Beryllium	100	88		1	88	80-120	06/18/2019 0942
Cadmium	100	86		1	86	80-120	06/18/2019 0942
Chromium	100	84		1	84	80-120	06/18/2019 0942
Cobalt	100	96		1	96	80-120	06/21/2019 2146
Copper	100	99		1	99	80-120	06/21/2019 2146
Lead	100	85		1	85	80-120	06/18/2019 0942
Nickel	100	97		1	97	80-120	06/21/2019 2146
Selenium	100	87		1	87	80-120	06/18/2019 0942
Silver	100	85		1	85	80-120	06/18/2019 0942
Vanadium	100	84		1	84	80-120	06/18/2019 0942
Zinc	100	86		1	86	80-120	06/18/2019 0942

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ19703-001
Batch: 19703
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/16/2019 1505

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/17/2019 1243

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ19703-002
Batch: 19703
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/16/2019 1505

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	94	80-120	06/17/2019 1245

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody
and
Miscellaneous Documents

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

SHEALY

Chain of Custody Record

Number

Client	Report to Contact	Telephone No. / E-mail	Quote No.
Ramboll US Corporation	Daniel Price/Michael Wilson	(816) 581-2276/dprice@ramboll.com (316) 440-7501/mwilson@ramboll.com	
Address 7600 College Boulevard Suite 1905	Sampler's Signature: x Elizabeth Borucki	Analysis (Attach list if more space is needed)	Page 1 of 1
City Overland Park / **State** KS / **Zip Code** 66210			
Project Name CMR RIAIM East Rail			UF14020 KMN2

Project Number	P.O No.	Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH	Remarks / Cooler I.D
1690012344-003		CMR-EB07-190613-GW	6/13/2019	09:18	G	X			2		1	7				X	X	X	X	X	Cooler 002
		CMR-EB14-190613-GW	6/13/2019	10:45	G	X			7		1	6				X	X	X	X	X	Cooler 002/VOCs and VPH collected in unpreserved VOA vials due to effervescence at time of sample collection. Included 4 HCl preserved VOA Vials (2 for VPH, 2 for VOCs).
		TB-11	NA	NA	G	X						2				X					Trip Blank/Cooler 002

Turn Around Time Required (Prior lab approval required for expedited TAT)
☐ Standard ☐ Rush (Please Specify)

Sample Disposal
☐ Return to Client ☐ Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks)
☐ Non-Hazardous ☐ Flammable ☐ Skin Irrit ☐ SDS prov ☒ Unknown

QC Requirements

	Date	Time		Date	Time
1. Relinquished by: Elizabeth Borucki	6/13/19	17:45	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: Fed Ex	6-14-19	1030	4. Laboratory Received by: L Hite	6-14-19	1030

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) ☒ Y ☐ N ☐ Ice Pack
Receipt Temp. 3.5 °C

Document Number: ME002OW-01

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 06-14-2019 Lot #: UP14020

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: LKH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

3.5 /3.5 °C NA /NA °C NA /NA °C NA /NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JSH Date: 06-14-2019

Comments:

MEMO

Date: **July 19, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF15015, 4 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF15015 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB15-0.5-1.0-190614	UF15015-001
CMR-EB15-15.0-16.0-190614	UF15015-002
CMR-EB15-18.0-19.0-190614	UF15015-003
CMR-EB15-20.5-21.5-190614	UF15015-004
TB-12-20190614	UF15015-005

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

MS/MSD Recoveries
For the metals and VOCs analysis suites MS/MSD results were reported. Recoveries were largely within criteria with the exception of antimony, naphthalene, acetone, cyclohexane, and isopropylbenzene. These out of criteria recoveries indicate a possible bias to results. Therefore, all antimony, naphthalene, acetone, cyclohexane, and isopropylbenzene results were flagged as estimated (J, UJ).

For the SVOC analysis suite MS/MSD results were reported to be almost universally out of criteria with extremely low recoveries. However, this is largely due to non-detected analytes. The MS/MSD sample was spike at a normal level but due to high native concentrations/ matrix issues, the sample was run at a high dilution. Therefore the spiked amount was at or below the reporting limit. Due to this, the low recoveries do not represent a systematic matrix issue. No validation action warranted.

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

Blank Detections
During analysis, antimony, beryllium, and chromium was detected in method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All antimony, beryllium, and chromium results below the RL or below 5x the blank result have been validated as non-detect (U).

Hold Time
All samples were analyzed by the lab within their hold time requirements. However, due to QC issues during the initial analysis some samples were reanalyzed outside of hold time. While these out of hold time results are generally usable, the results within hold time should be used preferentially.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF15015

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Antimony, beryllium, and chromium detected in method blank sample. All antimony, beryllium, and chromium project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.
Matrix Spike/Matrix Spike Duplicate	MS/MSD recoveries out of criteria for several metals. Most metals with issues had high concentrations in native samples. Antimony had evidence of matrix effects (low bias). All antimony results validated as estimated (J, UJ).
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All antimony, beryllium, and chromium project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher. All antimony results validated as estimated (J, UJ).

SDG No. UF15015

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	Multiple EPH samples re-analyzed out of hold time due to unreportable initial results. No action taken.
Blanks	No issues	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to matrix interference and/or sample dilution. No action taken.	Surrogates out due to matrix interference and/or sample dilution. No action taken.
Matrix Spike/Matrix Spike Duplicate	MS/MSD recoveries for multiple VOCs out of criteria. Since naphthalene, acetone, cyclohexane, and isopropylbenzene are potential site COCs, these exceedances show relevant potential bias. All naphthalene, acetone, cyclohexane, and isopropylbenzene results validated as estimated (J, UJ). MS/MSD recoveries for SVOC analysis almost universally out of criteria very low. However, this is likely due to high dilution used in analysis making most analytes ND. No action taken.	C9-C10 aromatics recoveries out of criteria. Likely due to high native sample concentrations. No action taken.
Laboratory Control Sample	VOCs acetone and 1,1-DCE (see discussion above) and SVOCs hexachlorocyclopentadiene and 3-nitroaniline out of criteria. RPDs out for several compounds. SVOCs are poorly performing compounds, no action taken.	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/A

SDG No. UF15015

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Other Non-conformances	No other non-conformances noted.	No other non-conformances noted.
Overall Assessment of Data	All naphthalene, acetone, cyclohexane, and isopropylbenzene results validated as estimated (J, UJ).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: David Heidlauf

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF15015**

Date Completed:07/11/2019

07/12/2019 10:14 AM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF15015

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 19923 had 1,1-dichloroethene recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections for this compound in the samples associated with this batch; therefore, data quality is not impacted.

The laboratory control sample duplicate (LCSD) associated with batch 20424 had acetone recovered marginally outside of the acceptance limits a number of RPDs exceeded the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -003 had multiple compounds and one surrogate recovered outside of the acceptance limits. Additionally, one RPD exceeded the acceptance limit. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample -003 had internal standards recovered below the acceptance limits due to confirmed matrix interference.

Sample -003 had surrogates recovered outside of the acceptance limits due to confirmed matrix interference.

Semivolatiles
The LCS associated with batch 19960 had hexachlorocyclopentadiene and 3-nitroaniline recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without

requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

The MS/MSD associated with sample -003 had multiple compounds and surrogates recovered outside of the acceptance limits. Additionally, a number of RPDs exceeded the acceptance limit. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Samples -001, -003, and -004 were diluted 50X, 50X, and 5X, respectively, due to the sample matrix. The reporting limits have been raised accordingly. The associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana EPH
Samples -001 and -004 were in a batch that required re-extraction and re-analysis outside of the holding time. Due to analyst error, the original results are not reportable and only out of hold results were reported for these samples.

Montana VPH
Samples -001, -003, and -004 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene, making it difficult for analysts to distinguish the target compounds from non-

target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS. The MS/MSD associated with sample -003 had C9-C10 Aromatics and C9-C12 Aliphatics, adjusted recovered outside of the acceptance limits. Additionally, the RPD for C9-C12 Aliphatics, adjusted exceeded the acceptance limit. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample -001 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The method blank associated with batch 20301 had antimony, beryllium, and chromium detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for these metals have been flagged with a "B" qualifier.

The MS/MSD associated with sample -003 had multiple metals recovered outside of the acceptance limits. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample Summary
Ramboll US Corporation
Lot Number: UF15015

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB15-0.5-1.0-190614	Solid	06/14/2019 0945	06/15/2019
002	CMR-EB15-15.0-16.0-190614	Solid	06/14/2019 1030	06/15/2019
003	CMR-EB15-18.0-19.0-190614	Solid	06/14/2019 1005	06/15/2019
004	CMR-EB15-20.5-21.5-190614	Solid	06/14/2019 1115	06/15/2019
005	TB-12-20190614	Aqueous	06/14/2019	06/15/2019

(5 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF15015

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB15-0.5-1.0-190614	Solid	Acetone	8260B	11	J	ug/kg	9
001	CMR-EB15-0.5-1.0-190614	Solid	Naphthalene	8260B	49		ug/kg	9
001	CMR-EB15-0.5-1.0-190614	Solid	Fluorene	8270D	51	J	ug/kg	11
001	CMR-EB15-0.5-1.0-190614	Solid	2-Methylnaphthalene	8270D	810		ug/kg	12
001	CMR-EB15-0.5-1.0-190614	Solid	Phenanthrene	8270D	70	J	ug/kg	12
001	CMR-EB15-0.5-1.0-190614	Solid	C19 - C36 Aliphatics	Montana EPH	93	H	mg/kg	13
001	CMR-EB15-0.5-1.0-190614	Solid	C9 - C18 Aliphatics	Montana EPH	22	H	mg/kg	13
001	CMR-EB15-0.5-1.0-190614	Solid	C11 - C22 Aromatics	Montana EPH	59	H	mg/kg	14
001	CMR-EB15-0.5-1.0-190614	Solid	C9 - C10 Aromatics	Montana VPH	0.82	J	mg/kg	16
001	CMR-EB15-0.5-1.0-190614	Solid	Naphthalene	Montana VPH	0.47		mg/kg	16
001	CMR-EB15-0.5-1.0-190614	Solid	TPH	Montana VPH	1.8	J	mg/kg	17
001	CMR-EB15-0.5-1.0-190614	Solid	Antimony	6020B	0.27	BJ	mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Arsenic	6020B	13		mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Barium	6020B	240		mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Beryllium	6020B	0.74	B	mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Cadmium	6020B	0.63		mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Chromium	6020B	16	B	mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Cobalt	6020B	6.4		mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Copper	6020B	46		mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Lead	6020B	48		mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Mercury	7471B	0.12		mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Nickel	6020B	13		mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Silver	6020B	0.15	J	mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Vanadium	6020B	35		mg/kg	18
001	CMR-EB15-0.5-1.0-190614	Solid	Zinc	6020B	120		mg/kg	18
002	CMR-EB15-15.0-16.0-190614	Solid	Acetone	8260B	40		ug/kg	19
002	CMR-EB15-15.0-16.0-190614	Solid	Carbon disulfide	8260B	2.0	J	ug/kg	19
002	CMR-EB15-15.0-16.0-190614	Solid	Naphthalene	8260B	6.2		ug/kg	19
002	CMR-EB15-15.0-16.0-190614	Solid	Anthracene	8270D	2.7	J	ug/kg	21
002	CMR-EB15-15.0-16.0-190614	Solid	Benzo(a)anthracene	8270D	5.7		ug/kg	21
002	CMR-EB15-15.0-16.0-190614	Solid	Benzo(a)pyrene	8270D	5.5		ug/kg	21
002	CMR-EB15-15.0-16.0-190614	Solid	Benzo(b)fluoranthene	8270D	12		ug/kg	21
002	CMR-EB15-15.0-16.0-190614	Solid	Benzo(g,h,i)perylene	8270D	3.8		ug/kg	21
002	CMR-EB15-15.0-16.0-190614	Solid	Benzo(k)fluoranthene	8270D	3.1	J	ug/kg	21
002	CMR-EB15-15.0-16.0-190614	Solid	Chrysene	8270D	5.1		ug/kg	21
002	CMR-EB15-15.0-16.0-190614	Solid	Fluoranthene	8270D	11		ug/kg	21
002	CMR-EB15-15.0-16.0-190614	Solid	Fluorene	8270D	1.6	J	ug/kg	21
002	CMR-EB15-15.0-16.0-190614	Solid	Indeno(1,2,3-c,d)pyrene	8270D	2.3	J	ug/kg	21
002	CMR-EB15-15.0-16.0-190614	Solid	2-Methylnaphthalene	8270D	23		ug/kg	22
002	CMR-EB15-15.0-16.0-190614	Solid	Naphthalene	8270D	5.9		ug/kg	22
002	CMR-EB15-15.0-16.0-190614	Solid	Pentachlorophenol	8270D	72	J	ug/kg	22
002	CMR-EB15-15.0-16.0-190614	Solid	Phenanthrene	8270D	14		ug/kg	22
002	CMR-EB15-15.0-16.0-190614	Solid	Pyrene	8270D	9.1		ug/kg	22
002	CMR-EB15-15.0-16.0-190614	Solid	Antimony	6020B	0.38	BJ	mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Arsenic	6020B	13		mg/kg	28

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-EB15-15.0-16.0-190614	Solid	Barium	6020B	380		mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Beryllium	6020B	0.93	B	mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Cadmium	6020B	0.61		mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Chromium	6020B	23	B	mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Cobalt	6020B	7.8		mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Copper	6020B	47		mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Lead	6020B	37		mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Mercury	7471B	0.097		mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Nickel	6020B	23		mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Silver	6020B	0.17	J	mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Vanadium	6020B	49		mg/kg	28
002	CMR-EB15-15.0-16.0-190614	Solid	Zinc	6020B	120		mg/kg	28
003	CMR-EB15-18.0-19.0-190614	Solid	Acetone	8260B	48		ug/kg	29
003	CMR-EB15-18.0-19.0-190614	Solid	2-Butanone (MEK)	8260B	11	J	ug/kg	29
003	CMR-EB15-18.0-19.0-190614	Solid	Carbon disulfide	8260B	2.7	J	ug/kg	29
003	CMR-EB15-18.0-19.0-190614	Solid	Naphthalene	8260B	4.1	J	ug/kg	29
003	CMR-EB15-18.0-19.0-190614	Solid	Benzo(a)pyrene	8270D	42	J	ug/kg	31
003	CMR-EB15-18.0-19.0-190614	Solid	Pyrene	8270D	61	J	ug/kg	32
003	CMR-EB15-18.0-19.0-190614	Solid	C19 - C36 Aliphatics	Montana EPH	760		mg/kg	33
003	CMR-EB15-18.0-19.0-190614	Solid	C9 - C18 Aliphatics	Montana EPH	870		mg/kg	33
003	CMR-EB15-18.0-19.0-190614	Solid	C11 - C22 Aromatics	Montana EPH	530		mg/kg	34
003	CMR-EB15-18.0-19.0-190614	Solid	C9 - C10 Aromatics	Montana VPH	6.3		mg/kg	36
003	CMR-EB15-18.0-19.0-190614	Solid	Naphthalene	Montana VPH	1.2		mg/kg	36
003	CMR-EB15-18.0-19.0-190614	Solid	TPH	Montana VPH	3.6	J	mg/kg	37
003	CMR-EB15-18.0-19.0-190614	Solid	Antimony	6020B	0.46	B	mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Arsenic	6020B	23		mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Barium	6020B	230		mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Beryllium	6020B	0.86	B	mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Cadmium	6020B	1.2		mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Chromium	6020B	17	B	mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Cobalt	6020B	8.0		mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Copper	6020B	87		mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Lead	6020B	150		mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Mercury	7471B	0.15		mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Nickel	6020B	16		mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Selenium	6020B	0.44	J	mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Silver	6020B	0.44		mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Vanadium	6020B	48		mg/kg	38
003	CMR-EB15-18.0-19.0-190614	Solid	Zinc	6020B	230		mg/kg	38
004	CMR-EB15-20.5-21.5-190614	Solid	Acetone	8260B	72		ug/kg	39
004	CMR-EB15-20.5-21.5-190614	Solid	C19 - C36 Aliphatics	Montana EPH	62	H	mg/kg	43
004	CMR-EB15-20.5-21.5-190614	Solid	C9 - C18 Aliphatics	Montana EPH	190	H	mg/kg	43
004	CMR-EB15-20.5-21.5-190614	Solid	C11 - C22 Aromatics	Montana EPH	33	H	mg/kg	44
004	CMR-EB15-20.5-21.5-190614	Solid	C9 - C12 Aliphatics,	Montana VPH	8.5		mg/kg	45
004	CMR-EB15-20.5-21.5-190614	Solid	C9 - C10 Aromatics	Montana VPH	12		mg/kg	46
004	CMR-EB15-20.5-21.5-190614	Solid	Naphthalene	Montana VPH	2.5		mg/kg	46
004	CMR-EB15-20.5-21.5-190614	Solid	TPH	Montana VPH	19		mg/kg	47
004	CMR-EB15-20.5-21.5-190614	Solid	Antimony	6020B	0.42	BJ	mg/kg	48

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
004	CMR-EB15-20.5-21.5-190614	Solid	Arsenic	6020B	8.6		mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Barium	6020B	90		mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Beryllium	6020B	0.60	B	mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Cadmium	6020B	0.58		mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Chromium	6020B	23	B	mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Cobalt	6020B	15		mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Copper	6020B	68		mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Lead	6020B	8.1		mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Mercury	7471B	0.16		mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Nickel	6020B	31		mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Silver	6020B	0.17	J	mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Vanadium	6020B	52		mg/kg	48
004	CMR-EB15-20.5-21.5-190614	Solid	Zinc	6020B	81		mg/kg	48

(106 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-001
Description: CMR-EB15-0.5-1.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 0945
% Solids: 92.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/18/2019 1803	JM1		19923	5.24

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	11	J	21	8.3	ug/kg	1
Benzene	71-43-2	8260B	ND		5.2	2.1	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		5.2	2.1	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		5.2	2.1	ug/kg	1
Bromoform	75-25-2	8260B	ND		5.2	2.1	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.2	3.1	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		21	4.1	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		5.2	2.1	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		5.2	2.1	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		5.2	2.1	ug/kg	1
Chloroethane	75-00-3	8260B	ND		5.2	2.1	ug/kg	1
Chloroform	67-66-3	8260B	ND		5.2	2.1	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.2	3.1	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.2	2.1	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.2	2.1	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.2	2.1	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.2	2.1	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		5.2	3.1	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		5.2	2.1	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		5.2	2.1	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.2	2.1	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		5.2	2.1	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.2	2.1	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.2	2.1	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		260	26	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		5.2	2.1	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		10	4.1	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		5.2	2.1	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		5.2	2.1	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.2	2.1	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	4.1	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		5.2	2.1	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		5.2	2.1	ug/kg	1
Naphthalene	91-20-3	8260B	49		5.2	2.1	ug/kg	1
Styrene	100-42-5	8260B	ND		5.2	2.1	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.2	2.1	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		5.2	2.1	ug/kg	1
Toluene	108-88-3	8260B	ND		5.2	2.1	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.2	2.1	ug/kg	1

LOQ = Limit of Quantitation
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H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-001
Description: CMR-EB15-0.5-1.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 0945
% Solids: 92.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/18/2019 1803	JM1		19923	5.24

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.2	2.1	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.2	2.1	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.2	2.1	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.2	2.1	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		5.2	2.1	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		5.2	2.1	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		5.2	3.1	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		10	4.1	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		5.2	2.1	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		5.2	2.1	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		105	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		116	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-001
Description: CMR-EB15-0.5-1.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 0945
% Solids: 92.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	06/20/2019 2002	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		140	43	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		140	50	ug/kg	1
Anthracene	120-12-7	8270D	ND		140	27	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		140	31	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		140	35	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		140	26	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		140	34	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		140	25	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		680	260	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		680	260	ug/kg	1
Carbazole	86-74-8	8270D	ND		680	260	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		680	260	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		680	260	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		680	260	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		680	260	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		680	260	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		680	260	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		680	260	ug/kg	1
Chrysene	218-01-9	8270D	ND		140	24	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		140	27	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		680	260	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		3500	1300	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		3500	1300	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		3500	1300	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		680	260	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		680	260	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		680	260	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		680	390	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		680	260	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		680	260	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		3500	1300	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		3500	1300	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1400	520	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1400	520	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		680	260	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		3500	1300	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		140	22	ug/kg	1
Fluorene	86-73-7	8270D	51	J	140	30	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		680	260	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		680	260	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		3500	1300	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		680	260	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		140	52	ug/kg	1
Isophorone	78-59-1	8270D	ND		680	260	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-001
Description: CMR-EB15-0.5-1.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 0945
% Solids: 92.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	06/20/2019 2002	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	810		140	52	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		680	260	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1400	520	ug/kg	1
Naphthalene	91-20-3	8270D	ND		140	51	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1400	520	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1400	520	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1400	520	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		680	260	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1400	520	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		3500	1300	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		680	260	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		680	260	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		3500	1300	ug/kg	1
Phenanthrene	85-01-8	8270D	70	J	140	38	ug/kg	1
Phenol	108-95-2	8270D	ND		680	260	ug/kg	1
Pyrene	129-00-0	8270D	ND		140	26	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		1700	520	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		3500	520	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		3500	1300	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		680	260	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		680	260	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl	N	31	33-102
2-Fluorophenol	N	14	35-115
Nitrobenzene-d5		40	22-109
Phenol-d5	N	17	33-122
Terphenyl-d14		45	41-120
2,4,6-Tribromophenol	N	6.8	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-001
Description: CMR-EB15-0.5-1.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 0945
% Solids: 92.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	07/09/2019 2147	DAL1	07/08/2019 1741	22165

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	93	H	10	10	mg/kg	2
C9 - C18 Aliphatics		Montana EPH	22	H	10	10	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)	H	89	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-001
Description: CMR-EB15-0.5-1.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 0945
% Solids: 92.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	07/10/2019 1417	DAL1	07/08/2019 1741	22166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	59	H	10	10	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)	H	84	40-140
2-Fluorobiphenyl (fractionation 1)	H	97	40-140
o - Terphenyl (aromatic)	H	104	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-001
Description: CMR-EB15-0.5-1.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 0945
% Solids: 92.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1821	JJG		19898

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.8	0.96	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.8	0.96	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	142	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-001
Description: CMR-EB15-0.5-1.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 0945
% Solids: 92.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1821	JJG		19897

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.32	0.043	mg/kg	1
C9 - C10 Aromatics		Montana VPH	0.82	J	1.6	0.64	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.32	0.040	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.32	0.069	mg/kg	1
Naphthalene	91-20-3	Montana VPH	0.47		0.32	0.17	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.32	0.051	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.32	0.071	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.32	0.036	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	160	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF15015-001
Description: CMR-EB15-0.5-1.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 0945
% Solids: 92.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1821	JJG		19896

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1.8	J	8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	143	70-130

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-EB15-0.5-1.0-190614
Date Sampled: 06/14/2019 0945
Date Received: 06/15/2019

Laboratory ID: UF15015-001
Matrix: Solid
% Solids: 92.1 06/18/2019 0004

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/23/2019 2040	LLL	06/22/2019 0957	20301
1	7471B	7471B	1	06/25/2019 1002	TJW	06/24/2019 1815	20448

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.27	BJ	0.50	0.20	mg/kg	1
Arsenic	7440-38-2	6020B	13		0.50	0.20	mg/kg	1
Barium	7440-39-3	6020B	240		1.3	0.31	mg/kg	1
Beryllium	7440-41-7	6020B	0.74	B	0.10	0.034	mg/kg	1
Cadmium	7440-43-9	6020B	0.63		0.13	0.025	mg/kg	1
Chromium	7440-47-3	6020B	16	B	1.3	0.55	mg/kg	1
Cobalt	7440-48-4	6020B	6.4		1.3	0.30	mg/kg	1
Copper	7440-50-8	6020B	46		1.3	0.33	mg/kg	1
Lead	7439-92-1	6020B	48		0.25	0.068	mg/kg	1
Mercury	7439-97-6	7471B	0.12		0.089	0.021	mg/kg	1
Nickel	7440-02-0	6020B	13		1.3	0.30	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.3	0.47	mg/kg	1
Silver	7440-22-4	6020B	0.15	J	0.25	0.060	mg/kg	1
Vanadium	7440-62-2	6020B	35		1.3	0.25	mg/kg	1
Zinc	7440-66-6	6020B	120		2.5	0.50	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-002
Description: CMR-EB15-15.0-16.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1030
% Solids: 85.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/18/2019 1825	JM1		19923	6.14

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	40		19	7.7	ug/kg	1
Benzene	71-43-2	8260B	ND		4.8	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.8	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.8	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.8	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.8	2.9	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.8	ug/kg	1
Carbon disulfide	75-15-0	8260B	2.0	J	4.8	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.8	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.8	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.8	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.8	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.8	2.9	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.8	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.8	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.8	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.8	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.8	2.9	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.8	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.8	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.8	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.8	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.8	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.8	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.8	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		240	24	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.8	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.6	3.8	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.8	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.8	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.8	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.6	3.8	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.8	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.8	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	6.2		4.8	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.8	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.8	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.8	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.8	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.8	1.9	ug/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-002
Description: CMR-EB15-15.0-16.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1030
% Solids: 85.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/18/2019 1825	JM1		19923	6.14

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.8	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.8	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.8	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.8	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.8	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.8	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.8	2.9	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.6	3.8	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.8	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.8	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		103	53-142
Bromofluorobenzene		102	47-138
Toluene-d8		117	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-002
Description: CMR-EB15-15.0-16.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1030
% Solids: 85.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	06/22/2019 1914	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		3.2	0.97	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		3.2	1.1	ug/kg	1
Anthracene	120-12-7	8270D	2.7	J	3.2	0.60	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	5.7		3.2	0.69	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	5.5		3.2	0.77	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	12		3.2	0.59	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	3.8		3.2	0.76	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	3.1	J	3.2	0.56	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		15	5.9	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		15	5.9	ug/kg	1
Carbazole	86-74-8	8270D	ND		15	5.9	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		15	5.9	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		15	5.9	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		15	5.9	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		15	5.9	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		15	5.9	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		15	5.9	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		15	5.9	ug/kg	1
Chrysene	218-01-9	8270D	5.1		3.2	0.53	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		3.2	0.60	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		15	5.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		78	29	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		78	29	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		78	29	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		15	5.9	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		15	5.9	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		15	5.9	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		15	8.7	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		15	5.9	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		15	5.9	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		78	29	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		78	29	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		32	12	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		32	12	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		15	5.9	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		78	29	ug/kg	1
Fluoranthene	206-44-0	8270D	11		3.2	0.49	ug/kg	1
Fluorene	86-73-7	8270D	1.6	J	3.2	0.67	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		15	5.9	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		15	5.9	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		78	29	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		15	5.9	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	2.3	J	3.2	1.2	ug/kg	1
Isophorone	78-59-1	8270D	ND		15	5.9	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-002
Description: CMR-EB15-15.0-16.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1030
% Solids: 85.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	06/22/2019 1914	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	23		3.2	1.2	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		15	5.9	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		32	12	ug/kg	1
Naphthalene	91-20-3	8270D	5.9		3.2	1.1	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		32	12	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		32	12	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		32	12	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		15	5.9	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		32	12	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		78	29	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		15	5.9	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		15	5.9	ug/kg	1
Pentachlorophenol	87-86-5	8270D	72	J	78	29	ug/kg	1
Phenanthrene	85-01-8	8270D	14		3.2	0.84	ug/kg	1
Phenol	108-95-2	8270D	ND		15	5.9	ug/kg	1
Pyrene	129-00-0	8270D	9.1		3.2	0.59	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		39	12	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		78	12	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		78	29	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		15	5.9	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		15	5.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		41	33-102
2-Fluorophenol		35	35-115
Nitrobenzene-d5		35	22-109
Phenol-d5		35	33-122
Terphenyl-d14		46	41-120
2,4,6-Tribromophenol		48	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-002
Description: CMR-EB15-15.0-16.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1030
% Solids: 85.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	07/06/2019 1607	DAL1	06/25/2019 1759	20678

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	2
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		67	40-140

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-002
Description: CMR-EB15-15.0-16.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1030
% Solids: 85.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	07/06/2019 2305	DAL1	06/25/2019 1759	20679

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		96	40-140
2-Fluorobiphenyl (fractionation 1)		97	40-140
o - Terphenyl (aromatic)		95	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-002
Description: CMR-EB15-15.0-16.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1030
% Solids: 85.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1849	JJG		19898

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.2	0.83	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.2	0.83	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		106	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-002
Description: CMR-EB15-15.0-16.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1030
% Solids: 85.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1849	JJG		19897

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.28	0.038	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.4	0.55	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.28	0.034	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.28	0.060	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.28	0.14	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.28	0.044	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.28	0.062	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.28	0.031	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		100	70-130

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ND = Not detected at or above the DL
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF15015-002
Description: CMR-EB15-15.0-16.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1030
% Solids: 85.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1849	JJG		19896

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		108	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-002
Description: CMR-EB15-15.0-16.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1030
% Solids: 85.1 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/23/2019 2046	LLL	06/22/2019 0957	20301
1	7471B	7471B	1	06/25/2019 1004	TJW	06/24/2019 1815	20448

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.38	BJ	0.54	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	13		0.54	0.22	mg/kg	1
Barium	7440-39-3	6020B	380		1.4	0.33	mg/kg	1
Beryllium	7440-41-7	6020B	0.93	B	0.11	0.037	mg/kg	1
Cadmium	7440-43-9	6020B	0.61		0.14	0.027	mg/kg	1
Chromium	7440-47-3	6020B	23	B	1.4	0.60	mg/kg	1
Cobalt	7440-48-4	6020B	7.8		1.4	0.32	mg/kg	1
Copper	7440-50-8	6020B	47		1.4	0.35	mg/kg	1
Lead	7439-92-1	6020B	37		0.27	0.073	mg/kg	1
Mercury	7439-97-6	7471B	0.097		0.087	0.021	mg/kg	1
Nickel	7440-02-0	6020B	23		1.4	0.32	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.51	mg/kg	1
Silver	7440-22-4	6020B	0.17	J	0.27	0.065	mg/kg	1
Vanadium	7440-62-2	6020B	49		1.4	0.27	mg/kg	1
Zinc	7440-66-6	6020B	120		2.7	0.54	mg/kg	1

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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-003
Description: CMR-EB15-18.0-19.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1005
% Solids: 81.0 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/18/2019 1847	JM1		19923	5.93

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	48		21	8.3	ug/kg	1
Benzene	71-43-2	8260B	ND		5.2	2.1	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		5.2	2.1	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		5.2	2.1	ug/kg	1
Bromoform	75-25-2	8260B	ND		5.2	2.1	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.2	3.1	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	11	J	21	4.2	ug/kg	1
Carbon disulfide	75-15-0	8260B	2.7	J	5.2	2.1	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		5.2	2.1	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		5.2	2.1	ug/kg	1
Chloroethane	75-00-3	8260B	ND		5.2	2.1	ug/kg	1
Chloroform	67-66-3	8260B	ND		5.2	2.1	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.2	3.1	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.2	2.1	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.2	2.1	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.2	2.1	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.2	2.1	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		5.2	3.1	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		5.2	2.1	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		5.2	2.1	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.2	2.1	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		5.2	2.1	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.2	2.1	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.2	2.1	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		260	26	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		5.2	2.1	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		10	4.2	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		5.2	2.1	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		5.2	2.1	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.2	2.1	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	4.2	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		5.2	2.1	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		5.2	2.1	ug/kg	1
Naphthalene	91-20-3	8260B	4.1	J	5.2	2.1	ug/kg	1
Styrene	100-42-5	8260B	ND		5.2	2.1	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.2	2.1	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		5.2	2.1	ug/kg	1
Toluene	108-88-3	8260B	ND		5.2	2.1	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.2	2.1	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-003
Description: CMR-EB15-18.0-19.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1005
% Solids: 81.0 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/18/2019 1847	JM1		19923	5.93

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.2	2.1	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.2	2.1	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.2	2.1	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.2	2.1	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		5.2	2.1	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		5.2	2.1	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		5.2	3.1	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		10	4.2	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		5.2	2.1	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		5.2	2.1	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		102	53-142
Bromofluorobenzene		92	47-138
Toluene-d8	N	127	68-124

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-003
Description: CMR-EB15-18.0-19.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1005
% Solids: 81.0 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	06/20/2019 1757	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		170	51	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		170	59	ug/kg	1
Anthracene	120-12-7	8270D	ND		170	31	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		170	36	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	42	J	170	41	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		170	31	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		170	40	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		170	30	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		800	310	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		800	310	ug/kg	1
Carbazole	86-74-8	8270D	ND		800	310	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		800	310	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		800	310	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		800	310	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		800	310	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		800	310	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		800	310	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		800	310	ug/kg	1
Chrysene	218-01-9	8270D	ND		170	28	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		170	31	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		800	310	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4100	1500	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4100	1500	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4100	1500	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		800	310	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		800	310	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		800	310	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		800	460	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		800	310	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		800	310	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4100	1500	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4100	1500	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1700	620	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1700	620	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		800	310	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		4100	1500	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		170	26	ug/kg	1
Fluorene	86-73-7	8270D	ND		170	35	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		800	310	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		800	310	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4100	1500	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		800	310	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		170	62	ug/kg	1
Isophorone	78-59-1	8270D	ND		800	310	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-003
Description: CMR-EB15-18.0-19.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1005
% Solids: 81.0 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	06/20/2019 1757	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		170	61	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		800	310	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1700	620	ug/kg	1
Naphthalene	91-20-3	8270D	ND		170	60	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1700	620	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1700	620	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1700	620	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		800	310	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1700	620	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		4100	1500	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		800	310	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		800	310	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		4100	1500	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		170	44	ug/kg	1
Phenol	108-95-2	8270D	ND		800	310	ug/kg	1
Pyrene	129-00-0	8270D	61	J	170	31	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		2000	620	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4100	620	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4100	1500	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		800	310	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		800	310	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		47	33-102
2-Fluorophenol	N	31	35-115
Nitrobenzene-d5		50	22-109
Phenol-d5		36	33-122
Terphenyl-d14		63	41-120
2,4,6-Tribromophenol		48	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-003
Description: CMR-EB15-18.0-19.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1005
% Solids: 81.0 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	06/27/2019 0325	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	760		12	12	mg/kg	2
C9 - C18 Aliphatics		Montana EPH	870		12	12	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		69	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-003
Description: CMR-EB15-18.0-19.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1005
% Solids: 81.0 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	06/27/2019 1537	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	530		12	12	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		94	40-140
2-Fluorobiphenyl (fractionation 1)		110	40-140
o - Terphenyl (aromatic)		107	40-140

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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-003
Description: CMR-EB15-18.0-19.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1005
% Solids: 81.0 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1918	JJG		19898

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		5.5	1.1	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		5.5	1.1	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-003
Description: CMR-EB15-18.0-19.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1005
% Solids: 81.0 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1918	JJG		19897

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.36	0.050	mg/kg	1
C9 - C10 Aromatics		Montana VPH	6.3		1.8	0.73	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.36	0.045	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.36	0.079	mg/kg	1
Naphthalene	91-20-3	Montana VPH	1.2		0.36	0.19	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.36	0.058	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.36	0.082	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.36	0.041	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		87	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF15015-003
Description: CMR-EB15-18.0-19.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1005
% Solids: 81.0 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1918	JJG		19896

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	3.6	J	8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-003
Description: CMR-EB15-18.0-19.0-190614
Matrix: Solid
Date Sampled: 06/14/2019 1005
% Solids: 81.0 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/23/2019 2051	LLL	06/22/2019 0957	20301
1	7471B	7471B	1	06/25/2019 1007	TJW	06/24/2019 1815	20448

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.46	B	0.46	0.18	mg/kg	1
Arsenic	7440-38-2	6020B	23		0.46	0.18	mg/kg	1
Barium	7440-39-3	6020B	230		1.2	0.28	mg/kg	1
Beryllium	7440-41-7	6020B	0.86	B	0.091	0.031	mg/kg	1
Cadmium	7440-43-9	6020B	1.2		0.12	0.023	mg/kg	1
Chromium	7440-47-3	6020B	17	B	1.2	0.50	mg/kg	1
Cobalt	7440-48-4	6020B	8.0		1.2	0.27	mg/kg	1
Copper	7440-50-8	6020B	87		1.2	0.30	mg/kg	1
Lead	7439-92-1	6020B	150		0.23	0.062	mg/kg	1
Mercury	7439-97-6	7471B	0.15		0.096	0.023	mg/kg	1
Nickel	7440-02-0	6020B	16		1.2	0.27	mg/kg	1
Selenium	7782-49-2	6020B	0.44	J	1.2	0.43	mg/kg	1
Silver	7440-22-4	6020B	0.44		0.23	0.055	mg/kg	1
Vanadium	7440-62-2	6020B	48		1.2	0.23	mg/kg	1
Zinc	7440-66-6	6020B	230		2.3	0.46	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-004
Description: CMR-EB15-20.5-21.5-190614
Matrix: Solid
Date Sampled: 06/14/2019 1115
% Solids: 87.6 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/18/2019 1910	JM1		19923	7.28

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	72		16	6.3	ug/kg	1
Benzene	71-43-2	8260B	ND		3.9	1.6	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		3.9	1.6	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		3.9	1.6	ug/kg	1
Bromoform	75-25-2	8260B	ND		3.9	1.6	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		3.9	2.4	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		16	3.1	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		3.9	1.6	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		3.9	1.6	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		3.9	1.6	ug/kg	1
Chloroethane	75-00-3	8260B	ND		3.9	1.6	ug/kg	1
Chloroform	67-66-3	8260B	ND		3.9	1.6	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		3.9	2.4	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		3.9	1.6	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		3.9	1.6	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		3.9	1.6	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		3.9	1.6	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		3.9	1.6	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		3.9	1.6	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		3.9	1.6	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		3.9	2.4	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		3.9	1.6	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		3.9	1.6	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		3.9	1.6	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		3.9	1.6	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		3.9	1.6	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		3.9	1.6	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		3.9	1.6	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		3.9	1.6	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		200	20	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		3.9	1.6	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		7.8	3.1	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		3.9	1.6	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		3.9	1.6	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		3.9	1.6	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		7.8	3.1	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		3.9	1.6	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		3.9	1.6	ug/kg	1
Naphthalene	91-20-3	8260B	ND		3.9	1.6	ug/kg	1
Styrene	100-42-5	8260B	ND		3.9	1.6	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		3.9	1.6	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		3.9	1.6	ug/kg	1
Toluene	108-88-3	8260B	ND		3.9	1.6	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		3.9	1.6	ug/kg	1

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-004
Description: CMR-EB15-20.5-21.5-190614
Matrix: Solid
Date Sampled: 06/14/2019 1115
% Solids: 87.6 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/18/2019 1910	JM1		19923	7.28

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		3.9	1.6	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		3.9	1.6	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		3.9	1.6	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		3.9	1.6	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		3.9	1.6	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		3.9	1.6	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		3.9	2.4	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		7.8	3.1	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		3.9	1.6	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		3.9	1.6	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		104	53-142
Bromofluorobenzene		98	47-138
Toluene-d8		118	68-124

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-004
Description: CMR-EB15-20.5-21.5-190614
Matrix: Solid
Date Sampled: 06/14/2019 1115
% Solids: 87.6 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/20/2019 2053	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		15	4.6	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		15	5.3	ug/kg	1
Anthracene	120-12-7	8270D	ND		15	2.8	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		15	3.3	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		15	3.7	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		15	2.8	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		15	3.6	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		15	2.7	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		72	28	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		72	28	ug/kg	1
Carbazole	86-74-8	8270D	ND		72	28	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		72	28	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		72	28	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		72	28	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		72	28	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		72	28	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		72	28	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		72	28	ug/kg	1
Chrysene	218-01-9	8270D	ND		15	2.5	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		15	2.8	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		72	28	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		370	140	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		370	140	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		370	140	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		72	28	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		72	28	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		72	28	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		72	41	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		72	28	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		72	28	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		370	140	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		370	140	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		150	56	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		150	56	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		72	28	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		370	140	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		15	2.3	ug/kg	1
Fluorene	86-73-7	8270D	ND		15	3.2	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		72	28	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		72	28	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		370	140	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		72	28	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		15	5.6	ug/kg	1
Isophorone	78-59-1	8270D	ND		72	28	ug/kg	1

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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-004
Description: CMR-EB15-20.5-21.5-190614
Matrix: Solid
Date Sampled: 06/14/2019 1115
% Solids: 87.6 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/20/2019 2053	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		15	5.5	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		72	28	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		150	56	ug/kg	1
Naphthalene	91-20-3	8270D	ND		15	5.4	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		150	56	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		150	56	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		150	56	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		72	28	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		150	56	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		370	140	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		72	28	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		72	28	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		370	140	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		15	4.0	ug/kg	1
Phenol	108-95-2	8270D	ND		72	28	ug/kg	1
Pyrene	129-00-0	8270D	ND		15	2.8	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		180	56	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		370	56	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		370	140	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		72	28	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		72	28	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		34	33-102
2-Fluorophenol		46	35-115
Nitrobenzene-d5		46	22-109
Phenol-d5		45	33-122
Terphenyl-d14		52	41-120
2,4,6-Tribromophenol		69	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-004
Description: CMR-EB15-20.5-21.5-190614
Matrix: Solid
Date Sampled: 06/14/2019 1115
% Solids: 87.6 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	07/10/2019 0016	DAL1	07/08/2019 1741	22165

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	62	H	11	11	mg/kg	2
C9 - C18 Aliphatics		Montana EPH	190	H	11	11	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)	H	92	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Description: CMR-EB15-20.5-21.5-190614
Date Sampled: 06/14/2019 1115
Date Received: 06/15/2019

Laboratory ID: UF15015-004
Matrix: Solid
% Solids: 87.6 06/18/2019 0004

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	MADEP-EPH-	Montana EPH	1	07/10/2019 1447	DAL1	07/08/2019 1741	22166

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	33	H	11	11	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)	H	90	40-140
2-Fluorobiphenyl (fractionation 1)	H	110	40-140
o - Terphenyl (aromatic)	H	90	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-004
Description: CMR-EB15-20.5-21.5-190614
Matrix: Solid
Date Sampled: 06/14/2019 1115
% Solids: 87.6 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1946	JJG		19898

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		3.9	0.78	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	8.5		3.9	0.78	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF15015-004
Description: CMR-EB15-20.5-21.5-190614
Matrix: Solid
Date Sampled: 06/14/2019 1115
% Solids: 87.6 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1946	JJG		19897

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.26	0.035	mg/kg	1
C9 - C10 Aromatics		Montana VPH	12		1.3	0.52	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.26	0.032	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.26	0.056	mg/kg	1
Naphthalene	91-20-3	Montana VPH	2.5		0.26	0.14	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.26	0.042	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.26	0.058	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.26	0.029	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF15015-004
Description: CMR-EB15-20.5-21.5-190614
Matrix: Solid
Date Sampled: 06/14/2019 1115
% Solids: 87.6 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/18/2019 1946	JJG		19896

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	19		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-004
Description: CMR-EB15-20.5-21.5-190614
Matrix: Solid
Date Sampled: 06/14/2019 1115
% Solids: 87.6 06/18/2019 0004
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	7471B	7471B	1	06/25/2019 1014	TJW	06/24/2019 1815	20448
2	3050B	6020B	1	06/24/2019 2023	BNW	06/22/2019 0957	20301

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.42	BJ	0.44	0.18	mg/kg	2
Arsenic	7440-38-2	6020B	8.6		0.44	0.18	mg/kg	2
Barium	7440-39-3	6020B	90		1.2	0.27	mg/kg	2
Beryllium	7440-41-7	6020B	0.60	B	0.089	0.030	mg/kg	2
Cadmium	7440-43-9	6020B	0.58		0.12	0.022	mg/kg	2
Chromium	7440-47-3	6020B	23	B	1.2	0.49	mg/kg	2
Cobalt	7440-48-4	6020B	15		1.2	0.27	mg/kg	2
Copper	7440-50-8	6020B	68		1.2	0.29	mg/kg	2
Lead	7439-92-1	6020B	8.1		0.22	0.060	mg/kg	2
Mercury	7439-97-6	7471B	0.16		0.082	0.020	mg/kg	1
Nickel	7440-02-0	6020B	31		1.2	0.27	mg/kg	2
Selenium	7782-49-2	6020B	ND		1.2	0.42	mg/kg	2
Silver	7440-22-4	6020B	0.17	J	0.22	0.053	mg/kg	2
Vanadium	7440-62-2	6020B	52		1.2	0.22	mg/kg	2
Zinc	7440-66-6	6020B	81		2.2	0.44	mg/kg	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-005
Description: TB-12-20190614
Matrix: Aqueous
Date Sampled: 06/14/2019
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/22/2019 2220	STM		20424

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF15015-005
Description: TB-12-20190614
Matrix: Aqueous
Date Sampled: 06/14/2019
Date Received: 06/15/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/22/2019 2220	STM		20424

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		107	70-130
Toluene-d8		95	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19923-001
Batch: 19923
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	06/18/2019 1016
Benzene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Bromochloromethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Bromoform	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	06/18/2019 1016
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	06/18/2019 1016
Carbon disulfide	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Chlorobenzene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Chloroethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Chloroform	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	06/18/2019 1016
Cyclohexane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	06/18/2019 1016
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,4-Dioxane	ND		1	250	25	ug/kg	06/18/2019 1016
Ethylbenzene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
2-Hexanone	ND		1	10	4.0	ug/kg	06/18/2019 1016
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Methyl acetate	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	06/18/2019 1016
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Methylene chloride	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Naphthalene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Styrene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Toluene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ19923-001
Batch: 19923
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Trichloroethene	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
Vinyl chloride	ND		1	5.0	3.0	ug/kg	06/18/2019 1016
Xylenes (total)	ND		1	10	4.0	ug/kg	06/18/2019 1016
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	06/18/2019 1016
o - Xylenes	ND		1	5.0	2.0	ug/kg	06/18/2019 1016

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		98	53-142
Bromofluorobenzene		110	47-138
Toluene-d8		114	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19923-002
Batch: 19923
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	99		1	99	60-140	06/18/2019 0935
Benzene	50	54		1	109	70-130	06/18/2019 0935
Bromochloromethane	50	51		1	102	70-130	06/18/2019 0935
Bromodichloromethane	50	52		1	104	70-130	06/18/2019 0935
Bromoform	50	52		1	103	70-130	06/18/2019 0935
Bromomethane (Methyl bromide)	50	58		1	116	70-130	06/18/2019 0935
2-Butanone (MEK)	100	110		1	108	60-140	06/18/2019 0935
Carbon disulfide	50	61		1	122	70-130	06/18/2019 0935
Carbon tetrachloride	50	56		1	112	70-130	06/18/2019 0935
Chlorobenzene	50	54		1	108	70-130	06/18/2019 0935
Chloroethane	50	61		1	122	70-130	06/18/2019 0935
Chloroform	50	54		1	107	70-130	06/18/2019 0935
Chloromethane (Methyl chloride)	50	51		1	102	60-140	06/18/2019 0935
Cyclohexane	50	58		1	115	70-130	06/18/2019 0935
1,2-Dibromo-3-chloropropane (DBCP)	50	52		1	104	70-130	06/18/2019 0935
Dibromochloromethane	50	54		1	108	70-130	06/18/2019 0935
1,2-Dibromoethane (EDB)	50	53		1	107	70-130	06/18/2019 0935
1,2-Dichlorobenzene	50	53		1	106	70-130	06/18/2019 0935
1,3-Dichlorobenzene	50	54		1	108	70-130	06/18/2019 0935
1,4-Dichlorobenzene	50	53		1	106	70-130	06/18/2019 0935
Dichlorodifluoromethane	50	67		1	134	60-140	06/18/2019 0935
1,1-Dichloroethane	50	54		1	108	70-130	06/18/2019 0935
1,2-Dichloroethane	50	51		1	101	70-130	06/18/2019 0935
1,1-Dichloroethene	50	65	N	1	131	70-130	06/18/2019 0935
cis-1,2-Dichloroethene	50	53		1	106	70-130	06/18/2019 0935
trans-1,2-Dichloroethene	50	59		1	118	70-130	06/18/2019 0935
1,2-Dichloropropane	50	53		1	106	70-130	06/18/2019 0935
cis-1,3-Dichloropropene	50	54		1	107	70-130	06/18/2019 0935
trans-1,3-Dichloropropene	50	56		1	111	70-130	06/18/2019 0935
1,4-Dioxane	500	460		1	92	60-140	06/18/2019 0935
Ethylbenzene	50	57		1	114	70-130	06/18/2019 0935
2-Hexanone	100	120		1	116	70-130	06/18/2019 0935
Isopropylbenzene	50	58		1	115	70-130	06/18/2019 0935
Methyl acetate	50	42		1	84	70-130	06/18/2019 0935
Methyl tertiary butyl ether (MTBE)	50	51		1	101	70-130	06/18/2019 0935
4-Methyl-2-pentanone	100	100		1	103	70-130	06/18/2019 0935
Methylcyclohexane	50	60		1	121	70-130	06/18/2019 0935
Methylene chloride	50	53		1	106	70-130	06/18/2019 0935
Naphthalene	50	54		1	108	70-130	06/18/2019 0935
Styrene	50	56		1	111	70-130	06/18/2019 0935
1,1,2,2-Tetrachloroethane	50	54		1	108	70-130	06/18/2019 0935
Tetrachloroethene	50	58		1	116	70-130	06/18/2019 0935
Toluene	50	57		1	113	70-130	06/18/2019 0935
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	56		1	113	70-130	06/18/2019 0935

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19923-002
Batch: 19923
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	58		1	116	70-130	06/18/2019 0935
1,2,4-Trichlorobenzene	50	58		1	115	70-130	06/18/2019 0935
1,1,1-Trichloroethane	50	54		1	108	70-130	06/18/2019 0935
1,1,2-Trichloroethane	50	53		1	106	70-130	06/18/2019 0935
Trichloroethene	50	54		1	108	70-130	06/18/2019 0935
Trichlorofluoromethane	50	61		1	121	70-130	06/18/2019 0935
Vinyl chloride	50	53		1	107	70-130	06/18/2019 0935
Xylenes (total)	100	110		1	113	70-130	06/18/2019 0935
m+p - Xylenes	50	57		1	114	70-130	06/18/2019 0935
o - Xylenes	50	56		1	113	70-130	06/18/2019 0935

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		96	53-142
Bromofluorobenzene		112	47-138
Toluene-d8		112	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MS

Sample ID: UF15015-003MS
Batch: 19923
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	48	94	120		1	75	70-130	06/18/2019 1932
Benzene	ND	47	45		1	97	70-130	06/18/2019 1932
Bromochloromethane	ND	47	41		1	88	70-130	06/18/2019 1932
Bromodichloromethane	ND	47	36		1	77	70-130	06/18/2019 1932
Bromoform	ND	47	29	N	1	62	70-130	06/18/2019 1932
Bromomethane (Methyl bromide)	ND	47	48		1	102	70-130	06/18/2019 1932
2-Butanone (MEK)	11	94	88		1	82	70-130	06/18/2019 1932
Carbon disulfide	2.7	47	46		1	92	70-130	06/18/2019 1932
Carbon tetrachloride	ND	47	42		1	90	70-130	06/18/2019 1932
Chlorobenzene	ND	47	39		1	83	70-130	06/18/2019 1932
Chloroethane	ND	47	54		1	115	70-130	06/18/2019 1932
Chloroform	ND	47	46		1	97	70-130	06/18/2019 1932
Chloromethane (Methyl chloride)	ND	47	50		1	107	60-140	06/18/2019 1932
Cyclohexane	ND	47	30	N	1	63	70-130	06/18/2019 1932
1,2-Dibromo-3-chloropropane (DBCP)	ND	47	44		1	94	70-130	06/18/2019 1932
Dibromochloromethane	ND	47	39		1	84	70-130	06/18/2019 1932
1,2-Dibromoethane (EDB)	ND	47	44		1	93	70-130	06/18/2019 1932
1,2-Dichlorobenzene	ND	47	29	N	1	63	70-130	06/18/2019 1932
1,3-Dichlorobenzene	ND	47	33		1	70	70-130	06/18/2019 1932
1,4-Dichlorobenzene	ND	47	32	N	1	69	70-130	06/18/2019 1932
Dichlorodifluoromethane	ND	47	64		1	136	60-140	06/18/2019 1932
1,1-Dichloroethane	ND	47	47		1	99	70-130	06/18/2019 1932
1,2-Dichloroethane	ND	47	41		1	86	70-130	06/18/2019 1932
1,1-Dichloroethene	ND	47	55		1	118	70-130	06/18/2019 1932
cis-1,2-Dichloroethene	ND	47	44		1	94	70-130	06/18/2019 1932
trans-1,2-Dichloroethene	ND	47	50		1	106	70-130	06/18/2019 1932
1,2-Dichloropropane	ND	47	40		1	86	70-130	06/18/2019 1932
cis-1,3-Dichloropropene	ND	47	33		1	71	70-130	06/18/2019 1932
trans-1,3-Dichloropropene	ND	47	42		1	91	70-130	06/18/2019 1932
1,4-Dioxane	ND	470	260	N	1	56	60-140	06/18/2019 1932
Ethylbenzene	ND	47	37		1	80	70-130	06/18/2019 1932
2-Hexanone	ND	94	91		1	97	70-130	06/18/2019 1932
Isopropylbenzene	ND	47	26	N	1	55	70-130	06/18/2019 1932
Methyl acetate	ND	47	51		1	109	70-130	06/18/2019 1932
Methyl tertiary butyl ether (MTBE)	ND	47	41		1	88	70-130	06/18/2019 1932
4-Methyl-2-pentanone	ND	94	76		1	82	70-130	06/18/2019 1932
Methylcyclohexane	ND	47	16	N	1	35	70-130	06/18/2019 1932
Methylene chloride	ND	47	42		1	91	70-130	06/18/2019 1932
Naphthalene	4.1	47	13	N	1	19	70-130	06/18/2019 1932
Styrene	ND	47	34		1	72	70-130	06/18/2019 1932
1,1,2,2-Tetrachloroethane	ND	47	64	N	1	137	70-130	06/18/2019 1932
Tetrachloroethene	ND	47	37		1	80	70-130	06/18/2019 1932
Toluene	ND	47	50		1	107	70-130	06/18/2019 1932
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	47	41		1	88	70-130	06/18/2019 1932

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MS

Sample ID: UF15015-003MS
Batch: 19923
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	ND	47	8.0	N	1	17	70-130	06/18/2019 1932
1,2,4-Trichlorobenzene	ND	47	9.7	N	1	21	70-130	06/18/2019 1932
1,1,1-Trichloroethane	ND	47	46		1	98	70-130	06/18/2019 1932
1,1,2-Trichloroethane	ND	47	46		1	99	70-130	06/18/2019 1932
Trichloroethene	ND	47	41		1	88	70-130	06/18/2019 1932
Trichlorofluoromethane	ND	47	54		1	115	70-130	06/18/2019 1932
Vinyl chloride	ND	47	52		1	111	70-130	06/18/2019 1932
Xylenes (total)	ND	94	69		1	74	70-130	06/18/2019 1932
m+p - Xylenes	ND	47	36		1	76	70-130	06/18/2019 1932
o - Xylenes	ND	47	34		1	72	70-130	06/18/2019 1932

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		100	53-142
Bromofluorobenzene		89	47-138
Toluene-d8	N	130	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MSD

Sample ID: UF15015-003MD
Batch: 19923
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acetone	48	92	170	+	1	130	34	70-130	20	06/18/2019 1954
Benzene	ND	46	45		1	97	0.77	70-130	20	06/18/2019 1954
Bromochloromethane	ND	46	41		1	89	1.1	70-130	20	06/18/2019 1954
Bromodichloromethane	ND	46	39		1	84	6.6	70-130	20	06/18/2019 1954
Bromoform	ND	46	30	N	1	66	4.6	70-130	20	06/18/2019 1954
Bromomethane (Methyl bromide)	ND	46	55		1	120	15	70-130	20	06/18/2019 1954
2-Butanone (MEK)	11	92	88		1	83	0.027	70-130	20	06/18/2019 1954
Carbon disulfide	2.7	46	50		1	103	9.8	70-130	20	06/18/2019 1954
Carbon tetrachloride	ND	46	43		1	93	2.1	70-130	20	06/18/2019 1954
Chlorobenzene	ND	46	39		1	85	0.69	70-130	20	06/18/2019 1954
Chloroethane	ND	46	62	N	1	133	14	70-130	20	06/18/2019 1954
Chloroform	ND	46	45		1	97	1.4	70-130	20	06/18/2019 1954
Chloromethane (Methyl chloride)	ND	46	55		1	119	9.1	60-140	20	06/18/2019 1954
Cyclohexane	ND	46	32	N	1	69	6.9	70-130	20	06/18/2019 1954
1,2-Dibromo-3-chloropropane (DBCP)	ND	46	39		1	84	13	70-130	20	06/18/2019 1954
Dibromochloromethane	ND	46	40		1	87	2.4	70-130	20	06/18/2019 1954
1,2-Dibromoethane (EDB)	ND	46	43		1	94	0.45	70-130	20	06/18/2019 1954
1,2-Dichlorobenzene	ND	46	28	N	1	61	3.8	70-130	20	06/18/2019 1954
1,3-Dichlorobenzene	ND	46	32	N	1	69	2.1	70-130	20	06/18/2019 1954
1,4-Dichlorobenzene	ND	46	32	N	1	68	2.4	70-130	20	06/18/2019 1954
Dichlorodifluoromethane	ND	46	73	N	1	157	13	60-140	20	06/18/2019 1954
1,1-Dichloroethane	ND	46	47		1	102	1.3	70-130	20	06/18/2019 1954
1,2-Dichloroethane	ND	46	39		1	84	4.0	70-130	20	06/18/2019 1954
1,1-Dichloroethene	ND	46	58		1	126	5.0	70-130	20	06/18/2019 1954
cis-1,2-Dichloroethene	ND	46	47		1	101	5.0	70-130	20	06/18/2019 1954
trans-1,2-Dichloroethene	ND	46	51		1	111	3.1	70-130	20	06/18/2019 1954
1,2-Dichloropropane	ND	46	41		1	88	0.97	70-130	20	06/18/2019 1954
cis-1,3-Dichloropropene	ND	46	35		1	76	5.5	70-130	20	06/18/2019 1954
trans-1,3-Dichloropropene	ND	46	43		1	94	1.8	70-130	20	06/18/2019 1954
1,4-Dioxane	ND	460	290		1	63	9.9	60-140	20	06/18/2019 1954
Ethylbenzene	ND	46	38		1	82	1.4	70-130	20	06/18/2019 1954
2-Hexanone	ND	92	88		1	95	3.5	70-130	20	06/18/2019 1954
Isopropylbenzene	ND	46	27	N	1	59	5.6	70-130	20	06/18/2019 1954
Methyl acetate	ND	46	60		1	129	16	70-130	20	06/18/2019 1954
Methyl tertiary butyl ether (MTBE)	ND	46	42		1	90	0.41	70-130	20	06/18/2019 1954
4-Methyl-2-pentanone	ND	92	80		1	86	4.1	70-130	20	06/18/2019 1954
Methylcyclohexane	ND	46	19	N	1	40	14	70-130	20	06/18/2019 1954
Methylene chloride	ND	46	43		1	94	2.1	70-130	20	06/18/2019 1954
Naphthalene	4.1	46	12	N	1	18	6.8	70-130	20	06/18/2019 1954
Styrene	ND	46	34		1	74	2.0	70-130	20	06/18/2019 1954
1,1,2,2-Tetrachloroethane	ND	46	61	N	1	133	4.0	70-130	20	06/18/2019 1954
Tetrachloroethene	ND	46	40		1	86	5.7	70-130	20	06/18/2019 1954
Toluene	ND	46	51		1	109	0.66	70-130	20	06/18/2019 1954
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND	46	44		1	96	7.5	70-130	20	06/18/2019 1954

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MSD

Sample ID: UF15015-003MD
Batch: 19923
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
1,2,3-Trichlorobenzene	ND	46	7.3	N	1	16	8.2	70-130	20	06/18/2019 1954
1,2,4-Trichlorobenzene	ND	46	9.0	N	1	19	7.4	70-130	20	06/18/2019 1954
1,1,1-Trichloroethane	ND	46	46		1	99	0.12	70-130	20	06/18/2019 1954
1,1,2-Trichloroethane	ND	46	46		1	100	0.56	70-130	20	06/18/2019 1954
Trichloroethene	ND	46	42		1	91	2.3	70-130	20	06/18/2019 1954
Trichlorofluoromethane	ND	46	61	N	1	132	12	70-130	20	06/18/2019 1954
Vinyl chloride	ND	46	58		1	126	11	70-130	20	06/18/2019 1954
Xylenes (total)	ND	92	71		1	77	2.4	70-130	20	06/18/2019 1954
m+p - Xylenes	ND	46	37		1	79	2.6	70-130	20	06/18/2019 1954
o - Xylenes	ND	46	34		1	74	2.2	70-130	20	06/18/2019 1954

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		95	53-142
Bromofluorobenzene		92	47-138
Toluene-d8	N	131	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20424-001
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/22/2019 1531
Benzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromoform	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/22/2019 1531
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloroform	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Cyclohexane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/22/2019 1531
1,4-Dioxane	ND		1	20	13	ug/L	06/22/2019 1531
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
2-Hexanone	ND		1	10	2.0	ug/L	06/22/2019 1531
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Methyl acetate	ND		1	1.0	0.40	ug/L	06/22/2019 1531
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/22/2019 1531
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/22/2019 1531
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/22/2019 1531
Methylene chloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Naphthalene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Styrene	ND		1	0.50	0.41	ug/L	06/22/2019 1531
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Toluene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/22/2019 1531

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20424-001
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Trichloroethene	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/22/2019 1531
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/22/2019 1531
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/22/2019 1531
o - Xylenes	ND		1	0.50	0.40	ug/L	06/22/2019 1531

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		106	70-130
Bromofluorobenzene		106	70-130
Toluene-d8		100	70-130

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LOD = Limit of Detection

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20424-002
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	63		1	63	60-140	06/22/2019 1428
Benzene	50	55		1	110	70-130	06/22/2019 1428
Bromochloromethane	50	49		1	98	70-130	06/22/2019 1428
Bromodichloromethane	50	56		1	112	70-130	06/22/2019 1428
Bromoform	50	49		1	97	70-130	06/22/2019 1428
Bromomethane (Methyl bromide)	50	46		1	93	70-130	06/22/2019 1428
2-Butanone (MEK)	100	88		1	88	70-130	06/22/2019 1428
Carbon disulfide	50	47		1	94	70-130	06/22/2019 1428
Carbon tetrachloride	50	50		1	100	70-130	06/22/2019 1428
Chlorobenzene	50	49		1	99	70-130	06/22/2019 1428
Chloroethane	50	50		1	101	70-130	06/22/2019 1428
Chloroform	50	49		1	98	70-130	06/22/2019 1428
Chloromethane (Methyl chloride)	50	55		1	109	60-140	06/22/2019 1428
Cyclohexane	50	46		1	93	70-130	06/22/2019 1428
1,2-Dibromo-3-chloropropane (DBCP)	50	55		1	111	70-130	06/22/2019 1428
Dibromochloromethane	50	53		1	107	70-130	06/22/2019 1428
1,2-Dibromoethane (EDB)	50	52		1	105	70-130	06/22/2019 1428
1,2-Dichlorobenzene	50	48		1	97	70-130	06/22/2019 1428
1,3-Dichlorobenzene	50	48		1	97	70-130	06/22/2019 1428
1,4-Dichlorobenzene	50	47		1	94	70-130	06/22/2019 1428
Dichlorodifluoromethane	50	52		1	105	60-140	06/22/2019 1428
1,1-Dichloroethane	50	49		1	99	70-130	06/22/2019 1428
1,2-Dichloroethane	50	56		1	112	70-130	06/22/2019 1428
1,1-Dichloroethene	50	51		1	101	70-130	06/22/2019 1428
cis-1,2-Dichloroethene	50	50		1	100	70-130	06/22/2019 1428
trans-1,2-Dichloroethene	50	53		1	106	70-130	06/22/2019 1428
1,2-Dichloropropane	50	55		1	110	70-130	06/22/2019 1428
cis-1,3-Dichloropropene	50	60		1	120	70-130	06/22/2019 1428
trans-1,3-Dichloropropene	50	53		1	106	70-130	06/22/2019 1428
1,4-Dioxane	500	530		1	107	60-140	06/22/2019 1428
Ethylbenzene	50	52		1	104	70-130	06/22/2019 1428
2-Hexanone	100	110		1	107	70-130	06/22/2019 1428
Isopropylbenzene	50	51		1	101	70-130	06/22/2019 1428
Methyl acetate	50	41		1	81	70-130	06/22/2019 1428
Methyl tertiary butyl ether (MTBE)	50	47		1	94	70-130	06/22/2019 1428
4-Methyl-2-pentanone	100	120		1	118	70-130	06/22/2019 1428
Methylcyclohexane	50	56		1	112	70-130	06/22/2019 1428
Methylene chloride	50	46		1	93	70-130	06/22/2019 1428
Naphthalene	50	57		1	115	70-130	06/22/2019 1428
Styrene	50	52		1	104	70-130	06/22/2019 1428
1,1,2,2-Tetrachloroethane	50	50		1	100	70-130	06/22/2019 1428
Tetrachloroethene	50	50		1	101	70-130	06/22/2019 1428
Toluene	50	50		1	101	70-130	06/22/2019 1428
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	44		1	88	70-130	06/22/2019 1428

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20424-002
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	56		1	112	70-130	06/22/2019 1428
1,2,4-Trichlorobenzene	50	54		1	108	70-130	06/22/2019 1428
1,1,1-Trichloroethane	50	48		1	96	70-130	06/22/2019 1428
1,1,2-Trichloroethane	50	51		1	102	70-130	06/22/2019 1428
Trichloroethene	50	53		1	107	70-130	06/22/2019 1428
Trichlorofluoromethane	50	49		1	97	70-130	06/22/2019 1428
Vinyl chloride	50	46		1	93	70-130	06/22/2019 1428
Xylenes (total)	100	100		1	101	70-130	06/22/2019 1428
m+p - Xylenes	50	52		1	103	70-130	06/22/2019 1428
o - Xylenes	50	50		1	100	70-130	06/22/2019 1428

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		105	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ20424-003
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acetone	100	54	N	1	54	15	60-140	20	06/23/2019 0039
Benzene	50	50		1	100	9.2	70-130	20	06/23/2019 0039
Bromochloromethane	50	49		1	98	0.067	70-130	20	06/23/2019 0039
Bromodichloromethane	50	48		1	96	15	70-130	20	06/23/2019 0039
Bromoform	50	46		1	91	6.4	70-130	20	06/23/2019 0039
Bromomethane (Methyl bromide)	50	45		1	90	3.2	70-130	20	06/23/2019 0039
2-Butanone (MEK)	100	86		1	86	2.6	70-130	20	06/23/2019 0039
Carbon disulfide	50	42		1	85	9.8	70-130	20	06/23/2019 0039
Carbon tetrachloride	50	46		1	92	8.7	70-130	20	06/23/2019 0039
Chlorobenzene	50	50		1	99	0.48	70-130	20	06/23/2019 0039
Chloroethane	50	47		1	93	7.4	70-130	20	06/23/2019 0039
Chloroform	50	49		1	97	0.92	70-130	20	06/23/2019 0039
Chloromethane (Methyl chloride)	50	51		1	103	6.4	60-140	20	06/23/2019 0039
Cyclohexane	50	41		1	82	13	70-130	20	06/23/2019 0039
1,2-Dibromo-3-chloropropane (DBCP)	50	51		1	102	7.8	70-130	20	06/23/2019 0039
Dibromochloromethane	50	51		1	102	4.2	70-130	20	06/23/2019 0039
1,2-Dibromoethane (EDB)	50	53		1	105	0.55	70-130	20	06/23/2019 0039
1,2-Dichlorobenzene	50	46		1	92	4.9	70-130	20	06/23/2019 0039
1,3-Dichlorobenzene	50	49		1	97	0.84	70-130	20	06/23/2019 0039
1,4-Dichlorobenzene	50	46		1	92	2.1	70-130	20	06/23/2019 0039
Dichlorodifluoromethane	50	49		1	99	5.9	60-140	20	06/23/2019 0039
1,1-Dichloroethane	50	46		1	93	5.8	70-130	20	06/23/2019 0039
1,2-Dichloroethane	50	47		1	95	17	70-130	20	06/23/2019 0039
1,1-Dichloroethene	50	47		1	94	7.2	70-130	20	06/23/2019 0039
cis-1,2-Dichloroethene	50	49		1	98	1.4	70-130	20	06/23/2019 0039
trans-1,2-Dichloroethene	50	49		1	99	7.4	70-130	20	06/23/2019 0039
1,2-Dichloropropane	50	46		1	92	18	70-130	20	06/23/2019 0039
cis-1,3-Dichloropropene	50	43	+	1	87	32	70-130	20	06/23/2019 0039
trans-1,3-Dichloropropene	50	48		1	96	9.8	70-130	20	06/23/2019 0039
1,4-Dioxane	500	470		1	94	13	60-140	20	06/23/2019 0039
Ethylbenzene	50	52		1	104	0.37	70-130	20	06/23/2019 0039
2-Hexanone	100	110		1	107	0.11	70-130	20	06/23/2019 0039
Isopropylbenzene	50	54		1	107	5.3	70-130	20	06/23/2019 0039
Methyl acetate	50	40		1	80	2.2	70-130	20	06/23/2019 0039
Methyl tertiary butyl ether (MTBE)	50	47		1	95	0.71	70-130	20	06/23/2019 0039
4-Methyl-2-pentanone	100	100		1	104	12	70-130	20	06/23/2019 0039
Methylcyclohexane	50	43	+	1	86	26	70-130	20	06/23/2019 0039
Methylene chloride	50	45		1	90	3.0	70-130	20	06/23/2019 0039
Naphthalene	50	49		1	97	16	70-130	20	06/23/2019 0039
Styrene	50	55		1	111	6.2	70-130	20	06/23/2019 0039
1,1,2,2-Tetrachloroethane	50	55		1	109	8.5	70-130	20	06/23/2019 0039
Tetrachloroethene	50	49		1	98	3.0	70-130	20	06/23/2019 0039
Toluene	50	48		1	95	5.9	70-130	20	06/23/2019 0039
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	40		1	80	9.8	70-130	20	06/23/2019 0039

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N = Recovery is out of criteria
+ = RPD is out of criteria

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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ20424-003
Batch: 20424
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
1,2,3-Trichlorobenzene	50	48		1	95	17	70-130	20	06/23/2019 0039
1,2,4-Trichlorobenzene	50	44	+	1	87	22	70-130	20	06/23/2019 0039
1,1,1-Trichloroethane	50	46		1	91	4.7	70-130	20	06/23/2019 0039
1,1,2-Trichloroethane	50	52		1	104	1.3	70-130	20	06/23/2019 0039
Trichloroethene	50	48		1	96	10	70-130	20	06/23/2019 0039
Trichlorofluoromethane	50	44		1	89	8.7	70-130	20	06/23/2019 0039
Vinyl chloride	50	43		1	86	7.3	70-130	20	06/23/2019 0039
Xylenes (total)	100	100		1	105	3.2	70-130	20	06/23/2019 0039
m+p - Xylenes	50	52		1	104	1.2	70-130	20	06/23/2019 0039
o - Xylenes	50	53		1	105	5.2	70-130	20	06/23/2019 0039

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		89	70-130
Bromofluorobenzene		107	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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J = Estimated result < LOQ and ≥ DL
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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19960-001
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	06/20/2019 1159
Acenaphthylene	ND		1	2.7	0.95	ug/kg	06/20/2019 1159
Anthracene	ND		1	2.7	0.51	ug/kg	06/20/2019 1159
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	06/20/2019 1159
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	06/20/2019 1159
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	06/20/2019 1159
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	06/20/2019 1159
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	06/20/2019 1159
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
Carbazole	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Chlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
Chrysene	ND		1	2.7	0.45	ug/kg	06/20/2019 1159
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	06/20/2019 1159
Dibenzofuran	ND		1	13	5.0	ug/kg	06/20/2019 1159
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	06/20/2019 1159
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Diethylphthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
Dimethyl phthalate	ND		1	13	7.4	ug/kg	06/20/2019 1159
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	06/20/2019 1159
2,4-Dinitrophenol	ND		1	67	25	ug/kg	06/20/2019 1159
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	06/20/2019 1159
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	06/20/2019 1159
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	06/20/2019 1159
Fluoranthene	ND		1	2.7	0.42	ug/kg	06/20/2019 1159
Fluorene	ND		1	2.7	0.57	ug/kg	06/20/2019 1159
Hexachlorobenzene	ND		1	13	5.0	ug/kg	06/20/2019 1159
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	06/20/2019 1159
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	06/20/2019 1159
Hexachloroethane	ND		1	13	5.0	ug/kg	06/20/2019 1159
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	06/20/2019 1159
Isophorone	ND		1	13	5.0	ug/kg	06/20/2019 1159

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19960-001
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	06/20/2019 1159
2-Methylphenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
3+4-Methylphenol	ND		1	27	10	ug/kg	06/20/2019 1159
Naphthalene	ND		1	2.7	0.97	ug/kg	06/20/2019 1159
2-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
3-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
4-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
Nitrobenzene	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Nitrophenol	ND		1	27	10	ug/kg	06/20/2019 1159
4-Nitrophenol	ND		1	67	25	ug/kg	06/20/2019 1159
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	06/20/2019 1159
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	06/20/2019 1159
Pentachlorophenol	ND		1	67	25	ug/kg	06/20/2019 1159
Phenanthrene	ND		1	2.7	0.72	ug/kg	06/20/2019 1159
Phenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Pyrene	ND		1	2.7	0.50	ug/kg	06/20/2019 1159
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	06/20/2019 1159
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	06/20/2019 1159
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		48	33-102
2-Fluorophenol		53	35-115
Nitrobenzene-d5		50	22-109
Phenol-d5		57	33-122
Terphenyl-d14		66	41-120
2,4,6-Tribromophenol		60	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19960-002
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	78		1	59	12-111	06/22/2019 1824
Acenaphthylene	130	88		1	66	44-122	06/22/2019 1824
Anthracene	130	89		1	67	16-122	06/22/2019 1824
Benzo(a)anthracene	130	91		1	68	40-121	06/22/2019 1824
Benzo(a)pyrene	130	88		1	66	36-114	06/22/2019 1824
Benzo(b)fluoranthene	130	83		1	62	38-123	06/22/2019 1824
Benzo(g,h,i)perylene	130	100		1	75	43-120	06/22/2019 1824
Benzo(k)fluoranthene	130	90		1	68	40-126	06/22/2019 1824
4-Bromophenyl phenyl ether	130	82		1	62	30-130	06/22/2019 1824
Butyl benzyl phthalate	130	110		1	81	48-124	06/22/2019 1824
Carbazole	130	94		1	70	47-125	06/22/2019 1824
bis (2-Chloro-1-methylethyl) ether	130	78		1	59	41-113	06/22/2019 1824
4-Chloro-3-methyl phenol	130	88		1	66	48-120	06/22/2019 1824
bis(2-Chloroethoxy)methane	130	80		1	60	38-115	06/22/2019 1824
bis(2-Chloroethyl)ether	130	74		1	55	46-122	06/22/2019 1824
2-Chloronaphthalene	130	81		1	61	37-106	06/22/2019 1824
2-Chlorophenol	130	75		1	56	44-122	06/22/2019 1824
4-Chlorophenyl phenyl ether	130	84		1	63	32-107	06/22/2019 1824
Chrysene	130	90		1	68	41-124	06/22/2019 1824
Dibenzo(a,h)anthracene	130	95		1	72	38-125	06/22/2019 1824
Dibenzofuran	130	84		1	63	45-128	06/22/2019 1824
1,2-Dichlorobenzene	130	69		1	52	39-94	06/22/2019 1824
1,3-Dichlorobenzene	130	71		1	53	30-130	06/22/2019 1824
1,4-Dichlorobenzene	130	69		1	52	39-92	06/22/2019 1824
3,3'-Dichlorobenzidine	130	58		1	44	10-119	06/22/2019 1824
2,4-Dichlorophenol	130	79		1	59	30-96	06/22/2019 1824
Diethylphthalate	130	90		1	68	30-130	06/22/2019 1824
Dimethyl phthalate	130	89		1	67	24-127	06/22/2019 1824
2,4-Dimethylphenol	130	120		1	92	30-130	06/22/2019 1824
Di-n-butyl phthalate	130	95		1	71	35-108	06/22/2019 1824
4,6-Dinitro-2-methylphenol	130	79		1	59	53-150	06/22/2019 1824
2,4-Dinitrophenol	270	150		1	55	32-115	06/22/2019 1824
2,4-Dinitrotoluene	130	98		1	74	40-130	06/22/2019 1824
2,6-Dinitrotoluene	130	90		1	67	46-118	06/22/2019 1824
Di-n-octylphthalate	130	90		1	68	49-118	06/22/2019 1824
bis(2-Ethylhexyl)phthalate	130	98		1	74	33-123	06/22/2019 1824
Fluoranthene	130	94		1	71	26-133	06/22/2019 1824
Fluorene	130	84		1	63	19-108	06/22/2019 1824
Hexachlorobenzene	130	84		1	63	10-125	06/22/2019 1824
Hexachlorobutadiene	130	69		1	52	47-116	06/22/2019 1824
Hexachlorocyclopentadiene	670	300	N	1	46	48-127	06/22/2019 1824
Hexachloroethane	130	73		1	55	18-154	06/22/2019 1824
Indeno(1,2,3-c,d)pyrene	130	99		1	74	42-123	06/22/2019 1824
Isophorone	130	85		1	64	30-130	06/22/2019 1824

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19960-002
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	81		1	61	10-107	06/22/2019 1824
2-Methylphenol	130	75		1	57	33-103	06/22/2019 1824
3+4-Methylphenol	130	90		1	68	18-121	06/22/2019 1824
Naphthalene	130	79		1	59	10-112	06/22/2019 1824
2-Nitroaniline	130	98		1	74	46-128	06/22/2019 1824
3-Nitroaniline	130	33	N	1	25	30-130	06/22/2019 1824
4-Nitroaniline	130	67		1	51	51-129	06/22/2019 1824
Nitrobenzene	130	81		1	61	49-142	06/22/2019 1824
2-Nitrophenol	130	79		1	60	33-114	06/22/2019 1824
4-Nitrophenol	270	170		1	62	27-138	06/22/2019 1824
N-Nitrosodi-n-propylamine	130	85		1	64	45-112	06/22/2019 1824
N-Nitrosodiphenylamine (Diphenylamine)	130	89		1	67	49-123	06/22/2019 1824
Pentachlorophenol	270	120		1	45	36-108	06/22/2019 1824
Phenanthrene	130	86		1	65	16-123	06/22/2019 1824
Phenol	130	78		1	59	39-108	06/22/2019 1824
Pyrene	130	96		1	72	34-121	06/22/2019 1824
1,2,4,5-Tetrachlorobenzene	130	71		1	53	30-130	06/22/2019 1824
2,3,4,6-Tetrachlorophenol	130	84		1	64	53-125	06/22/2019 1824
1,2,4-Trichlorobenzene	130	74		1	55	30-130	06/22/2019 1824
2,4,5-Trichlorophenol	130	84		1	63	32-105	06/22/2019 1824
2,4,6-Trichlorophenol	130	81		1	61	31-102	06/22/2019 1824

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		55	33-102
2-Fluorophenol		54	35-115
Nitrobenzene-d5		57	22-109
Phenol-d5		56	33-122
Terphenyl-d14		78	41-120
2,4,6-Tribromophenol		68	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF15015-003MS
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	ND	160	49		50	31	12-111	06/20/2019 2118
Acenaphthylene	ND	160	47	N	50	30	44-122	06/20/2019 2118
Anthracene	ND	160	77		50	49	16-122	06/20/2019 2118
Benzo(a)anthracene	ND	160	130		50	82	40-121	06/20/2019 2118
Benzo(a)pyrene	42	160	96	N	50	35	36-114	06/20/2019 2118
Benzo(b)fluoranthene	ND	160	84		50	53	38-123	06/20/2019 2118
Benzo(g,h,i)perylene	ND	160	65	N	50	41	43-120	06/20/2019 2118
Benzo(k)fluoranthene	ND	160	71		50	45	40-126	06/20/2019 2118
4-Bromophenyl phenyl ether	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Butyl benzyl phthalate	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Carbazole	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
bis (2-Chloro-1-methylethyl) ether	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
4-Chloro-3-methyl phenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
bis(2-Chloroethoxy)methane	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
bis(2-Chloroethyl)ether	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
2-Chloronaphthalene	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
2-Chlorophenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
4-Chlorophenyl phenyl ether	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Chrysene	ND	160	74		50	47	41-124	06/20/2019 2118
Dibenzo(a,h)anthracene	ND	160	60		50	38	38-125	06/20/2019 2118
Dibenzofuran	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
1,2-Dichlorobenzene	ND	790	ND	N	50	0.00	39-94	06/20/2019 2118
1,3-Dichlorobenzene	ND	790	ND	N	50	0.00	30-130	06/20/2019 2118
1,4-Dichlorobenzene	ND	790	ND	N	50	0.00	39-92	06/20/2019 2118
3,3'-Dichlorobenzidine	ND	160	ND	N	50	0.00	10-119	06/20/2019 2118
2,4-Dichlorophenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Diethylphthalate	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Dimethyl phthalate	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
2,4-Dimethylphenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Di-n-butyl phthalate	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
4,6-Dinitro-2-methylphenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
2,4-Dinitrophenol	ND	310	ND	N	50	0.00	30-130	06/20/2019 2118
2,4-Dinitrotoluene	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
2,6-Dinitrotoluene	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Di-n-octylphthalate	ND	160	460	N	50	293	30-130	06/20/2019 2118
bis(2-Ethylhexyl)phthalate	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Fluoranthene	ND	160	45		50	28	26-133	06/20/2019 2118
Fluorene	ND	160	66		50	42	19-108	06/20/2019 2118
Hexachlorobenzene	ND	160	ND	N	50	0.00	10-130	06/20/2019 2118
Hexachlorobutadiene	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Hexachlorocyclopentadiene	ND	790	ND	N	50	0.00	30-130	06/20/2019 2118
Hexachloroethane	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Indeno(1,2,3-c,d)pyrene	ND	160	65	N	50	41	42-123	06/20/2019 2118
Isophorone	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF15015-003MS
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	ND	160	52		50	33	10-107	06/20/2019 2118
2-Methylphenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
3+4-Methylphenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Naphthalene	ND	160	53		50	34	10-112	06/20/2019 2118
2-Nitroaniline	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
3-Nitroaniline	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
4-Nitroaniline	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Nitrobenzene	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
2-Nitrophenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
4-Nitrophenol	ND	310	ND	N	50	0.00	30-130	06/20/2019 2118
N-Nitrosodi-n-propylamine	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
N-Nitrosodiphenylamine (Diphenylamine)	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Pentachlorophenol	ND	310	ND	N	50	0.00	30-130	06/20/2019 2118
Phenanthrene	ND	160	70		50	44	16-123	06/20/2019 2118
Phenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
Pyrene	61	160	100	N	50	25	34-121	06/20/2019 2118
1,2,4,5-Tetrachlorobenzene	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
2,3,4,6-Tetrachlorophenol	ND	160	ND	N	50	0.00	53-125	06/20/2019 2118
1,2,4-Trichlorobenzene	ND	790	ND	N	50	0.00	30-130	06/20/2019 2118
2,4,5-Trichlorophenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118
2,4,6-Trichlorophenol	ND	160	ND	N	50	0.00	30-130	06/20/2019 2118

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl	N	28	33-102
2-Fluorophenol	N	14	35-115
Nitrobenzene-d5		39	22-109
Phenol-d5	N	23	33-122
Terphenyl-d14	N	39	41-120
2,4,6-Tribromophenol	N	22	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF15015-003MD
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acenaphthene	ND	160	69	+	50	44	34	12-111	30	06/20/2019 2143
Acenaphthylene	ND	160	66	N,+	50	42	33	44-122	30	06/20/2019 2143
Anthracene	ND	160	97		50	62	24	16-122	30	06/20/2019 2143
Benzo(a)anthracene	ND	160	160		50	99	19	40-121	30	06/20/2019 2143
Benzo(a)pyrene	42	160	110		50	42	11	36-114	30	06/20/2019 2143
Benzo(b)fluoranthene	ND	160	120	+	50	74	33	38-123	30	06/20/2019 2143
Benzo(g,h,i)perylene	ND	160	76		50	49	16	43-120	30	06/20/2019 2143
Benzo(k)fluoranthene	ND	160	120	+	50	76	50	40-126	30	06/20/2019 2143
4-Bromophenyl phenyl ether	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Butyl benzyl phthalate	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Carbazole	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
bis (2-Chloro-1-methylethyl) ether	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
4-Chloro-3-methyl phenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
bis(2-Chloroethoxy)methane	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
bis(2-Chloroethyl)ether	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
2-Chloronaphthalene	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
2-Chlorophenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
4-Chlorophenyl phenyl ether	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Chrysene	ND	160	79		50	51	7.0	41-124	30	06/20/2019 2143
Dibenzo(a,h)anthracene	ND	160	91	+	50	58	42	38-125	30	06/20/2019 2143
Dibenzofuran	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
1,2-Dichlorobenzene	ND	790	ND	N	50	0.00	0.00	39-94	40	06/20/2019 2143
1,3-Dichlorobenzene	ND	790	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
1,4-Dichlorobenzene	ND	790	ND	N	50	0.00	0.00	39-92	40	06/20/2019 2143
3,3'-Dichlorobenzidine	ND	160	ND	N	50	0.00	0.00	10-119	40	06/20/2019 2143
2,4-Dichlorophenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Diethylphthalate	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Dimethyl phthalate	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
2,4-Dimethylphenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Di-n-butyl phthalate	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
4,6-Dinitro-2-methylphenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
2,4-Dinitrophenol	ND	310	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
2,4-Dinitrotoluene	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
2,6-Dinitrotoluene	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Di-n-octylphthalate	ND	160	500	N	50	322	9.2	30-130	40	06/20/2019 2143
bis(2-Ethylhexyl)phthalate	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Fluoranthene	ND	160	62	+	50	40	33	26-133	30	06/20/2019 2143
Fluorene	ND	160	100	+	50	64	41	19-108	30	06/20/2019 2143
Hexachlorobenzene	ND	160	ND	N	50	0.00	0.00	10-130	40	06/20/2019 2143
Hexachlorobutadiene	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Hexachlorocyclopentadiene	ND	780	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Hexachloroethane	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Indeno(1,2,3-c,d)pyrene	ND	160	89	+	50	56	31	42-123	30	06/20/2019 2143
Isophorone	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF15015-003MD
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Sample Amount (ug/kg)	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
2-Methylnaphthalene	ND	160	64		50	41	20	10-107	30	06/20/2019 2143
2-Methylphenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
3+4-Methylphenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Naphthalene	ND	160	71		50	45	29	10-112	30	06/20/2019 2143
2-Nitroaniline	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
3-Nitroaniline	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
4-Nitroaniline	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Nitrobenzene	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
2-Nitrophenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
4-Nitrophenol	ND	310	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
N-Nitrosodi-n-propylamine	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
N-Nitrosodiphenylamine (Diphenylamine)	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Pentachlorophenol	ND	310	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Phenanthrene	ND	160	88		50	56	23	16-123	30	06/20/2019 2143
Phenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
Pyrene	61	160	120		50	36	16	34-121	30	06/20/2019 2143
1,2,4,5-Tetrachlorobenzene	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
2,3,4,6-Tetrachlorophenol	ND	160	ND	N	50	0.00	0.00	53-125	40	06/20/2019 2143
1,2,4-Trichlorobenzene	ND	790	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
2,4,5-Trichlorophenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143
2,4,6-Trichlorophenol	ND	160	ND	N	50	0.00	0.00	30-130	40	06/20/2019 2143

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		36	33-102
2-Fluorophenol	N	32	35-115
Nitrobenzene-d5		55	22-109
Phenol-d5		34	33-122
Terphenyl-d14		58	41-120
2,4,6-Tribromophenol		46	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20483-001
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/26/2019 1830
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/26/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		82	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20483-002
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	40-140	06/26/2019 1900
C9 - C18 Aliphatics	30	20		1	68	40-140	06/26/2019 1900

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		78	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20483-003
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	37		1	92	6.2	40-140	25	06/26/2019 1930
C9 - C18 Aliphatics	30	23		1	76	10	40-140	25	06/26/2019 1930

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		79	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20484-001
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/27/2019 0424

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		83	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20484-002
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	64		1	75	40-140	06/27/2019 0453

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		83	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20484-003
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	63		1	74	0.98	40-140	25	06/27/2019 0523

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		84	40-140
2-Fluorobiphenyl (fractionation 1)		87	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20678-001
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	07/06/2019 1238
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	07/06/2019 1238

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		68	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20678-002
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	40-140	07/06/2019 1308
C9 - C18 Aliphatics	30	19		1	65	40-140	07/06/2019 1308

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		75	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20678-003
Batch: 20678
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	0.64	40-140	25	07/06/2019 1338
C9 - C18 Aliphatics	30	19		1	64	2.1	40-140	25	07/06/2019 1338

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20679-001
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	07/06/2019 2036

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		72	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		85	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20679-002
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	68		1	81	40-140	07/06/2019 2105

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		92	40-140
o - Terphenyl (aromatic)		91	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20679-003
Batch: 20679
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/25/2019 1759

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	56		1	66	20	40-140	25	07/06/2019 2135

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		71	40-140
2-Fluorobiphenyl (fractionation 1)		73	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ22165-001
Batch: 22165
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 07/08/2019 1741

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	07/09/2019 1916
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	07/09/2019 1916

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		92	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ22165-002
Batch: 22165
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 07/08/2019 1741

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	42		1	105	40-140	07/09/2019 1947
C9 - C18 Aliphatics	30	20		1	68	40-140	07/09/2019 1947

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		90	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ22166-001
Batch: 22166
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 07/08/2019 1741

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	07/10/2019 1317

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		92	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ22166-002
Batch: 22166
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 07/08/2019 1741

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	70		1	82	40-140	07/10/2019 1347

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		87	40-140
2-Fluorobiphenyl (fractionation 1)		101	40-140
o - Terphenyl (aromatic)		92	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ19896-001
Batch: 19896
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ19896-002
Batch: 19896
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	19		1	100	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MS

Sample ID: UF15015-003MS
Batch: 19896
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	3.6	23	34		1	129	70-130	06/18/2019 2014

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - MSD

Sample ID: UF15015-003MD
Batch: 19896
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	3.6	23	31		1	113	11	70-130	25	06/18/2019 2042

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		93	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ19897-001
Batch: 19897
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	06/18/2019 1601
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/18/2019 1601
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/18/2019 1601
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/18/2019 1601
Naphthalene	ND		1	0.25	0.13	mg/kg	06/18/2019 1601
Toluene	ND		1	0.25	0.040	mg/kg	06/18/2019 1601
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/18/2019 1601
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ19897-002
Batch: 19897
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	06/18/2019 1533
C9 - C10 Aromatics	1.3	1.3		1	104	70-130	06/18/2019 1533
Ethylbenzene	1.3	1.2		1	96	70-130	06/18/2019 1533
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	06/18/2019 1533
Naphthalene	1.3	1.1		1	88	70-130	06/18/2019 1533
Toluene	1.3	1.2		1	96	70-130	06/18/2019 1533
m+p - Xylenes	2.5	2.4		1	96	70-130	06/18/2019 1533
o - Xylenes	1.3	1.2		1	96	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MS

Sample ID: UF15015-003MS
Batch: 19897
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	ND	1.5	1.6		1	104	70-130	06/18/2019 2014
C9 - C10 Aromatics	6.3	1.5	5.7	N	1	-39	70-130	06/18/2019 2014
Ethylbenzene	ND	1.5	1.7		1	110	70-130	06/18/2019 2014
Methyl tertiary butyl ether (MTBE)	ND	1.5	1.5		1	97	70-130	06/18/2019 2014
Naphthalene	1.2	1.5	2.6		1	91	70-130	06/18/2019 2014
Toluene	ND	1.5	1.7		1	110	70-130	06/18/2019 2014
m+p - Xylenes	ND	3.1	3.4		1	110	70-130	06/18/2019 2014
o - Xylenes	ND	1.5	1.7		1	110	70-130	06/18/2019 2014

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MSD

Sample ID: UF15015-003MD
Batch: 19897
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	ND	1.5	1.5		1	97	6.5	70-130	25	06/18/2019 2042
C9 - C10 Aromatics	6.3	1.5	6.3	N	1	0.00	10	70-130	25	06/18/2019 2042
Ethylbenzene	ND	1.5	1.5		1	97	13	70-130	25	06/18/2019 2042
Methyl tertiary butyl ether (MTBE)	ND	1.5	1.4		1	91	6.9	70-130	25	06/18/2019 2042
Naphthalene	1.2	1.5	2.5		1	84	3.9	70-130	25	06/18/2019 2042
Toluene	ND	1.5	1.5		1	97	13	70-130	25	06/18/2019 2042
m+p - Xylenes	ND	3.1	3.0		1	97	13	70-130	25	06/18/2019 2042
o - Xylenes	ND	1.5	1.5		1	97	13	70-130	25	06/18/2019 2042

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ19898-001
Batch: 19898
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/18/2019 1601
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/18/2019 1601

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ19898-002
Batch: 19898
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	4.6		1	92	70-130	06/18/2019 1533
C9 - C12 Aliphatics, Adjusted	3.8	3.6		1	95	70-130	06/18/2019 1533

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MS

Sample ID: UF15015-003MS
Batch: 19898
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND	6.2	5.4		1	87	70-130	06/18/2019 2014
C9 - C12 Aliphatics, Adjusted	ND	4.6	4.9		1	106	70-130	06/18/2019 2014

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MSD

Sample ID: UF15015-003MD
Batch: 19898
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND	6.2	4.5		1	74	16	70-130	25	06/18/2019 2042
C9 - C12 Aliphatics, Adjusted	ND	4.6	2.1	N,+	1	45	81	70-130	25	06/18/2019 2042

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20301-001
Batch: 20301
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/22/2019 957

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	0.40	J	1	0.50	0.20	mg/kg	06/23/2019 2011
Arsenic	ND		1	0.50	0.20	mg/kg	06/23/2019 2011
Barium	ND		1	1.3	0.31	mg/kg	06/23/2019 2011
Beryllium	0.035	J	1	0.10	0.034	mg/kg	06/23/2019 2011
Cadmium	ND		1	0.13	0.025	mg/kg	06/23/2019 2011
Chromium	0.92	J	1	1.3	0.55	mg/kg	06/23/2019 2011
Cobalt	ND		1	1.3	0.30	mg/kg	06/23/2019 2011
Copper	ND		1	1.3	0.33	mg/kg	06/23/2019 2011
Lead	ND		1	0.25	0.068	mg/kg	06/23/2019 2011
Nickel	ND		1	1.3	0.30	mg/kg	06/23/2019 2011
Selenium	ND		1	1.3	0.47	mg/kg	06/23/2019 2011
Silver	ND		1	0.25	0.060	mg/kg	06/23/2019 2011
Vanadium	ND		1	1.3	0.25	mg/kg	06/23/2019 2011
Zinc	ND		1	2.5	0.50	mg/kg	06/23/2019 2011

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20301-002
Batch: 20301
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/22/2019 957

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	50		1	100	80-120	06/23/2019 2017
Arsenic	50	51		1	101	80-120	06/23/2019 2017
Barium	50	50		1	100	80-120	06/23/2019 2017
Beryllium	50	60		1	120	80-120	06/23/2019 2017
Cadmium	50	50		1	100	80-120	06/23/2019 2017
Chromium	50	52		1	104	80-120	06/23/2019 2017
Cobalt	50	50		1	99	80-120	06/23/2019 2017
Copper	50	51		1	102	80-120	06/23/2019 2017
Lead	50	51		1	101	80-120	06/23/2019 2017
Nickel	50	49		1	98	80-120	06/23/2019 2017
Selenium	50	49		1	99	80-120	06/23/2019 2017
Silver	50	52		1	104	80-120	06/23/2019 2017
Vanadium	50	50		1	100	80-120	06/23/2019 2017
Zinc	50	50		1	101	80-120	06/23/2019 2017

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UF15015-003MS
Batch: 20301
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/22/2019 957

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	0.46	50	31	N	1	61	75-125	06/23/2019 2057
Arsenic	23	50	69		1	91	75-125	06/23/2019 2057
Barium	230	50	310	N	1	166	75-125	06/23/2019 2057
Beryllium	0.86	50	52		1	102	75-125	06/23/2019 2057
Cadmium	1.2	50	49		1	94	75-125	06/23/2019 2057
Chromium	17	50	69		1	103	75-125	06/23/2019 2057
Cobalt	8.0	50	49		1	82	75-125	06/23/2019 2057
Copper	87	50	110	N	1	55	75-125	06/23/2019 2057
Lead	150	50	160	N	1	21	75-125	06/23/2019 2057
Nickel	16	50	56		1	79	75-125	06/23/2019 2057
Selenium	0.44	50	43		1	85	75-125	06/23/2019 2057
Silver	0.44	50	48		1	94	75-125	06/23/2019 2057
Vanadium	48	50	110		1	118	75-125	06/23/2019 2057
Zinc	230	50	220	N	1	-4.0	75-125	06/23/2019 2057

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF15015-003MD
Batch: 20301
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/22/2019 957

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Antimony	0.46	54	36	N	1	66	14	75-125	20	06/23/2019 2114
Arsenic	23	54	77		1	99	10	75-125	20	06/23/2019 2114
Barium	230	54	360	N	1	241	14	75-125	20	06/23/2019 2114
Beryllium	0.86	54	57		1	105	8.4	75-125	20	06/23/2019 2114
Cadmium	1.2	54	54		1	98	9.9	75-125	20	06/23/2019 2114
Chromium	17	54	75		1	110	9.3	75-125	20	06/23/2019 2114
Cobalt	8.0	54	55		1	88	11	75-125	20	06/23/2019 2114
Copper	87	54	130	N	1	71	9.0	75-125	20	06/23/2019 2114
Lead	150	54	200		1	88	20	75-125	20	06/23/2019 2114
Nickel	16	54	62		1	86	11	75-125	20	06/23/2019 2114
Selenium	0.44	54	49		1	90	11	75-125	20	06/23/2019 2114
Silver	0.44	54	53		1	98	10	75-125	20	06/23/2019 2114
Vanadium	48	54	120	N	1	128	8.5	75-125	20	06/23/2019 2114
Zinc	230	54	270		1	81	18	75-125	20	06/23/2019 2114

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20448-001
Batch: 20448
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1815

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/25/2019 0926

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20448-002
Batch: 20448
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1815

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.83		1	100	80-120	06/25/2019 0929

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UF15015-003MS
Batch: 20448
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1815

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.15	0.99	1.2		1	110	80-120	06/25/2019 1009

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF15015-003MD
Batch: 20448
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1815

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Mercury	0.15	0.94	1.2		1	115	0.97	80-120	20	06/25/2019 1012

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Chain of Custody

and

Miscellaneous Documents

SHEALY

Chain of Custody Record

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

Number

Client: Ramboll US Corporation
Report to Contact: Daniel Price/Michael Wilson
Telephone No. / E-mail: (314) [illegible] / (316) 440-7500 [illegible]
Quote No.:
Address: 7500 College Boulevard Suite 1905
Sampler's Signature: X (signature) Elizabeth Borucki/Andrew E. Hardwick
Analysis (Attach list if more space is needed)
Page 1 of 1
City: Overland Park | State: KS | Zip Code: 66210
Project Name: CMR RIAIM East Rail
Project Number: 1690012344-003
P.O No.:

UF15015
KMN2

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH	Remarks / Cooler I.D.
CMR-EB15-0.5-1.0-190614	6/14/2019	09:45	G		X		2					1	2	X	X	X	X	X	Cooler 001
CMR-EB15-15.0-16.0-190614	6/14/2019	10:30	G		X		2					1	2	X	X	X	X	X	Cooler 001
CMR-EB15-18.0-19.0-190614	6/14/2019	10:05	G		X		6					3	6	X	X	X	X	X	MS/MSD/Cooler 001
CMR-EB15-20.5-21.5-190614	6/14/2019	11:15	G		X		2					1	2	X	X	X	X	X	Cooler 001
TB-12	NA	NA	G	X						2				X					Trip Blank/Cooler 001

Turn Around Time Required (Prior lab approval required for expedited TAT): [X] Standard [ ] Rush (Please Specify)

Sample Disposal: [ ] Return to Client [X] Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks): [ ] Non-Hazardous [ ] Flammable [ ] Skin Irritant [ ] SDS provided [X] Unknown

QC Requirements:

Relinquished by	Date	Time	Received by	Date	Time
1. (signature) (Ramboll)	6/14/2019	1715	1. Received by		
2.			2. Received by		
3.			3. Received by		
4. FedEx	6/15/19	1111	4. Laboratory Received by (signature)	6/15/19	1111

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) [X] Y [ ] N [ ] Ice Pack
Receipt Temp. 3.1 °C

Document Number: ME002OW-07

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: Ramboll US Corporation Cooler Inspected by/date: JSH / 06/15/19 Lot #: UF15015

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

3.1 / 3.1 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼" or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.

Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JSH Date: 06/15/19

Comments: 1 of 2 vials for the trip blanks has a bubble in it.

MEMO

Date: **July 19, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF18024, 4 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF18024 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB09-2.0-3.0-190617	UF18024-001
CMR-WB09-6.0-6.75-190617	UF18024-002
CMR-WB08-5.0-6.0-190617	UF18024-003
CMR-WB07-5.0-6.0-190617	UF18024-004
TB-13-20190617	UF18024-005

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of methyl acetate, acetone, and methylcyclohexane. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methyl acetate, acetone, and methylcyclohexane results have been validated as estimated.

Blank Detections
During analysis, chromium was detected in method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All chromium results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF18024

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Chromium detected in method blank sample. All chromium project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All chromium project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.

SDG No. UF18024

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 4 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	No issues	No issues
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out of criteria due to matrix effects. No action taken.	Surrogates out of criteria due to matrix effects. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	VOC methyl acetate, acetone, and methylcyclohexane out of criteria. All methyl acetate, acetone, and methylcyclohexane results validated as estimated (J, UJ). SVOCs hexachlorocyclopentadiene and 3-aniline out of criteria. Not site COCs, no action taken.	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified.	N/A
Other Non-conformances	No other non-conformances noted.	No other non-conformances noted.
Overall Assessment of Data	All methyl acetate, acetone, and methylcyclohexane results validated as estimated (J, UJ).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF18024**

Date Completed:07/01/2019

07/02/2019 2:20 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF18024

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 20330 had acetone recovered marginally outside of the acceptance limits. The LCS associated with batches 20364 and 21175 had methylcyclohexane recovered marginally outside of the acceptance limits. The LCS associated with batch 21174 had methyl acetate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Sample -003 was analyzed high level due to the sample matrix. The reporting limits have been raised accordingly.

Semivolatiles
The LCS associated with batch 19960 had hexachlorocyclopentadiene and 3-nitroaniline recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Due to the sample matrix, samples -001, -002, and -003 were diluted 5X, 200X, and 5X, respectively. The reporting limits have been raised accordingly. The associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
Samples -002 and -003 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as

naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Samples -002 and -003 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The method blank associated with batch 20445 had chromium detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for chromium have been flagged with a “B” qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF18024

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB09-2.0-3.0-190617	Solid	06/17/2019 1045	06/18/2019
002	CMR-WB09-6.0-6.75-190617	Solid	06/17/2019 1050	06/18/2019
003	CMR-WB08-5.0-6.0-190617	Solid	06/17/2019 1455	06/18/2019
004	CMR-WB07-5.0-6.0-190617	Solid	06/17/2019 1540	06/18/2019
005	TB-13-20190617	Aqueous	06/17/2019	06/18/2019

(5 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF18024

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB09-2.0-3.0-190617	Solid	Acetone	8260B	38		ug/kg	8
001	CMR-WB09-2.0-3.0-190617	Solid	2-Methylnaphthalene	8270D	5.9	J	ug/kg	11
001	CMR-WB09-2.0-3.0-190617	Solid	Arsenic	6020B	13		mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Barium	6020B	230		mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Beryllium	6020B	0.95		mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Cadmium	6020B	0.21		mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Chromium	6020B	21	B	mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Cobalt	6020B	6.2		mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Copper	6020B	15		mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Lead	6020B	10		mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Mercury	7471B	0.029	J	mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Nickel	6020B	16		mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Silver	6020B	0.083	J	mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Vanadium	6020B	51		mg/kg	17
001	CMR-WB09-2.0-3.0-190617	Solid	Zinc	6020B	53		mg/kg	17
002	CMR-WB09-6.0-6.75-190617	Solid	Ethylbenzene	8260B	910		ug/kg	18
002	CMR-WB09-6.0-6.75-190617	Solid	Isopropylbenzene	8260B	270		ug/kg	18
002	CMR-WB09-6.0-6.75-190617	Solid	Methylcyclohexane	8260B	520		ug/kg	18
002	CMR-WB09-6.0-6.75-190617	Solid	2-Methylnaphthalene	8270D	290	J	ug/kg	21
002	CMR-WB09-6.0-6.75-190617	Solid	C19 - C36 Aliphatics	Montana EPH	480		mg/kg	22
002	CMR-WB09-6.0-6.75-190617	Solid	C9 - C18 Aliphatics	Montana EPH	1300		mg/kg	22
002	CMR-WB09-6.0-6.75-190617	Solid	C11 - C22 Aromatics	Montana EPH	170		mg/kg	23
002	CMR-WB09-6.0-6.75-190617	Solid	C5 - C8 Aliphatics,	Montana VPH	33		mg/kg	24
002	CMR-WB09-6.0-6.75-190617	Solid	C9 - C12 Aliphatics,	Montana VPH	130		mg/kg	24
002	CMR-WB09-6.0-6.75-190617	Solid	C9 - C10 Aromatics	Montana VPH	82		mg/kg	25
002	CMR-WB09-6.0-6.75-190617	Solid	Ethylbenzene	Montana VPH	2.2		mg/kg	25
002	CMR-WB09-6.0-6.75-190617	Solid	Naphthalene	Montana VPH	2.3		mg/kg	25
002	CMR-WB09-6.0-6.75-190617	Solid	o - Xylenes	Montana VPH	2.9		mg/kg	25
002	CMR-WB09-6.0-6.75-190617	Solid	TPH	Montana VPH	280		mg/kg	26
002	CMR-WB09-6.0-6.75-190617	Solid	Arsenic	6020B	7.8		mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Barium	6020B	220		mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Beryllium	6020B	0.60		mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Cadmium	6020B	0.15		mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Chromium	6020B	14	B	mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Cobalt	6020B	4.6		mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Copper	6020B	11		mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Lead	6020B	9.3		mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Mercury	7471B	0.025	J	mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Nickel	6020B	11		mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Vanadium	6020B	32		mg/kg	27
002	CMR-WB09-6.0-6.75-190617	Solid	Zinc	6020B	42		mg/kg	27
003	CMR-WB08-5.0-6.0-190617	Solid	Toluene	8260B	150	J	ug/kg	28
003	CMR-WB08-5.0-6.0-190617	Solid	Anthracene	8270D	4.2	J	ug/kg	30
003	CMR-WB08-5.0-6.0-190617	Solid	Benzo(b)fluoranthene	8270D	8.2	J	ug/kg	30
003	CMR-WB08-5.0-6.0-190617	Solid	Fluoranthene	8270D	7.4	J	ug/kg	30

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-WB08-5.0-6.0-190617	Solid	Phenanthrene	8270D	7.6	J	ug/kg	31
003	CMR-WB08-5.0-6.0-190617	Solid	Pyrene	8270D	11	J	ug/kg	31
003	CMR-WB08-5.0-6.0-190617	Solid	C19 - C36 Aliphatics	Montana EPH	190		mg/kg	32
003	CMR-WB08-5.0-6.0-190617	Solid	C9 - C18 Aliphatics	Montana EPH	420		mg/kg	32
003	CMR-WB08-5.0-6.0-190617	Solid	C11 - C22 Aromatics	Montana EPH	32		mg/kg	33
003	CMR-WB08-5.0-6.0-190617	Solid	C5 - C8 Aliphatics,	Montana VPH	1.3	J	mg/kg	34
003	CMR-WB08-5.0-6.0-190617	Solid	C9 - C12 Aliphatics,	Montana VPH	87		mg/kg	34
003	CMR-WB08-5.0-6.0-190617	Solid	C9 - C10 Aromatics	Montana VPH	59		mg/kg	35
003	CMR-WB08-5.0-6.0-190617	Solid	Ethylbenzene	Montana VPH	0.16	J	mg/kg	35
003	CMR-WB08-5.0-6.0-190617	Solid	Naphthalene	Montana VPH	1.5		mg/kg	35
003	CMR-WB08-5.0-6.0-190617	Solid	o - Xylenes	Montana VPH	0.40		mg/kg	35
003	CMR-WB08-5.0-6.0-190617	Solid	TPH	Montana VPH	130		mg/kg	36
003	CMR-WB08-5.0-6.0-190617	Solid	Arsenic	6020B	8.7		mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Barium	6020B	180		mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Beryllium	6020B	0.46		mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Cadmium	6020B	0.33		mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Chromium	6020B	12	B	mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Cobalt	6020B	4.4		mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Copper	6020B	22		mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Lead	6020B	12		mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Mercury	7471B	0.034	J	mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Nickel	6020B	8.9		mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Silver	6020B	0.096	J	mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Vanadium	6020B	26		mg/kg	37
003	CMR-WB08-5.0-6.0-190617	Solid	Zinc	6020B	70		mg/kg	37
004	CMR-WB07-5.0-6.0-190617	Solid	Acetone	8260B	13	J	ug/kg	38
004	CMR-WB07-5.0-6.0-190617	Solid	Benzo(a)anthracene	8270D	1.3	J	ug/kg	40
004	CMR-WB07-5.0-6.0-190617	Solid	Benzo(a)pyrene	8270D	1.4	J	ug/kg	40
004	CMR-WB07-5.0-6.0-190617	Solid	Benzo(b)fluoranthene	8270D	3.6		ug/kg	40
004	CMR-WB07-5.0-6.0-190617	Solid	Benzo(k)fluoranthene	8270D	1.1	J	ug/kg	40
004	CMR-WB07-5.0-6.0-190617	Solid	Chrysene	8270D	1.4	J	ug/kg	40
004	CMR-WB07-5.0-6.0-190617	Solid	Fluoranthene	8270D	2.5	J	ug/kg	40
004	CMR-WB07-5.0-6.0-190617	Solid	2-Methylnaphthalene	8270D	1.6	J	ug/kg	41
004	CMR-WB07-5.0-6.0-190617	Solid	Naphthalene	8270D	1.6	J	ug/kg	41
004	CMR-WB07-5.0-6.0-190617	Solid	Phenanthrene	8270D	2.7	J	ug/kg	41
004	CMR-WB07-5.0-6.0-190617	Solid	Pyrene	8270D	2.3	J	ug/kg	41
004	CMR-WB07-5.0-6.0-190617	Solid	C5 - C8 Aliphatics,	Montana VPH	1.3	J	mg/kg	44
004	CMR-WB07-5.0-6.0-190617	Solid	Arsenic	6020B	7.8		mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Barium	6020B	250		mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Beryllium	6020B	0.48		mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Cadmium	6020B	0.63		mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Chromium	6020B	12	B	mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Cobalt	6020B	4.7		mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Copper	6020B	19		mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Lead	6020B	18		mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Mercury	7471B	0.069	J	mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Nickel	6020B	10		mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Silver	6020B	0.13	J	mg/kg	47

Detection Summary (Continued)

Lot Number: UF18024

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
004	CMR-WB07-5.0-6.0-190617	Solid	Vanadium	6020B	27		mg/kg	47
004	CMR-WB07-5.0-6.0-190617	Solid	Zinc	6020B	110		mg/kg	47

(95 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-001
Description: CMR-WB09-2.0-3.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1045
% Solids: 84.0 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/21/2019 1250	JM1		20330	6.58

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	38		18	7.2	ug/kg	1
Benzene	71-43-2	8260B	ND		4.5	1.8	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.5	1.8	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.5	1.8	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.5	1.8	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.5	2.7	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		18	3.6	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.5	1.8	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.5	1.8	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.5	1.8	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.5	1.8	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.5	1.8	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.5	2.7	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.5	1.8	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.5	1.8	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.5	1.8	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.5	1.8	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.5	2.7	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.5	1.8	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.5	1.8	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.5	1.8	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.5	1.8	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.5	1.8	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.5	1.8	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.5	1.8	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		230	23	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.5	1.8	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.0	3.6	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.5	1.8	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.5	1.8	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.5	1.8	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.0	3.6	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.5	1.8	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.5	1.8	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.5	1.8	ug/kg	1
Styrene	100-42-5	8260B	ND		4.5	1.8	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.5	1.8	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.5	1.8	ug/kg	1
Toluene	108-88-3	8260B	ND		4.5	1.8	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.5	1.8	ug/kg	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
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H = Out of holding time
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-001
Description: CMR-WB09-2.0-3.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1045
% Solids: 84.0 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/21/2019 1250	JM1		20330	6.58

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.5	1.8	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.5	1.8	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.5	1.8	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.5	1.8	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.5	1.8	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.5	1.8	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.5	2.7	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.0	3.6	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.5	1.8	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.5	1.8	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		102	53-142
Bromofluorobenzene		102	47-138
Toluene-d8		115	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-001
Description: CMR-WB09-2.0-3.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1045
% Solids: 84.0 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/22/2019 2258	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		16	4.8	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		16	5.5	ug/kg	1
Anthracene	120-12-7	8270D	ND		16	3.0	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		16	3.4	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		16	3.8	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		16	2.9	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		16	3.8	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		16	2.8	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		76	29	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		76	29	ug/kg	1
Carbazole	86-74-8	8270D	ND		76	29	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		76	29	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		76	29	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		76	29	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		76	29	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		76	29	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		76	29	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		76	29	ug/kg	1
Chrysene	218-01-9	8270D	ND		16	2.6	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		16	3.0	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		76	29	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		390	150	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		390	150	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		390	150	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		76	29	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		76	29	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		76	29	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		76	43	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		76	29	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		76	29	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		390	150	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		390	150	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		160	58	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		160	58	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		76	29	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		390	150	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		16	2.4	ug/kg	1
Fluorene	86-73-7	8270D	ND		16	3.3	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		76	29	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		76	29	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		390	150	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		76	29	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		16	5.8	ug/kg	1
Isophorone	78-59-1	8270D	ND		76	29	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-001
Description: CMR-WB09-2.0-3.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1045
% Solids: 84.0 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/22/2019 2258	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	5.9	J	16	5.8	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		76	29	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		160	58	ug/kg	1
Naphthalene	91-20-3	8270D	ND		16	5.6	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		160	58	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		160	58	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		160	58	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		76	29	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		160	58	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		390	150	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		76	29	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		76	29	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		390	150	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		16	4.2	ug/kg	1
Phenol	108-95-2	8270D	ND		76	29	ug/kg	1
Pyrene	129-00-0	8270D	ND		16	2.9	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		190	58	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		390	58	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		390	150	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		76	29	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		76	29	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		39	33-102
2-Fluorophenol	N	33	35-115
Nitrobenzene-d5		37	22-109
Phenol-d5	N	30	33-122
Terphenyl-d14		48	41-120
2,4,6-Tribromophenol		34	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-001
Description: CMR-WB09-2.0-3.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1045
% Solids: 84.0 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/26/2019 2000	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		70	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-001
Description: CMR-WB09-2.0-3.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1045
% Solids: 84.0 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 0552	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		80	40-140
2-Fluorobiphenyl (fractionation 1)		83	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
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DL = Detection Limit
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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-001
Description: CMR-WB09-2.0-3.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1045
% Solids: 84.0 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1411	JJG		20855

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.93	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.93	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-001
Description: CMR-WB09-2.0-3.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1045
% Solids: 84.0 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1411	JJG		20854

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.31	0.042	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.6	0.62	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.31	0.039	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.31	0.067	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.31	0.16	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.31	0.050	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.31	0.070	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.31	0.035	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF18024-001
Description: CMR-WB09-2.0-3.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1045
% Solids: 84.0 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1411	JJG		20853

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB09-2.0-3.0-190617
Date Sampled: 06/17/2019 1045
Date Received: 06/18/2019

Laboratory ID: UF18024-001
Matrix: Solid
% Solids: 84.0 06/19/2019 0057

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/25/2019 2216	BNW	06/24/2019 1157	20445
1	7471B	7471B	1	06/25/2019 1024	TJW	06/24/2019 1815	20448

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.57	0.23	mg/kg	1
Arsenic	7440-38-2	6020B	13		0.57	0.23	mg/kg	1
Barium	7440-39-3	6020B	230		1.5	0.35	mg/kg	1
Beryllium	7440-41-7	6020B	0.95		0.11	0.039	mg/kg	1
Cadmium	7440-43-9	6020B	0.21		0.15	0.028	mg/kg	1
Chromium	7440-47-3	6020B	21	B	1.5	0.63	mg/kg	1
Cobalt	7440-48-4	6020B	6.2		1.5	0.34	mg/kg	1
Copper	7440-50-8	6020B	15		1.5	0.37	mg/kg	1
Lead	7439-92-1	6020B	10		0.28	0.077	mg/kg	1
Mercury	7439-97-6	7471B	0.029	J	0.095	0.023	mg/kg	1
Nickel	7440-02-0	6020B	16		1.5	0.34	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.5	0.54	mg/kg	1
Silver	7440-22-4	6020B	0.083	J	0.28	0.068	mg/kg	1
Vanadium	7440-62-2	6020B	51		1.5	0.28	mg/kg	1
Zinc	7440-66-6	6020B	53		2.8	0.57	mg/kg	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-002
Description: CMR-WB09-6.0-6.75-190617
Matrix: Solid
Date Sampled: 06/17/2019 1050
% Solids: 83.1 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	1	06/28/2019 1938	JM1		21175	6.88

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1100	220	ug/kg	2
Benzene	71-43-2	8260B	ND		270	110	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		270	110	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		270	110	ug/kg	2
Bromoform	75-25-2	8260B	ND		270	110	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		270	110	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		1100	220	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		270	110	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		270	110	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		270	110	ug/kg	2
Chloroethane	75-00-3	8260B	ND		270	110	ug/kg	2
Chloroform	67-66-3	8260B	ND		270	110	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		270	110	ug/kg	2
Cyclohexane	110-82-7	8260B	ND		270	110	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		270	110	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		270	110	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		270	110	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		270	110	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		270	110	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		270	110	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		270	110	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		270	110	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		270	110	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		270	110	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		270	110	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		270	110	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		270	110	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		270	110	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		270	110	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		13000	1300	ug/kg	2
Ethylbenzene	100-41-4	8260B	910		270	110	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		540	220	ug/kg	2
Isopropylbenzene	98-82-8	8260B	270		270	110	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		270	110	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		270	110	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		540	220	ug/kg	2
Methylcyclohexane	108-87-2	8260B	520		270	110	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		270	110	ug/kg	2
Naphthalene	91-20-3	8260B	ND		270	110	ug/kg	2
Styrene	100-42-5	8260B	ND		270	110	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		270	110	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		270	110	ug/kg	2
Toluene	108-88-3	8260B	ND		270	110	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		270	110	ug/kg	2

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-002
Description: CMR-WB09-6.0-6.75-190617
Matrix: Solid
Date Sampled: 06/17/2019 1050
% Solids: 83.1 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035 High	8260B	1	06/28/2019 1938	JM1		21175	6.88

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		270	110	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		270	110	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		270	110	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		270	110	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		270	110	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		270	110	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		270	110	ug/kg	2
Xylenes (total)	1330-20-7	8260B	ND		540	220	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	ND		270	110	ug/kg	2
o - Xylenes	95-47-6	8260B	ND		270	110	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		99	53-142
Bromofluorobenzene		100	47-138
Toluene-d8		101	68-124

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-002
Description: CMR-WB09-6.0-6.75-190617
Matrix: Solid
Date Sampled: 06/17/2019 1050
% Solids: 83.1 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	200	06/23/2019 0305	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		650	200	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		650	230	ug/kg	1
Anthracene	120-12-7	8270D	ND		650	120	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		650	140	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		650	160	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		650	120	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		650	160	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		650	120	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		3100	1200	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		3100	1200	ug/kg	1
Carbazole	86-74-8	8270D	ND		3100	1200	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		3100	1200	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		3100	1200	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		3100	1200	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		3100	1200	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		3100	1200	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		3100	1200	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		3100	1200	ug/kg	1
Chrysene	218-01-9	8270D	ND		650	110	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		650	120	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		3100	1200	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		16000	6000	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		16000	6000	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		16000	6000	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		3100	1200	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		3100	1200	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		3100	1200	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		3100	1800	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		3100	1200	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		3100	1200	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		16000	6000	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		16000	6000	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		6500	2400	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		6500	2400	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		3100	1200	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		16000	6000	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		650	100	ug/kg	1
Fluorene	86-73-7	8270D	ND		650	140	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		3100	1200	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		3100	1200	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		16000	6000	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		3100	1200	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		650	240	ug/kg	1
Isophorone	78-59-1	8270D	ND		3100	1200	ug/kg	1

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W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-002
Description: CMR-WB09-6.0-6.75-190617
Matrix: Solid
Date Sampled: 06/17/2019 1050
% Solids: 83.1 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	200	06/23/2019 0305	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	290	J	650	240	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		3100	1200	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		6500	2400	ug/kg	1
Naphthalene	91-20-3	8270D	ND		650	230	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		6500	2400	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		6500	2400	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		6500	2400	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		3100	1200	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		6500	2400	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		16000	6000	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		3100	1200	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		3100	1200	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		16000	6000	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		650	170	ug/kg	1
Phenol	108-95-2	8270D	ND		3100	1200	ug/kg	1
Pyrene	129-00-0	8270D	ND		650	120	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		7900	2400	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		16000	2400	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		16000	6000	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		3100	1200	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		3100	1200	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		55	33-102
2-Fluorophenol	N	25	35-115
Nitrobenzene-d5		89	22-109
Phenol-d5		64	33-122
Terphenyl-d14		65	41-120
2,4,6-Tribromophenol	N	9.0	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-002
Description: CMR-WB09-6.0-6.75-190617
Matrix: Solid
Date Sampled: 06/17/2019 1050
% Solids: 83.1 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/26/2019 2030	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	480		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	1300		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		59	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-002
Description: CMR-WB09-6.0-6.75-190617
Matrix: Solid
Date Sampled: 06/17/2019 1050
% Solids: 83.1 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 0622	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	170		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		89	40-140
2-Fluorobiphenyl (fractionation 1)		103	40-140
o - Terphenyl (aromatic)		87	40-140

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-002
Description: CMR-WB09-6.0-6.75-190617
Matrix: Solid
Date Sampled: 06/17/2019 1050
% Solids: 83.1 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1439	JJG		20855

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	33		4.3	0.86	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	130		4.3	0.86	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	463	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-002
Description: CMR-WB09-6.0-6.75-190617
Matrix: Solid
Date Sampled: 06/17/2019 1050
% Solids: 83.1 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1439	JJG		20854

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.29	0.039	mg/kg	1
C9 - C10 Aromatics		Montana VPH	82		1.4	0.57	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	2.2		0.29	0.036	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.29	0.062	mg/kg	1
Naphthalene	91-20-3	Montana VPH	2.3		0.29	0.15	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.29	0.046	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.29	0.064	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	2.9		0.29	0.032	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	258	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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DL = Detection Limit
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF18024-002
Description: CMR-WB09-6.0-6.75-190617
Matrix: Solid
Date Sampled: 06/17/2019 1050
% Solids: 83.1 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1439	JJG		20853

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	280		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	654	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB09-6.0-6.75-190617
Date Sampled: 06/17/2019 1050
Date Received: 06/18/2019

Laboratory ID: UF18024-002
Matrix: Solid
% Solids: 83.1 06/19/2019 0057

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/25/2019 2222	BNW	06/24/2019 1157	20445
1	7471B	7471B	1	06/25/2019 1027	TJW	06/24/2019 1815	20448

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.54	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	7.8		0.54	0.22	mg/kg	1
Barium	7440-39-3	6020B	220		1.4	0.33	mg/kg	1
Beryllium	7440-41-7	6020B	0.60		0.11	0.037	mg/kg	1
Cadmium	7440-43-9	6020B	0.15		0.14	0.027	mg/kg	1
Chromium	7440-47-3	6020B	14	B	1.4	0.60	mg/kg	1
Cobalt	7440-48-4	6020B	4.6		1.4	0.32	mg/kg	1
Copper	7440-50-8	6020B	11		1.4	0.35	mg/kg	1
Lead	7439-92-1	6020B	9.3		0.27	0.073	mg/kg	1
Mercury	7439-97-6	7471B	0.025	J	0.086	0.021	mg/kg	1
Nickel	7440-02-0	6020B	11		1.4	0.32	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.51	mg/kg	1
Silver	7440-22-4	6020B	ND		0.27	0.065	mg/kg	1
Vanadium	7440-62-2	6020B	32		1.4	0.27	mg/kg	1
Zinc	7440-66-6	6020B	42		2.7	0.54	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-003
Description: CMR-WB08-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1455
% Solids: 84.9 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/21/2019 1709	JM1		20364	5.85

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1200	240	ug/kg	1
Benzene	71-43-2	8260B	ND		300	120	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		300	120	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		300	120	ug/kg	1
Bromoform	75-25-2	8260B	ND		300	120	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		300	120	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1200	240	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		300	120	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		300	120	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		300	120	ug/kg	1
Chloroethane	75-00-3	8260B	ND		300	120	ug/kg	1
Chloroform	67-66-3	8260B	ND		300	120	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		300	120	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		300	120	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		300	120	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		300	120	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		300	120	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		300	120	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		300	120	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		300	120	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		300	120	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		300	120	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		300	120	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		300	120	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		300	120	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		300	120	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		300	120	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		300	120	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		300	120	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		15000	1500	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		300	120	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		590	240	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		300	120	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		300	120	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		300	120	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		590	240	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		300	120	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		300	120	ug/kg	1
Naphthalene	91-20-3	8260B	ND		300	120	ug/kg	1
Styrene	100-42-5	8260B	ND		300	120	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		300	120	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		300	120	ug/kg	1
Toluene	108-88-3	8260B	150	J	300	120	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		300	120	ug/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-003
Description: CMR-WB08-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1455
% Solids: 84.9 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/21/2019 1709	JM1		20364	5.85

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		300	120	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		300	120	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		300	120	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		300	120	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		300	120	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		300	120	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		300	120	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		590	240	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		300	120	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		300	120	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		120	53-142
Bromofluorobenzene		120	47-138
Toluene-d8		115	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-003
Description: CMR-WB08-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1455
% Solids: 84.9 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/22/2019 2347	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		16	4.9	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		16	5.6	ug/kg	1
Anthracene	120-12-7	8270D	4.2	J	16	3.0	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		16	3.5	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		16	3.9	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	8.2	J	16	2.9	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		16	3.8	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		16	2.8	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		76	29	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		76	29	ug/kg	1
Carbazole	86-74-8	8270D	ND		76	29	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		76	29	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		76	29	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		76	29	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		76	29	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		76	29	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		76	29	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		76	29	ug/kg	1
Chrysene	218-01-9	8270D	ND		16	2.6	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		16	3.0	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		76	29	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		390	150	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		390	150	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		390	150	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		76	29	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		76	29	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		76	29	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		76	43	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		76	29	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		76	29	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		390	150	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		390	150	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		160	58	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		160	58	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		76	29	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		390	150	ug/kg	1
Fluoranthene	206-44-0	8270D	7.4	J	16	2.5	ug/kg	1
Fluorene	86-73-7	8270D	ND		16	3.3	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		76	29	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		76	29	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		390	150	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		76	29	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		16	5.8	ug/kg	1
Isophorone	78-59-1	8270D	ND		76	29	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-003
Description: CMR-WB08-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1455
% Solids: 84.9 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/22/2019 2347	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		16	5.8	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		76	29	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		160	58	ug/kg	1
Naphthalene	91-20-3	8270D	ND		16	5.7	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		160	58	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		160	58	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		160	58	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		76	29	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		160	58	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		390	150	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		76	29	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		76	29	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		390	150	ug/kg	1
Phenanthrene	85-01-8	8270D	7.6	J	16	4.2	ug/kg	1
Phenol	108-95-2	8270D	ND		76	29	ug/kg	1
Pyrene	129-00-0	8270D	11	J	16	2.9	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		190	58	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		390	58	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		390	150	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		76	29	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		76	29	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		57	33-102
2-Fluorophenol		44	35-115
Nitrobenzene-d5		57	22-109
Phenol-d5		44	33-122
Terphenyl-d14		75	41-120
2,4,6-Tribromophenol	N	133	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-003
Description: CMR-WB08-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1455
% Solids: 84.9 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/26/2019 2100	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	190		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	420		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		61	40-140

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-003
Description: CMR-WB08-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1455
% Solids: 84.9 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 0651	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	32		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		73	40-140
2-Fluorobiphenyl (fractionation 1)		90	40-140
o - Terphenyl (aromatic)		78	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation	Laboratory ID: UF18024-003
Description: CMR-WB08-5.0-6.0-190617	Matrix: Solid
Date Sampled: 06/17/2019 1455	% Solids: 84.9 06/19/2019 0057
Date Received: 06/18/2019	

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1507	JJG		20855

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	1.3	J	4.2	0.84	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	87		4.2	0.84	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	893	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-003
Description: CMR-WB08-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1455
% Solids: 84.9 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1507	JJG		20854

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.28	0.038	mg/kg	1
C9 - C10 Aromatics		Montana VPH	59		1.4	0.56	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	0.16	J	0.28	0.035	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.28	0.060	mg/kg	1
Naphthalene	91-20-3	Montana VPH	1.5		0.28	0.15	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.28	0.045	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.28	0.063	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	0.40		0.28	0.031	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	283	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF18024-003
Description: CMR-WB08-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1455
% Solids: 84.9 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1507	JJG		20853

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	130		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	466	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB08-5.0-6.0-190617
Date Sampled: 06/17/2019 1455
Date Received: 06/18/2019

Laboratory ID: UF18024-003
Matrix: Solid
% Solids: 84.9 06/19/2019 0057

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/25/2019 2228	BNW	06/24/2019 1157	20445
1	7471B	7471B	1	06/25/2019 1030	TJW	06/24/2019 1815	20448

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.53	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	8.7		0.53	0.21	mg/kg	1
Barium	7440-39-3	6020B	180		1.4	0.33	mg/kg	1
Beryllium	7440-41-7	6020B	0.46		0.11	0.036	mg/kg	1
Cadmium	7440-43-9	6020B	0.33		0.14	0.026	mg/kg	1
Chromium	7440-47-3	6020B	12	B	1.4	0.58	mg/kg	1
Cobalt	7440-48-4	6020B	4.4		1.4	0.32	mg/kg	1
Copper	7440-50-8	6020B	22		1.4	0.34	mg/kg	1
Lead	7439-92-1	6020B	12		0.26	0.071	mg/kg	1
Mercury	7439-97-6	7471B	0.034	J	0.089	0.021	mg/kg	1
Nickel	7440-02-0	6020B	8.9		1.4	0.32	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.50	mg/kg	1
Silver	7440-22-4	6020B	0.096	J	0.26	0.063	mg/kg	1
Vanadium	7440-62-2	6020B	26		1.4	0.26	mg/kg	1
Zinc	7440-66-6	6020B	70		2.6	0.53	mg/kg	1

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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-004
Description: CMR-WB07-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1540
% Solids: 82.4 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	06/28/2019 1437	JM1		21174	5.12

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	13	J	24	9.5	ug/kg	2
Benzene	71-43-2	8260B	ND		5.9	2.4	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		5.9	2.4	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		5.9	2.4	ug/kg	2
Bromoform	75-25-2	8260B	ND		5.9	2.4	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.9	3.6	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		24	4.7	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		5.9	2.4	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		5.9	2.4	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		5.9	2.4	ug/kg	2
Chloroethane	75-00-3	8260B	ND		5.9	2.4	ug/kg	2
Chloroform	67-66-3	8260B	ND		5.9	2.4	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.9	3.6	ug/kg	2
Cyclohexane	110-82-7	8260B	ND		5.9	2.4	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.9	2.4	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		5.9	2.4	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.9	2.4	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.9	2.4	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.9	2.4	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.9	2.4	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		5.9	3.6	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		5.9	2.4	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		5.9	2.4	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		5.9	2.4	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.9	2.4	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.9	2.4	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		5.9	2.4	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.9	2.4	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.9	2.4	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		300	30	ug/kg	2
Ethylbenzene	100-41-4	8260B	ND		5.9	2.4	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		12	4.7	ug/kg	2
Isopropylbenzene	98-82-8	8260B	ND		5.9	2.4	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		5.9	2.4	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.9	2.4	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		12	4.7	ug/kg	2
Methylcyclohexane	108-87-2	8260B	ND		5.9	2.4	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		5.9	2.4	ug/kg	2
Naphthalene	91-20-3	8260B	ND		5.9	2.4	ug/kg	2
Styrene	100-42-5	8260B	ND		5.9	2.4	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.9	2.4	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		5.9	2.4	ug/kg	2
Toluene	108-88-3	8260B	ND		5.9	2.4	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.9	2.4	ug/kg	2

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-004
Description: CMR-WB07-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1540
% Solids: 82.4 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	06/28/2019 1437	JM1		21174	5.12

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.9	2.4	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.9	2.4	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.9	2.4	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.9	2.4	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		5.9	2.4	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		5.9	2.4	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		5.9	3.6	ug/kg	2
Xylenes (total)	1330-20-7	8260B	ND		12	4.7	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	ND		5.9	2.4	ug/kg	2
o - Xylenes	95-47-6	8260B	ND		5.9	2.4	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		106	68-124

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-004
Description: CMR-WB07-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1540
% Solids: 82.4 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	06/23/2019 0330	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		3.2	0.99	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		3.2	1.1	ug/kg	1
Anthracene	120-12-7	8270D	ND		3.2	0.61	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	1.3	J	3.2	0.71	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	1.4	J	3.2	0.79	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	3.6		3.2	0.60	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		3.2	0.78	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	1.1	J	3.2	0.57	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		16	6.0	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		16	6.0	ug/kg	1
Carbazole	86-74-8	8270D	ND		16	6.0	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		16	6.0	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		16	6.0	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		16	6.0	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		16	6.0	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		16	6.0	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		16	6.0	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		16	6.0	ug/kg	1
Chrysene	218-01-9	8270D	1.4	J	3.2	0.54	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		3.2	0.61	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		16	6.0	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		80	30	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		80	30	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		80	30	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		16	6.0	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		16	6.0	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		16	6.0	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		16	8.9	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		16	6.0	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		16	6.0	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		80	30	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		80	30	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		32	12	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		32	12	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		16	6.0	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		80	30	ug/kg	1
Fluoranthene	206-44-0	8270D	2.5	J	3.2	0.50	ug/kg	1
Fluorene	86-73-7	8270D	ND		3.2	0.68	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		16	6.0	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		16	6.0	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		80	30	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		16	6.0	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		3.2	1.2	ug/kg	1
Isophorone	78-59-1	8270D	ND		16	6.0	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-004
Description: CMR-WB07-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1540
% Solids: 82.4 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	06/23/2019 0330	JCG	06/19/2019 1230	19960

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	1.6	J	3.2	1.2	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		16	6.0	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		32	12	ug/kg	1
Naphthalene	91-20-3	8270D	1.6	J	3.2	1.2	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		32	12	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		32	12	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		32	12	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		16	6.0	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		32	12	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		80	30	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		16	6.0	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		16	6.0	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		80	30	ug/kg	1
Phenanthrene	85-01-8	8270D	2.7	J	3.2	0.86	ug/kg	1
Phenol	108-95-2	8270D	ND		16	6.0	ug/kg	1
Pyrene	129-00-0	8270D	2.3	J	3.2	0.60	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		40	12	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		80	12	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		80	30	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		16	6.0	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		16	6.0	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		50	33-102
2-Fluorophenol		43	35-115
Nitrobenzene-d5		45	22-109
Phenol-d5		49	33-122
Terphenyl-d14		60	41-120
2,4,6-Tribromophenol		48	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-004
Description: CMR-WB07-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1540
% Solids: 82.4 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/26/2019 2129	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-004
Description: CMR-WB07-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1540
% Solids: 82.4 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 0938	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		81	40-140
o - Terphenyl (aromatic)		72	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-004
Description: CMR-WB07-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1540
% Solids: 82.4 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1535	JJG		20855

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	1.3	J	5.3	1.1	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		5.3	1.1	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		110	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18024-004
Description: CMR-WB07-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1540
% Solids: 82.4 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1535	JJG		20854

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.35	0.048	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.8	0.70	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.35	0.044	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.35	0.076	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.35	0.18	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.35	0.056	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.35	0.079	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.35	0.039	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF18024-004
Description: CMR-WB07-5.0-6.0-190617
Matrix: Solid
Date Sampled: 06/17/2019 1540
% Solids: 82.4 06/19/2019 0057
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1535	JJG		20853

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		108	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB07-5.0-6.0-190617
Date Sampled: 06/17/2019 1540
Date Received: 06/18/2019

Laboratory ID: UF18024-004
Matrix: Solid
% Solids: 82.4 06/19/2019 0057

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/25/2019 2234	BNW	06/24/2019 1157	20445
1	7471B	7471B	1	06/25/2019 1032	TJW	06/24/2019 1815	20448

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.61	0.24	mg/kg	1
Arsenic	7440-38-2	6020B	7.8		0.61	0.24	mg/kg	1
Barium	7440-39-3	6020B	250		1.6	0.38	mg/kg	1
Beryllium	7440-41-7	6020B	0.48		0.12	0.041	mg/kg	1
Cadmium	7440-43-9	6020B	0.63		0.16	0.030	mg/kg	1
Chromium	7440-47-3	6020B	12	B	1.6	0.67	mg/kg	1
Cobalt	7440-48-4	6020B	4.7		1.6	0.36	mg/kg	1
Copper	7440-50-8	6020B	19		1.6	0.39	mg/kg	1
Lead	7439-92-1	6020B	18		0.30	0.083	mg/kg	1
Mercury	7439-97-6	7471B	0.069	J	0.092	0.022	mg/kg	1
Nickel	7440-02-0	6020B	10		1.6	0.36	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.6	0.57	mg/kg	1
Silver	7440-22-4	6020B	0.13	J	0.30	0.073	mg/kg	1
Vanadium	7440-62-2	6020B	27		1.6	0.30	mg/kg	1
Zinc	7440-66-6	6020B	110		3.0	0.61	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-005
Description: TB-13-20190617
Matrix: Aqueous
Date Sampled: 06/17/2019
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1330	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18024-005
Description: TB-13-20190617
Matrix: Aqueous
Date Sampled: 06/17/2019
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1330	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		110	70-130
Toluene-d8		111	70-130

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20330-001
Batch: 20330
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	06/21/2019 0954
Benzene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Bromochloromethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Bromoform	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	06/21/2019 0954
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	06/21/2019 0954
Carbon disulfide	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Chlorobenzene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Chloroethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Chloroform	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	06/21/2019 0954
Cyclohexane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	06/21/2019 0954
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,4-Dioxane	ND		1	250	25	ug/kg	06/21/2019 0954
Ethylbenzene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
2-Hexanone	ND		1	10	4.0	ug/kg	06/21/2019 0954
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Methyl acetate	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	06/21/2019 0954
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Methylene chloride	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Naphthalene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Styrene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Toluene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20330-001
Batch: 20330
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Trichloroethene	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
Vinyl chloride	ND		1	5.0	3.0	ug/kg	06/21/2019 0954
Xylenes (total)	ND		1	10	4.0	ug/kg	06/21/2019 0954
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	06/21/2019 0954
o - Xylenes	ND		1	5.0	2.0	ug/kg	06/21/2019 0954

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		102	53-142
Bromofluorobenzene		115	47-138
Toluene-d8		109	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20330-002
Batch: 20330
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	56	N	1	56	60-140	06/21/2019 0932
Benzene	50	52		1	104	70-130	06/21/2019 0932
Bromochloromethane	50	49		1	99	70-130	06/21/2019 0932
Bromodichloromethane	50	49		1	99	70-130	06/21/2019 0932
Bromoform	50	48		1	97	70-130	06/21/2019 0932
Bromomethane (Methyl bromide)	50	57		1	114	70-130	06/21/2019 0932
2-Butanone (MEK)	100	72		1	72	60-140	06/21/2019 0932
Carbon disulfide	50	51		1	103	70-130	06/21/2019 0932
Carbon tetrachloride	50	53		1	105	70-130	06/21/2019 0932
Chlorobenzene	50	50		1	100	70-130	06/21/2019 0932
Chloroethane	50	61		1	123	70-130	06/21/2019 0932
Chloroform	50	50		1	100	70-130	06/21/2019 0932
Chloromethane (Methyl chloride)	50	53		1	105	60-140	06/21/2019 0932
Cyclohexane	50	50		1	100	70-130	06/21/2019 0932
1,2-Dibromo-3-chloropropane (DBCP)	50	48		1	96	70-130	06/21/2019 0932
Dibromochloromethane	50	50		1	101	70-130	06/21/2019 0932
1,2-Dibromoethane (EDB)	50	50		1	101	70-130	06/21/2019 0932
1,2-Dichlorobenzene	50	49		1	98	70-130	06/21/2019 0932
1,3-Dichlorobenzene	50	49		1	99	70-130	06/21/2019 0932
1,4-Dichlorobenzene	50	50		1	99	70-130	06/21/2019 0932
Dichlorodifluoromethane	50	66		1	132	60-140	06/21/2019 0932
1,1-Dichloroethane	50	50		1	100	70-130	06/21/2019 0932
1,2-Dichloroethane	50	50		1	100	70-130	06/21/2019 0932
1,1-Dichloroethene	50	56		1	112	70-130	06/21/2019 0932
cis-1,2-Dichloroethene	50	52		1	103	70-130	06/21/2019 0932
trans-1,2-Dichloroethene	50	54		1	108	70-130	06/21/2019 0932
1,2-Dichloropropane	50	50		1	100	70-130	06/21/2019 0932
cis-1,3-Dichloropropene	50	50		1	101	70-130	06/21/2019 0932
trans-1,3-Dichloropropene	50	52		1	103	70-130	06/21/2019 0932
1,4-Dioxane	500	510		1	102	60-140	06/21/2019 0932
Ethylbenzene	50	53		1	107	70-130	06/21/2019 0932
2-Hexanone	100	77		1	77	70-130	06/21/2019 0932
Isopropylbenzene	50	54		1	107	70-130	06/21/2019 0932
Methyl acetate	50	39		1	78	70-130	06/21/2019 0932
Methyl tertiary butyl ether (MTBE)	50	47		1	95	70-130	06/21/2019 0932
4-Methyl-2-pentanone	100	93		1	93	70-130	06/21/2019 0932
Methylcyclohexane	50	53		1	105	70-130	06/21/2019 0932
Methylene chloride	50	48		1	97	70-130	06/21/2019 0932
Naphthalene	50	49		1	99	70-130	06/21/2019 0932
Styrene	50	52		1	104	70-130	06/21/2019 0932
1,1,2,2-Tetrachloroethane	50	51		1	101	70-130	06/21/2019 0932
Tetrachloroethene	50	54		1	107	70-130	06/21/2019 0932
Toluene	50	53		1	105	70-130	06/21/2019 0932
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	48		1	95	70-130	06/21/2019 0932

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20330-002
Batch: 20330
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	53		1	106	70-130	06/21/2019 0932
1,2,4-Trichlorobenzene	50	53		1	107	70-130	06/21/2019 0932
1,1,1-Trichloroethane	50	53		1	106	70-130	06/21/2019 0932
1,1,2-Trichloroethane	50	50		1	101	70-130	06/21/2019 0932
Trichloroethene	50	51		1	103	70-130	06/21/2019 0932
Trichlorofluoromethane	50	58		1	116	70-130	06/21/2019 0932
Vinyl chloride	50	54		1	107	70-130	06/21/2019 0932
Xylenes (total)	100	110		1	106	70-130	06/21/2019 0932
m+p - Xylenes	50	53		1	107	70-130	06/21/2019 0932
o - Xylenes	50	52		1	105	70-130	06/21/2019 0932

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		100	53-142
Bromofluorobenzene		112	47-138
Toluene-d8		109	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20364-001
Batch: 20364
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	06/20/2019 1758
Benzene	ND		1	250	100	ug/kg	06/20/2019 1758
Bromochloromethane	ND		1	250	100	ug/kg	06/20/2019 1758
Bromodichloromethane	ND		1	250	100	ug/kg	06/20/2019 1758
Bromoform	ND		1	250	100	ug/kg	06/20/2019 1758
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	06/20/2019 1758
2-Butanone (MEK)	ND		1	1000	200	ug/kg	06/20/2019 1758
Carbon disulfide	ND		1	250	100	ug/kg	06/20/2019 1758
Carbon tetrachloride	ND		1	250	100	ug/kg	06/20/2019 1758
Chlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
Chloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
Chloroform	ND		1	250	100	ug/kg	06/20/2019 1758
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	06/20/2019 1758
Cyclohexane	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	06/20/2019 1758
Dibromochloromethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
Dichlorodifluoromethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,1-Dichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,1-Dichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dichloropropane	ND		1	250	100	ug/kg	06/20/2019 1758
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/20/2019 1758
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/20/2019 1758
1,4-Dioxane	ND		1	13000	1300	ug/kg	06/20/2019 1758
Ethylbenzene	ND		1	250	100	ug/kg	06/20/2019 1758
2-Hexanone	ND		1	500	200	ug/kg	06/20/2019 1758
Isopropylbenzene	ND		1	250	100	ug/kg	06/20/2019 1758
Methyl acetate	ND		1	250	100	ug/kg	06/20/2019 1758
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	06/20/2019 1758
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	06/20/2019 1758
Methylcyclohexane	ND		1	250	100	ug/kg	06/20/2019 1758
Methylene chloride	ND		1	250	100	ug/kg	06/20/2019 1758
Naphthalene	ND		1	250	100	ug/kg	06/20/2019 1758
Styrene	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
Tetrachloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
Toluene	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	06/20/2019 1758

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20364-001
Batch: 20364
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
Trichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
Trichlorofluoromethane	ND		1	250	100	ug/kg	06/20/2019 1758
Vinyl chloride	ND		1	250	100	ug/kg	06/20/2019 1758
Xylenes (total)	ND		1	500	200	ug/kg	06/20/2019 1758
m+p - Xylenes	ND		1	250	100	ug/kg	06/20/2019 1758
o - Xylenes	ND		1	250	100	ug/kg	06/20/2019 1758

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		98	53-142
Bromofluorobenzene		98	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20364-002
Batch: 20364
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	3000		1	60	60-140	06/21/2019 1050
Benzene	2500	2700		1	110	70-130	06/21/2019 1050
Bromochloromethane	2500	2600		1	106	70-130	06/21/2019 1050
Bromodichloromethane	2500	2700		1	106	70-130	06/21/2019 1050
Bromoform	2500	2300		1	94	70-130	06/21/2019 1050
Bromomethane (Methyl bromide)	2500	2500		1	98	70-130	06/21/2019 1050
2-Butanone (MEK)	5000	3700		1	74	60-140	06/21/2019 1050
Carbon disulfide	2500	2800		1	112	70-130	06/21/2019 1050
Carbon tetrachloride	2500	2900		1	115	70-130	06/21/2019 1050
Chlorobenzene	2500	2600		1	105	70-130	06/21/2019 1050
Chloroethane	2500	3000		1	119	70-130	06/21/2019 1050
Chloroform	2500	2700		1	110	70-130	06/21/2019 1050
Chloromethane (Methyl chloride)	2500	2400		1	95	60-140	06/21/2019 1050
Cyclohexane	2500	3000		1	120	70-130	06/21/2019 1050
1,2-Dibromo-3-chloropropane (DBCP)	2500	2300		1	91	70-130	06/21/2019 1050
Dibromochloromethane	2500	2600		1	104	70-130	06/21/2019 1050
1,2-Dibromoethane (EDB)	2500	2500		1	100	70-130	06/21/2019 1050
1,2-Dichlorobenzene	2500	2600		1	102	70-130	06/21/2019 1050
1,3-Dichlorobenzene	2500	2600		1	105	70-130	06/21/2019 1050
1,4-Dichlorobenzene	2500	2700		1	107	70-130	06/21/2019 1050
Dichlorodifluoromethane	2500	2300		1	92	60-140	06/21/2019 1050
1,1-Dichloroethane	2500	2800		1	111	70-130	06/21/2019 1050
1,2-Dichloroethane	2500	2600		1	104	70-130	06/21/2019 1050
1,1-Dichloroethene	2500	3200		1	130	70-130	06/21/2019 1050
cis-1,2-Dichloroethene	2500	2800		1	111	70-130	06/21/2019 1050
trans-1,2-Dichloroethene	2500	3000		1	121	70-130	06/21/2019 1050
1,2-Dichloropropane	2500	2700		1	106	70-130	06/21/2019 1050
cis-1,3-Dichloropropene	2500	2700		1	109	70-130	06/21/2019 1050
trans-1,3-Dichloropropene	2500	2500		1	99	70-130	06/21/2019 1050
1,4-Dioxane	25000	26000		1	105	60-140	06/21/2019 1050
Ethylbenzene	2500	2700		1	109	70-130	06/21/2019 1050
2-Hexanone	5000	3600		1	72	70-130	06/21/2019 1050
Isopropylbenzene	2500	2700		1	106	70-130	06/21/2019 1050
Methyl acetate	2500	2200		1	88	70-130	06/21/2019 1050
Methyl tertiary butyl ether (MTBE)	2500	2700		1	108	70-130	06/21/2019 1050
4-Methyl-2-pentanone	5000	4800		1	95	70-130	06/21/2019 1050
Methylcyclohexane	2500	3400	N	1	135	70-130	06/21/2019 1050
Methylene chloride	2500	2800		1	111	70-130	06/21/2019 1050
Naphthalene	2500	2400		1	98	70-130	06/21/2019 1050
Styrene	2500	2600		1	105	70-130	06/21/2019 1050
1,1,2,2-Tetrachloroethane	2500	2500		1	100	70-130	06/21/2019 1050
Tetrachloroethene	2500	2800		1	110	70-130	06/21/2019 1050
Toluene	2500	2600		1	102	70-130	06/21/2019 1050
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3200		1	127	70-130	06/21/2019 1050

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20364-002
Batch: 20364
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2800		1	113	70-130	06/21/2019 1050
1,2,4-Trichlorobenzene	2500	2900		1	114	70-130	06/21/2019 1050
1,1,1-Trichloroethane	2500	2700		1	109	70-130	06/21/2019 1050
1,1,2-Trichloroethane	2500	2400		1	97	70-130	06/21/2019 1050
Trichloroethene	2500	2700		1	107	70-130	06/21/2019 1050
Trichlorofluoromethane	2500	3200		1	130	70-130	06/21/2019 1050
Vinyl chloride	2500	2600		1	104	70-130	06/21/2019 1050
Xylenes (total)	5000	5400		1	107	70-130	06/21/2019 1050
m+p - Xylenes	2500	2700		1	109	70-130	06/21/2019 1050
o - Xylenes	2500	2700		1	106	70-130	06/21/2019 1050

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		104	53-142
Bromofluorobenzene		102	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20531-001
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/24/2019 1159
Benzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromoform	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/24/2019 1159
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloroform	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Cyclohexane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/24/2019 1159
1,4-Dioxane	ND		1	20	13	ug/L	06/24/2019 1159
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
2-Hexanone	ND		1	10	2.0	ug/L	06/24/2019 1159
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Methyl acetate	ND		1	1.0	0.40	ug/L	06/24/2019 1159
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/24/2019 1159
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/24/2019 1159
Methylene chloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Naphthalene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Styrene	ND		1	0.50	0.41	ug/L	06/24/2019 1159
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Toluene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/24/2019 1159

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20531-001
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Trichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/24/2019 1159
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/24/2019 1159
o - Xylenes	ND		1	0.50	0.40	ug/L	06/24/2019 1159

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		98	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20531-002
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	74		1	74	60-140	06/24/2019 1100
Benzene	50	48		1	96	70-130	06/24/2019 1100
Bromochloromethane	50	47		1	94	70-130	06/24/2019 1100
Bromodichloromethane	50	49		1	98	70-130	06/24/2019 1100
Bromoform	50	47		1	95	70-130	06/24/2019 1100
Bromomethane (Methyl bromide)	50	44		1	88	70-130	06/24/2019 1100
2-Butanone (MEK)	100	95		1	95	70-130	06/24/2019 1100
Carbon disulfide	50	45		1	90	70-130	06/24/2019 1100
Carbon tetrachloride	50	48		1	96	70-130	06/24/2019 1100
Chlorobenzene	50	47		1	93	70-130	06/24/2019 1100
Chloroethane	50	47		1	94	70-130	06/24/2019 1100
Chloroform	50	46		1	92	70-130	06/24/2019 1100
Chloromethane (Methyl chloride)	50	51		1	102	60-140	06/24/2019 1100
Cyclohexane	50	45		1	91	70-130	06/24/2019 1100
1,2-Dibromo-3-chloropropane (DBCP)	50	50		1	100	70-130	06/24/2019 1100
Dibromochloromethane	50	50		1	99	70-130	06/24/2019 1100
1,2-Dibromoethane (EDB)	50	50		1	100	70-130	06/24/2019 1100
1,2-Dichlorobenzene	50	46		1	92	70-130	06/24/2019 1100
1,3-Dichlorobenzene	50	45		1	89	70-130	06/24/2019 1100
1,4-Dichlorobenzene	50	44		1	88	70-130	06/24/2019 1100
Dichlorodifluoromethane	50	54		1	107	60-140	06/24/2019 1100
1,1-Dichloroethane	50	46		1	92	70-130	06/24/2019 1100
1,2-Dichloroethane	50	50		1	100	70-130	06/24/2019 1100
1,1-Dichloroethene	50	50		1	100	70-130	06/24/2019 1100
cis-1,2-Dichloroethene	50	47		1	93	70-130	06/24/2019 1100
trans-1,2-Dichloroethene	50	49		1	99	70-130	06/24/2019 1100
1,2-Dichloropropane	50	45		1	89	70-130	06/24/2019 1100
cis-1,3-Dichloropropene	50	53		1	105	70-130	06/24/2019 1100
trans-1,3-Dichloropropene	50	50		1	101	70-130	06/24/2019 1100
1,4-Dioxane	500	470		1	93	60-140	06/24/2019 1100
Ethylbenzene	50	50		1	100	70-130	06/24/2019 1100
2-Hexanone	100	100		1	102	70-130	06/24/2019 1100
Isopropylbenzene	50	52		1	104	70-130	06/24/2019 1100
Methyl acetate	50	38		1	77	70-130	06/24/2019 1100
Methyl tertiary butyl ether (MTBE)	50	44		1	88	70-130	06/24/2019 1100
4-Methyl-2-pentanone	100	110		1	105	70-130	06/24/2019 1100
Methylcyclohexane	50	48		1	95	70-130	06/24/2019 1100
Methylene chloride	50	44		1	87	70-130	06/24/2019 1100
Naphthalene	50	49		1	98	70-130	06/24/2019 1100
Styrene	50	52		1	104	70-130	06/24/2019 1100
1,1,2,2-Tetrachloroethane	50	52		1	104	70-130	06/24/2019 1100
Tetrachloroethene	50	48		1	97	70-130	06/24/2019 1100
Toluene	50	48		1	96	70-130	06/24/2019 1100
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	45		1	90	70-130	06/24/2019 1100

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20531-002
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	101	70-130	06/24/2019 1100
1,2,4-Trichlorobenzene	50	48		1	95	70-130	06/24/2019 1100
1,1,1-Trichloroethane	50	45		1	91	70-130	06/24/2019 1100
1,1,2-Trichloroethane	50	49		1	97	70-130	06/24/2019 1100
Trichloroethene	50	48		1	95	70-130	06/24/2019 1100
Trichlorofluoromethane	50	48		1	97	70-130	06/24/2019 1100
Vinyl chloride	50	44		1	88	70-130	06/24/2019 1100
Xylenes (total)	100	100		1	101	70-130	06/24/2019 1100
m+p - Xylenes	50	52		1	103	70-130	06/24/2019 1100
o - Xylenes	50	50		1	99	70-130	06/24/2019 1100

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		102	70-130
Bromofluorobenzene		112	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21174-001
Batch: 21174
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	06/28/2019 1146
Benzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Bromochloromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Bromoform	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	06/28/2019 1146
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	06/28/2019 1146
Carbon disulfide	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Chlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Chloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Chloroform	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	06/28/2019 1146
Cyclohexane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	06/28/2019 1146
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,4-Dioxane	ND		1	250	25	ug/kg	06/28/2019 1146
Ethylbenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
2-Hexanone	ND		1	10	4.0	ug/kg	06/28/2019 1146
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Methyl acetate	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	06/28/2019 1146
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Methylene chloride	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Naphthalene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Styrene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Toluene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21174-001
Batch: 21174
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Trichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Vinyl chloride	ND		1	5.0	3.0	ug/kg	06/28/2019 1146
Xylenes (total)	ND		1	10	4.0	ug/kg	06/28/2019 1146
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
o - Xylenes	ND		1	5.0	2.0	ug/kg	06/28/2019 1146

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		104	47-138
Toluene-d8		103	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21174-002
Batch: 21174
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	88		1	88	60-140	06/28/2019 1240
Benzene	50	52		1	104	70-130	06/28/2019 1240
Bromochloromethane	50	47		1	93	70-130	06/28/2019 1240
Bromodichloromethane	50	49		1	98	70-130	06/28/2019 1240
Bromoform	50	47		1	94	70-130	06/28/2019 1240
Bromomethane (Methyl bromide)	50	58		1	116	70-130	06/28/2019 1240
2-Butanone (MEK)	100	97		1	97	60-140	06/28/2019 1240
Carbon disulfide	50	54		1	108	70-130	06/28/2019 1240
Carbon tetrachloride	50	54		1	108	70-130	06/28/2019 1240
Chlorobenzene	50	54		1	108	70-130	06/28/2019 1240
Chloroethane	50	59		1	119	70-130	06/28/2019 1240
Chloroform	50	49		1	99	70-130	06/28/2019 1240
Chloromethane (Methyl chloride)	50	35		1	70	60-140	06/28/2019 1240
Cyclohexane	50	47		1	94	70-130	06/28/2019 1240
1,2-Dibromo-3-chloropropane (DBCP)	50	49		1	97	70-130	06/28/2019 1240
Dibromochloromethane	50	49		1	98	70-130	06/28/2019 1240
1,2-Dibromoethane (EDB)	50	48		1	97	70-130	06/28/2019 1240
1,2-Dichlorobenzene	50	54		1	107	70-130	06/28/2019 1240
1,3-Dichlorobenzene	50	56		1	111	70-130	06/28/2019 1240
1,4-Dichlorobenzene	50	55		1	110	70-130	06/28/2019 1240
Dichlorodifluoromethane	50	50		1	101	60-140	06/28/2019 1240
1,1-Dichloroethane	50	51		1	103	70-130	06/28/2019 1240
1,2-Dichloroethane	50	45		1	91	70-130	06/28/2019 1240
1,1-Dichloroethene	50	54		1	108	70-130	06/28/2019 1240
cis-1,2-Dichloroethene	50	50		1	99	70-130	06/28/2019 1240
trans-1,2-Dichloroethene	50	53		1	107	70-130	06/28/2019 1240
1,2-Dichloropropane	50	49		1	97	70-130	06/28/2019 1240
cis-1,3-Dichloropropene	50	50		1	99	70-130	06/28/2019 1240
trans-1,3-Dichloropropene	50	50		1	101	70-130	06/28/2019 1240
1,4-Dioxane	500	460		1	92	60-140	06/28/2019 1240
Ethylbenzene	50	56		1	112	70-130	06/28/2019 1240
2-Hexanone	100	100		1	104	70-130	06/28/2019 1240
Isopropylbenzene	50	59		1	119	70-130	06/28/2019 1240
Methyl acetate	50	31	N	1	62	70-130	06/28/2019 1240
Methyl tertiary butyl ether (MTBE)	50	47		1	94	70-130	06/28/2019 1240
4-Methyl-2-pentanone	100	84		1	84	70-130	06/28/2019 1240
Methylcyclohexane	50	50		1	101	70-130	06/28/2019 1240
Methylene chloride	50	48		1	96	70-130	06/28/2019 1240
Naphthalene	50	50		1	100	70-130	06/28/2019 1240
Styrene	50	53		1	106	70-130	06/28/2019 1240
1,1,2,2-Tetrachloroethane	50	48		1	95	70-130	06/28/2019 1240
Tetrachloroethene	50	60		1	120	70-130	06/28/2019 1240
Toluene	50	51		1	103	70-130	06/28/2019 1240
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	51		1	103	70-130	06/28/2019 1240

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21174-002
Batch: 21174
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	56		1	111	70-130	06/28/2019 1240
1,2,4-Trichlorobenzene	50	57		1	113	70-130	06/28/2019 1240
1,1,1-Trichloroethane	50	53		1	107	70-130	06/28/2019 1240
1,1,2-Trichloroethane	50	48		1	95	70-130	06/28/2019 1240
Trichloroethene	50	55		1	109	70-130	06/28/2019 1240
Trichlorofluoromethane	50	54		1	107	70-130	06/28/2019 1240
Vinyl chloride	50	46		1	93	70-130	06/28/2019 1240
Xylenes (total)	100	110		1	110	70-130	06/28/2019 1240
m+p - Xylenes	50	56		1	112	70-130	06/28/2019 1240
o - Xylenes	50	54		1	109	70-130	06/28/2019 1240

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		86	53-142
Bromofluorobenzene		103	47-138
Toluene-d8		104	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21175-001
Batch: 21175
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	06/20/2019 1758
Benzene	ND		1	250	100	ug/kg	06/20/2019 1758
Bromochloromethane	ND		1	250	100	ug/kg	06/20/2019 1758
Bromodichloromethane	ND		1	250	100	ug/kg	06/20/2019 1758
Bromoform	ND		1	250	100	ug/kg	06/20/2019 1758
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	06/20/2019 1758
2-Butanone (MEK)	ND		1	1000	200	ug/kg	06/20/2019 1758
Carbon disulfide	ND		1	250	100	ug/kg	06/20/2019 1758
Carbon tetrachloride	ND		1	250	100	ug/kg	06/20/2019 1758
Chlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
Chloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
Chloroform	ND		1	250	100	ug/kg	06/20/2019 1758
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	06/20/2019 1758
Cyclohexane	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	06/20/2019 1758
Dibromochloromethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
Dichlorodifluoromethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,1-Dichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,1-Dichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dichloropropane	ND		1	250	100	ug/kg	06/20/2019 1758
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/20/2019 1758
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/20/2019 1758
1,4-Dioxane	ND		1	13000	1300	ug/kg	06/20/2019 1758
Ethylbenzene	ND		1	250	100	ug/kg	06/20/2019 1758
2-Hexanone	ND		1	500	200	ug/kg	06/20/2019 1758
Isopropylbenzene	ND		1	250	100	ug/kg	06/20/2019 1758
Methyl acetate	ND		1	250	100	ug/kg	06/20/2019 1758
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	06/20/2019 1758
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	06/20/2019 1758
Methylcyclohexane	ND		1	250	100	ug/kg	06/20/2019 1758
Methylene chloride	ND		1	250	100	ug/kg	06/20/2019 1758
Naphthalene	ND		1	250	100	ug/kg	06/20/2019 1758
Styrene	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
Tetrachloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
Toluene	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	06/20/2019 1758

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21175-001
Batch: 21175
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
Trichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
Trichlorofluoromethane	ND		1	250	100	ug/kg	06/20/2019 1758
Vinyl chloride	ND		1	250	100	ug/kg	06/20/2019 1758
Xylenes (total)	ND		1	500	200	ug/kg	06/20/2019 1758
m+p - Xylenes	ND		1	250	100	ug/kg	06/20/2019 1758
o - Xylenes	ND		1	250	100	ug/kg	06/20/2019 1758

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		98	53-142
Bromofluorobenzene		98	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21175-002
Batch: 21175
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	3000		1	60	60-140	06/21/2019 1050
Benzene	2500	2700		1	110	70-130	06/21/2019 1050
Bromochloromethane	2500	2600		1	106	70-130	06/21/2019 1050
Bromodichloromethane	2500	2700		1	106	70-130	06/21/2019 1050
Bromoform	2500	2300		1	94	70-130	06/21/2019 1050
Bromomethane (Methyl bromide)	2500	2500		1	98	70-130	06/21/2019 1050
2-Butanone (MEK)	5000	3700		1	74	60-140	06/21/2019 1050
Carbon disulfide	2500	2800		1	112	70-130	06/21/2019 1050
Carbon tetrachloride	2500	2900		1	115	70-130	06/21/2019 1050
Chlorobenzene	2500	2600		1	105	70-130	06/21/2019 1050
Chloroethane	2500	3000		1	119	70-130	06/21/2019 1050
Chloroform	2500	2700		1	110	70-130	06/21/2019 1050
Chloromethane (Methyl chloride)	2500	2400		1	95	60-140	06/21/2019 1050
Cyclohexane	2500	3000		1	120	70-130	06/21/2019 1050
1,2-Dibromo-3-chloropropane (DBCP)	2500	2300		1	91	70-130	06/21/2019 1050
Dibromochloromethane	2500	2600		1	104	70-130	06/21/2019 1050
1,2-Dibromoethane (EDB)	2500	2500		1	100	70-130	06/21/2019 1050
1,2-Dichlorobenzene	2500	2600		1	102	70-130	06/21/2019 1050
1,3-Dichlorobenzene	2500	2600		1	105	70-130	06/21/2019 1050
1,4-Dichlorobenzene	2500	2700		1	107	70-130	06/21/2019 1050
Dichlorodifluoromethane	2500	2300		1	92	60-140	06/21/2019 1050
1,1-Dichloroethane	2500	2800		1	111	70-130	06/21/2019 1050
1,2-Dichloroethane	2500	2600		1	104	70-130	06/21/2019 1050
1,1-Dichloroethene	2500	3200		1	130	70-130	06/21/2019 1050
cis-1,2-Dichloroethene	2500	2800		1	111	70-130	06/21/2019 1050
trans-1,2-Dichloroethene	2500	3000		1	121	70-130	06/21/2019 1050
1,2-Dichloropropane	2500	2700		1	106	70-130	06/21/2019 1050
cis-1,3-Dichloropropene	2500	2700		1	109	70-130	06/21/2019 1050
trans-1,3-Dichloropropene	2500	2500		1	99	70-130	06/21/2019 1050
1,4-Dioxane	25000	26000		1	105	60-140	06/21/2019 1050
Ethylbenzene	2500	2700		1	109	70-130	06/21/2019 1050
2-Hexanone	5000	3600		1	72	70-130	06/21/2019 1050
Isopropylbenzene	2500	2700		1	106	70-130	06/21/2019 1050
Methyl acetate	2500	2200		1	88	70-130	06/21/2019 1050
Methyl tertiary butyl ether (MTBE)	2500	2700		1	108	70-130	06/21/2019 1050
4-Methyl-2-pentanone	5000	4800		1	95	70-130	06/21/2019 1050
Methylcyclohexane	2500	3400	N	1	135	70-130	06/21/2019 1050
Methylene chloride	2500	2800		1	111	70-130	06/21/2019 1050
Naphthalene	2500	2400		1	98	70-130	06/21/2019 1050
Styrene	2500	2600		1	105	70-130	06/21/2019 1050
1,1,2,2-Tetrachloroethane	2500	2500		1	100	70-130	06/21/2019 1050
Tetrachloroethene	2500	2800		1	110	70-130	06/21/2019 1050
Toluene	2500	2600		1	102	70-130	06/21/2019 1050
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3200		1	127	70-130	06/21/2019 1050

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21175-002
Batch: 21175
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2800		1	113	70-130	06/21/2019 1050
1,2,4-Trichlorobenzene	2500	2900		1	114	70-130	06/21/2019 1050
1,1,1-Trichloroethane	2500	2700		1	109	70-130	06/21/2019 1050
1,1,2-Trichloroethane	2500	2400		1	97	70-130	06/21/2019 1050
Trichloroethene	2500	2700		1	107	70-130	06/21/2019 1050
Trichlorofluoromethane	2500	3200		1	130	70-130	06/21/2019 1050
Vinyl chloride	2500	2600		1	104	70-130	06/21/2019 1050
Xylenes (total)	5000	5400		1	107	70-130	06/21/2019 1050
m+p - Xylenes	2500	2700		1	109	70-130	06/21/2019 1050
o - Xylenes	2500	2700		1	106	70-130	06/21/2019 1050

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		104	53-142
Bromofluorobenzene		102	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19960-001
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	06/20/2019 1159
Acenaphthylene	ND		1	2.7	0.95	ug/kg	06/20/2019 1159
Anthracene	ND		1	2.7	0.51	ug/kg	06/20/2019 1159
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	06/20/2019 1159
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	06/20/2019 1159
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	06/20/2019 1159
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	06/20/2019 1159
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	06/20/2019 1159
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
Carbazole	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Chlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/20/2019 1159
Chrysene	ND		1	2.7	0.45	ug/kg	06/20/2019 1159
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	06/20/2019 1159
Dibenzofuran	ND		1	13	5.0	ug/kg	06/20/2019 1159
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	06/20/2019 1159
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Diethylphthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
Dimethyl phthalate	ND		1	13	7.4	ug/kg	06/20/2019 1159
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	06/20/2019 1159
2,4-Dinitrophenol	ND		1	67	25	ug/kg	06/20/2019 1159
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	06/20/2019 1159
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	06/20/2019 1159
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	06/20/2019 1159
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	06/20/2019 1159
Fluoranthene	ND		1	2.7	0.42	ug/kg	06/20/2019 1159
Fluorene	ND		1	2.7	0.57	ug/kg	06/20/2019 1159
Hexachlorobenzene	ND		1	13	5.0	ug/kg	06/20/2019 1159
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	06/20/2019 1159
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	06/20/2019 1159
Hexachloroethane	ND		1	13	5.0	ug/kg	06/20/2019 1159
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	06/20/2019 1159
Isophorone	ND		1	13	5.0	ug/kg	06/20/2019 1159

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19960-001
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	06/20/2019 1159
2-Methylphenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
3+4-Methylphenol	ND		1	27	10	ug/kg	06/20/2019 1159
Naphthalene	ND		1	2.7	0.97	ug/kg	06/20/2019 1159
2-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
3-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
4-Nitroaniline	ND		1	27	10	ug/kg	06/20/2019 1159
Nitrobenzene	ND		1	13	5.0	ug/kg	06/20/2019 1159
2-Nitrophenol	ND		1	27	10	ug/kg	06/20/2019 1159
4-Nitrophenol	ND		1	67	25	ug/kg	06/20/2019 1159
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	06/20/2019 1159
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	06/20/2019 1159
Pentachlorophenol	ND		1	67	25	ug/kg	06/20/2019 1159
Phenanthrene	ND		1	2.7	0.72	ug/kg	06/20/2019 1159
Phenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
Pyrene	ND		1	2.7	0.50	ug/kg	06/20/2019 1159
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	06/20/2019 1159
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	06/20/2019 1159
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	06/20/2019 1159
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	06/20/2019 1159

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		48	33-102
2-Fluorophenol		53	35-115
Nitrobenzene-d5		50	22-109
Phenol-d5		57	33-122
Terphenyl-d14		66	41-120
2,4,6-Tribromophenol		60	30-117

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19960-002
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	78		1	59	12-111	06/22/2019 1824
Acenaphthylene	130	88		1	66	44-122	06/22/2019 1824
Anthracene	130	89		1	67	16-122	06/22/2019 1824
Benzo(a)anthracene	130	91		1	68	40-121	06/22/2019 1824
Benzo(a)pyrene	130	88		1	66	36-114	06/22/2019 1824
Benzo(b)fluoranthene	130	83		1	62	38-123	06/22/2019 1824
Benzo(g,h,i)perylene	130	100		1	75	43-120	06/22/2019 1824
Benzo(k)fluoranthene	130	90		1	68	40-126	06/22/2019 1824
4-Bromophenyl phenyl ether	130	82		1	62	30-130	06/22/2019 1824
Butyl benzyl phthalate	130	110		1	81	48-124	06/22/2019 1824
Carbazole	130	94		1	70	47-125	06/22/2019 1824
bis (2-Chloro-1-methylethyl) ether	130	78		1	59	41-113	06/22/2019 1824
4-Chloro-3-methyl phenol	130	88		1	66	48-120	06/22/2019 1824
bis(2-Chloroethoxy)methane	130	80		1	60	38-115	06/22/2019 1824
bis(2-Chloroethyl)ether	130	74		1	55	46-122	06/22/2019 1824
2-Chloronaphthalene	130	81		1	61	37-106	06/22/2019 1824
2-Chlorophenol	130	75		1	56	44-122	06/22/2019 1824
4-Chlorophenyl phenyl ether	130	84		1	63	32-107	06/22/2019 1824
Chrysene	130	90		1	68	41-124	06/22/2019 1824
Dibenzo(a,h)anthracene	130	95		1	72	38-125	06/22/2019 1824
Dibenzofuran	130	84		1	63	45-128	06/22/2019 1824
1,2-Dichlorobenzene	130	69		1	52	39-94	06/22/2019 1824
1,3-Dichlorobenzene	130	71		1	53	30-130	06/22/2019 1824
1,4-Dichlorobenzene	130	69		1	52	39-92	06/22/2019 1824
3,3'-Dichlorobenzidine	130	58		1	44	10-119	06/22/2019 1824
2,4-Dichlorophenol	130	79		1	59	30-96	06/22/2019 1824
Diethylphthalate	130	90		1	68	30-130	06/22/2019 1824
Dimethyl phthalate	130	89		1	67	24-127	06/22/2019 1824
2,4-Dimethylphenol	130	120		1	92	30-130	06/22/2019 1824
Di-n-butyl phthalate	130	95		1	71	35-108	06/22/2019 1824
4,6-Dinitro-2-methylphenol	130	79		1	59	53-150	06/22/2019 1824
2,4-Dinitrophenol	270	150		1	55	32-115	06/22/2019 1824
2,4-Dinitrotoluene	130	98		1	74	40-130	06/22/2019 1824
2,6-Dinitrotoluene	130	90		1	67	46-118	06/22/2019 1824
Di-n-octylphthalate	130	90		1	68	49-118	06/22/2019 1824
bis(2-Ethylhexyl)phthalate	130	98		1	74	33-123	06/22/2019 1824
Fluoranthene	130	94		1	71	26-133	06/22/2019 1824
Fluorene	130	84		1	63	19-108	06/22/2019 1824
Hexachlorobenzene	130	84		1	63	10-125	06/22/2019 1824
Hexachlorobutadiene	130	69		1	52	47-116	06/22/2019 1824
Hexachlorocyclopentadiene	670	300	N	1	46	48-127	06/22/2019 1824
Hexachloroethane	130	73		1	55	18-154	06/22/2019 1824
Indeno(1,2,3-c,d)pyrene	130	99		1	74	42-123	06/22/2019 1824
Isophorone	130	85		1	64	30-130	06/22/2019 1824

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19960-002
Batch: 19960
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/19/2019 1230

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	81		1	61	10-107	06/22/2019 1824
2-Methylphenol	130	75		1	57	33-103	06/22/2019 1824
3+4-Methylphenol	130	90		1	68	18-121	06/22/2019 1824
Naphthalene	130	79		1	59	10-112	06/22/2019 1824
2-Nitroaniline	130	98		1	74	46-128	06/22/2019 1824
3-Nitroaniline	130	33	N	1	25	30-130	06/22/2019 1824
4-Nitroaniline	130	67		1	51	51-129	06/22/2019 1824
Nitrobenzene	130	81		1	61	49-142	06/22/2019 1824
2-Nitrophenol	130	79		1	60	33-114	06/22/2019 1824
4-Nitrophenol	270	170		1	62	27-138	06/22/2019 1824
N-Nitrosodi-n-propylamine	130	85		1	64	45-112	06/22/2019 1824
N-Nitrosodiphenylamine (Diphenylamine)	130	89		1	67	49-123	06/22/2019 1824
Pentachlorophenol	270	120		1	45	36-108	06/22/2019 1824
Phenanthrene	130	86		1	65	16-123	06/22/2019 1824
Phenol	130	78		1	59	39-108	06/22/2019 1824
Pyrene	130	96		1	72	34-121	06/22/2019 1824
1,2,4,5-Tetrachlorobenzene	130	71		1	53	30-130	06/22/2019 1824
2,3,4,6-Tetrachlorophenol	130	84		1	64	53-125	06/22/2019 1824
1,2,4-Trichlorobenzene	130	74		1	55	30-130	06/22/2019 1824
2,4,5-Trichlorophenol	130	84		1	63	32-105	06/22/2019 1824
2,4,6-Trichlorophenol	130	81		1	61	31-102	06/22/2019 1824

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		55	33-102
2-Fluorophenol		54	35-115
Nitrobenzene-d5		57	22-109
Phenol-d5		56	33-122
Terphenyl-d14		78	41-120
2,4,6-Tribromophenol		68	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20483-001
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/26/2019 1830
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/26/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		82	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20483-002
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	40-140	06/26/2019 1900
C9 - C18 Aliphatics	30	20		1	68	40-140	06/26/2019 1900

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		78	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20483-003
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	37		1	92	6.2	40-140	25	06/26/2019 1930
C9 - C18 Aliphatics	30	23		1	76	10	40-140	25	06/26/2019 1930

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		79	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20484-001
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/27/2019 0424

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		83	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20484-002
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	64		1	75	40-140	06/27/2019 0453

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		83	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20484-003
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	63		1	74	0.98	40-140	25	06/27/2019 0523

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		84	40-140
2-Fluorobiphenyl (fractionation 1)		87	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ20853-001
Batch: 20853
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/26/2019 1116

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		93	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ20853-002
Batch: 20853
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	19		1	99	70-130	06/26/2019 1019

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ20853-003
Batch: 20853
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	18		1	97	1.6	70-130	25	06/26/2019 1047

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ20854-001
Batch: 20854
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	06/26/2019 1116
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/26/2019 1116
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/26/2019 1116
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/26/2019 1116
Naphthalene	ND		1	0.25	0.13	mg/kg	06/26/2019 1116
Toluene	ND		1	0.25	0.040	mg/kg	06/26/2019 1116
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/26/2019 1116
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/26/2019 1116

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ20854-002
Batch: 20854
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	06/26/2019 1019
C9 - C10 Aromatics	1.3	1.2		1	96	70-130	06/26/2019 1019
Ethylbenzene	1.3	1.2		1	96	70-130	06/26/2019 1019
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	06/26/2019 1019
Naphthalene	1.3	1.0		1	80	70-130	06/26/2019 1019
Toluene	1.3	1.2		1	96	70-130	06/26/2019 1019
m+p - Xylenes	2.5	2.4		1	96	70-130	06/26/2019 1019
o - Xylenes	1.3	1.2		1	96	70-130	06/26/2019 1019

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ20854-003
Batch: 20854
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.1		1	88	8.7	70-130	25	06/26/2019 1047
C9 - C10 Aromatics	1.3	1.2		1	96	0.00	70-130	25	06/26/2019 1047
Ethylbenzene	1.3	1.2		1	96	0.00	70-130	25	06/26/2019 1047
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	0.00	70-130	25	06/26/2019 1047
Naphthalene	1.3	0.98		1	78	2.0	70-130	25	06/26/2019 1047
Toluene	1.3	1.1		1	88	8.7	70-130	25	06/26/2019 1047
m+p - Xylenes	2.5	2.4		1	96	0.00	70-130	25	06/26/2019 1047
o - Xylenes	1.3	1.2		1	96	0.00	70-130	25	06/26/2019 1047

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ20855-001
Batch: 20855
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/26/2019 1116
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/26/2019 1116

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ20855-002
Batch: 20855
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	4.9		1	98	70-130	06/26/2019 1019
C9 - C12 Aliphatics, Adjusted	3.8	3.8		1	101	70-130	06/26/2019 1019

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ20855-003
Batch: 20855
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.1		1	102	3.3	70-130	25	06/26/2019 1047
C9 - C12 Aliphatics, Adjusted	3.8	3.8		1	101	0.95	70-130	25	06/26/2019 1047

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20445-001
Batch: 20445
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/24/2019 1157

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	06/25/2019 2030
Arsenic	ND		1	0.50	0.20	mg/kg	06/25/2019 2030
Barium	ND		1	1.3	0.31	mg/kg	06/25/2019 2030
Beryllium	ND		1	0.10	0.034	mg/kg	06/25/2019 2030
Cadmium	ND		1	0.13	0.025	mg/kg	06/25/2019 2030
Chromium	0.84	J	1	1.3	0.55	mg/kg	06/25/2019 2030
Cobalt	ND		1	1.3	0.30	mg/kg	06/25/2019 2030
Copper	ND		1	1.3	0.33	mg/kg	06/25/2019 2030
Lead	ND		1	0.25	0.068	mg/kg	06/25/2019 2030
Nickel	ND		1	1.3	0.30	mg/kg	06/25/2019 2030
Selenium	ND		1	1.3	0.47	mg/kg	06/25/2019 2030
Silver	ND		1	0.25	0.060	mg/kg	06/25/2019 2030
Vanadium	ND		1	1.3	0.25	mg/kg	06/25/2019 2030
Zinc	ND		1	2.5	0.50	mg/kg	06/25/2019 2030

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20445-002
Batch: 20445
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/24/2019 1157

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	50		1	100	80-120	06/25/2019 2035
Arsenic	50	50		1	100	80-120	06/25/2019 2035
Barium	50	50		1	100	80-120	06/25/2019 2035
Beryllium	50	56		1	113	80-120	06/25/2019 2035
Cadmium	50	50		1	100	80-120	06/25/2019 2035
Chromium	50	51		1	103	80-120	06/25/2019 2035
Cobalt	50	50		1	100	80-120	06/25/2019 2035
Copper	50	50		1	100	80-120	06/25/2019 2035
Lead	50	53		1	107	80-120	06/25/2019 2035
Nickel	50	50		1	100	80-120	06/25/2019 2035
Selenium	50	46		1	91	80-120	06/25/2019 2035
Silver	50	52		1	104	80-120	06/25/2019 2035
Vanadium	50	51		1	102	80-120	06/25/2019 2035
Zinc	50	46		1	93	80-120	06/25/2019 2035

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20448-001
Batch: 20448
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1815

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/25/2019 0926

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20448-002
Batch: 20448
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1815

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.83		1	100	80-120	06/25/2019 0929

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody

and

Miscellaneous Documents

Chain of Custody Record

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

Number

Client: Ramboll US Corporation	Report to Contact: Daniel Price/Michael Wilson	Telephone No. / E-mail: (314) 590-8977 / dprice@ramboll.com; (785) 443-7568 / mwilson@ramboll.com
Address: 7500 College Boulevard Suite 1905	Sampler's Signature: x [signature] Elizabeth Borucki	Quote No.
City: Overland Park; State: KS; Zip Code: 66210		Page 1 of 1
Project Name: CMR RIAIM East Rail		Analysis (Attach list if more space is needed)
Project Number: 1690012344-003	P.O No.	UF18024 KMN2

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous		Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH	Remarks / Cooler I.D.
CMR-WB09-2.0-3.0-190617	6/17/2019	10:45	G		X			2					1	2	X	X	X	X	X	Cooler 001
CMR-WB09-6.0-6.75-190617	6/17/2019	10:50	G		X			2					1	2	X	X	X	X	X	Cooler 001
CMR-WB08-5.0-6.0-190617	6/17/2019	14:55	G		X			2					1	2	X	X	X	X	X	Cooler 001
CMR-WB07-5.0-6.0-190617	6/17/2019	15:40	G		X			2					1	2	X	X	X	X	X	Cooler 001
TB-13	NA	NA	G	X							2				X					Trip Blank/Cooler 001

Turn Around Time Required (Prior lab approval required for expedited TAT): [X] Standard [ ] Rush (Please Specify)

Sample Disposal: [ ] Return to Client [ ] Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks): [ ] Non-Hazardous [ ] Flammable [ ] Skin irritant [X] SDS provided Unknown

QC Requirements

Relinquished by	Date	Time	Received by	Date	Time
1. [signature]	6/17/2019	17:30	1.		
2.			2.		
3.			3.		
4. Fed Ex	6-18-19	0949	4. Laboratory Received by [signature]	6-18-19	0949

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) [X] Y [ ] N [ ] Ice Pack
Receipt Temp. 3.2 °C

Document Number: ME002OW-01

Shealy Environmental Services, Inc
Document Number: MF0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 06-17-2019 Lot #: UF18024

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

3.2 / 3.2 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote #: NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: LKH Date: 06-18-2019

Comments:

MEMO

Date: **July 19, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF18034, 3 Groundwater Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF18034 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-EB04D-190617-GW	UF18034-001
CMR-MW81S-190617-GW	UF18034-002
CMR-MW81D-190617-GW	UF18034-003
TB-14-20190617	UF18034-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

MS/MSD Recoveries
For the SVOC analysis suite MS/MSD results were reported to be almost universally out of criteria with extremely low recoveries. However, this is largely due to non-detected analytes. The MS/MSD sample was spike at a normal level but due to high native concentrations/ matrix issues, the sample was run at a high dilution. Therefore the spiked amount was at or below the reporting limit. Due to this, the low recoveries do not represent a systematic matrix issue. No validation action warranted.

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of methyl acetate. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methyl acetate results have been validated as estimated.

Blank Detections
During analysis, chromium and bis(2-ethylhexyl)phthalate were detected in method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All chromium and bis(2-ethylhexyl)phthalate results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF18034

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 GW, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Chromium detected in method blank sample. All chromium project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All chromium project sample results less than the RL or 5x the blank result validated as non-detect (U) at the RL or sample result, whichever is higher.

SDG No. UF18034

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 GW, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	SVOC bis(2-ethylhexyl)phthalate detected in method blank sample. All project sample detections (all below the RL) validated as non-detect (U).	No issues
Deuterated Monitoring Compound or Surrogate Spikes	No issues	Surrogates out of criteria due to matrix effects. No action taken.
Matrix Spike/Matrix Spike Duplicate	MS/MSD out of criteria for multiple SVOCs, likely due to dilution required.. 3&4-methylphenol and phenol validated as estimated (J, UJ).	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	VOC methyl acetate out of criteria. All methyl acetate results validated as estimated (J, UJ). SVOCs 2-chlorophenol and 4-nitrophenol out of criteria. Not site COCs, no action taken.	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified.	N/A
Other Non-conformances	No other non-confromances noted.	No other non-conformances noted.
Overall Assessment of Data	All bis(2-ethylhexyl)phthalate project sample detections (all below the RL) validated as non-detect (U). 3&4-methylphenol and phenol validated as estimated (J, UJ). All methyl acetate results validated as estimated (J, UJ).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF18034**

Date Completed:07/09/2019

07/09/2019 5:05 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF18034

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 20584 had methyl acetate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Semivolatiles
The method blank associated with batch 19982 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for bis(2-ethylhexyl)phthalate have been flagged with a “B” qualifier.

The LCS associated with batch 19982 had 2-chlorphenol and 4-nitrophenol recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -002 had multiple recovered outside of the acceptance limits. Additionally, one RPD exceeded the acceptance limit. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Samples -001, -002, and -003 were diluted 10X due to the sample matrix. The reporting limits have been raised accordingly.

Montana VPH
Samples -001, -002, and -003 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Samples -001 and -002 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The method blank associated with batch 20200 had chromium detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for chromium have been flagged with a “B” qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF18034

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-EB04D-190617-GW	Aqueous	06/15/2019 1025	06/18/2019
002	CMR-MW81S-190617-GW	Aqueous	06/17/2019 1048	06/18/2019
003	CMR-MW81D-190617-GW	Aqueous	06/17/2019 1229	06/18/2019
004	TB-14-20190617	Aqueous	06/17/2019	06/18/2019

(4 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF18034

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-EB04D-190617-GW	Aqueous	Acetone	8260B	49		ug/L	8
001	CMR-EB04D-190617-GW	Aqueous	Benzene	8260B	14		ug/L	8
001	CMR-EB04D-190617-GW	Aqueous	2-Butanone (MEK)	8260B	15		ug/L	8
001	CMR-EB04D-190617-GW	Aqueous	Cyclohexane	8260B	1.4		ug/L	8
001	CMR-EB04D-190617-GW	Aqueous	Ethylbenzene	8260B	4.2		ug/L	8
001	CMR-EB04D-190617-GW	Aqueous	2-Hexanone	8260B	2.3	J	ug/L	8
001	CMR-EB04D-190617-GW	Aqueous	Isopropylbenzene	8260B	2.5		ug/L	8
001	CMR-EB04D-190617-GW	Aqueous	Methylcyclohexane	8260B	1.2	J	ug/L	8
001	CMR-EB04D-190617-GW	Aqueous	Naphthalene	8260B	150		ug/L	8
001	CMR-EB04D-190617-GW	Aqueous	Toluene	8260B	0.83		ug/L	8
001	CMR-EB04D-190617-GW	Aqueous	Xylenes (total)	8260B	6.9		ug/L	9
001	CMR-EB04D-190617-GW	Aqueous	m+p - Xylenes	8260B	3.6		ug/L	9
001	CMR-EB04D-190617-GW	Aqueous	o - Xylenes	8260B	3.3		ug/L	9
001	CMR-EB04D-190617-GW	Aqueous	Acenaphthene	8270D	1.8		ug/L	10
001	CMR-EB04D-190617-GW	Aqueous	Carbazole	8270D	1.2	J	ug/L	10
001	CMR-EB04D-190617-GW	Aqueous	Dibenzofuran	8270D	1.9	J	ug/L	10
001	CMR-EB04D-190617-GW	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	4.9	BJ	ug/L	10
001	CMR-EB04D-190617-GW	Aqueous	Fluorene	8270D	2.1		ug/L	10
001	CMR-EB04D-190617-GW	Aqueous	2-Methylnaphthalene	8270D	190		ug/L	11
001	CMR-EB04D-190617-GW	Aqueous	Naphthalene	8270D	60		ug/L	11
001	CMR-EB04D-190617-GW	Aqueous	Phenanthrene	8270D	0.74	J	ug/L	11
001	CMR-EB04D-190617-GW	Aqueous	C11 - C22 Aromatics	Montana EPH	490		ug/L	13
001	CMR-EB04D-190617-GW	Aqueous	C5 - C8 Aliphatics,	Montana VPH	110		ug/L	14
001	CMR-EB04D-190617-GW	Aqueous	C9 - C12 Aliphatics,	Montana VPH	200		ug/L	14
001	CMR-EB04D-190617-GW	Aqueous	Benzene	Montana VPH	12		ug/L	15
001	CMR-EB04D-190617-GW	Aqueous	C9 - C10 Aromatics	Montana VPH	260		ug/L	15
001	CMR-EB04D-190617-GW	Aqueous	Ethylbenzene	Montana VPH	8.0		ug/L	15
001	CMR-EB04D-190617-GW	Aqueous	Naphthalene	Montana VPH	140		ug/L	15
001	CMR-EB04D-190617-GW	Aqueous	m+p - Xylenes	Montana VPH	3.9	J	ug/L	15
001	CMR-EB04D-190617-GW	Aqueous	o - Xylenes	Montana VPH	4.8	J	ug/L	15
001	CMR-EB04D-190617-GW	Aqueous	TPH	Montana VPH	620		ug/L	16
001	CMR-EB04D-190617-GW	Aqueous	Antimony	6020B	0.88	J	ug/L	17
001	CMR-EB04D-190617-GW	Aqueous	Barium	6020B	950		ug/L	17
001	CMR-EB04D-190617-GW	Aqueous	Chromium	6020B	1.8	BJ	ug/L	17
001	CMR-EB04D-190617-GW	Aqueous	Cobalt	6020B	1.3	J	ug/L	17
001	CMR-EB04D-190617-GW	Aqueous	Copper	6020B	2.3	J	ug/L	17
001	CMR-EB04D-190617-GW	Aqueous	Nickel	6020B	13		ug/L	17
001	CMR-EB04D-190617-GW	Aqueous	Zinc	6020B	5.6	J	ug/L	17
002	CMR-MW81S-190617-GW	Aqueous	Acetone	8260B	7.1	J	ug/L	18
002	CMR-MW81S-190617-GW	Aqueous	Benzene	8260B	48		ug/L	18
002	CMR-MW81S-190617-GW	Aqueous	2-Butanone (MEK)	8260B	2.2	J	ug/L	18
002	CMR-MW81S-190617-GW	Aqueous	Chlorobenzene	8260B	0.64		ug/L	18
002	CMR-MW81S-190617-GW	Aqueous	Cyclohexane	8260B	38		ug/L	18
002	CMR-MW81S-190617-GW	Aqueous	Ethylbenzene	8260B	4.6		ug/L	18
002	CMR-MW81S-190617-GW	Aqueous	Isopropylbenzene	8260B	19		ug/L	18

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-MW81S-190617-GW	Aqueous	Methylcyclohexane	8260B	23		ug/L	18
002	CMR-MW81S-190617-GW	Aqueous	Naphthalene	8260B	130		ug/L	18
002	CMR-MW81S-190617-GW	Aqueous	Toluene	8260B	1.0		ug/L	18
002	CMR-MW81S-190617-GW	Aqueous	Xylenes (total)	8260B	8.9		ug/L	19
002	CMR-MW81S-190617-GW	Aqueous	m+p - Xylenes	8260B	3.4		ug/L	19
002	CMR-MW81S-190617-GW	Aqueous	o - Xylenes	8260B	5.5		ug/L	19
002	CMR-MW81S-190617-GW	Aqueous	Acenaphthene	8270D	1.6		ug/L	20
002	CMR-MW81S-190617-GW	Aqueous	Carbazole	8270D	1.1	J	ug/L	20
002	CMR-MW81S-190617-GW	Aqueous	Dibenzofuran	8270D	1.9	J	ug/L	20
002	CMR-MW81S-190617-GW	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	4.8	BJ	ug/L	20
002	CMR-MW81S-190617-GW	Aqueous	Fluorene	8270D	2.7		ug/L	20
002	CMR-MW81S-190617-GW	Aqueous	2-Methylnaphthalene	8270D	41		ug/L	21
002	CMR-MW81S-190617-GW	Aqueous	Naphthalene	8270D	20		ug/L	21
002	CMR-MW81S-190617-GW	Aqueous	Phenanthrene	8270D	1.2	J	ug/L	21
002	CMR-MW81S-190617-GW	Aqueous	Phenol	8270D	1.9	J	ug/L	21
002	CMR-MW81S-190617-GW	Aqueous	C11 - C22 Aromatics	Montana EPH	300		ug/L	23
002	CMR-MW81S-190617-GW	Aqueous	C5 - C8 Aliphatics,	Montana VPH	310		ug/L	24
002	CMR-MW81S-190617-GW	Aqueous	C9 - C12 Aliphatics,	Montana VPH	310		ug/L	24
002	CMR-MW81S-190617-GW	Aqueous	Benzene	Montana VPH	45		ug/L	25
002	CMR-MW81S-190617-GW	Aqueous	C9 - C10 Aromatics	Montana VPH	360		ug/L	25
002	CMR-MW81S-190617-GW	Aqueous	Ethylbenzene	Montana VPH	7.6		ug/L	25
002	CMR-MW81S-190617-GW	Aqueous	Naphthalene	Montana VPH	160		ug/L	25
002	CMR-MW81S-190617-GW	Aqueous	Toluene	Montana VPH	1.1	J	ug/L	25
002	CMR-MW81S-190617-GW	Aqueous	m+p - Xylenes	Montana VPH	3.6	J	ug/L	25
002	CMR-MW81S-190617-GW	Aqueous	o - Xylenes	Montana VPH	8.2		ug/L	25
002	CMR-MW81S-190617-GW	Aqueous	TPH	Montana VPH	1100		ug/L	26
002	CMR-MW81S-190617-GW	Aqueous	Arsenic	6020B	49		ug/L	27
002	CMR-MW81S-190617-GW	Aqueous	Barium	6020B	5000		ug/L	27
002	CMR-MW81S-190617-GW	Aqueous	Chromium	6020B	1.7	BJ	ug/L	27
002	CMR-MW81S-190617-GW	Aqueous	Cobalt	6020B	1.4	J	ug/L	27
002	CMR-MW81S-190617-GW	Aqueous	Copper	6020B	1.3	J	ug/L	27
002	CMR-MW81S-190617-GW	Aqueous	Nickel	6020B	6.0		ug/L	27
002	CMR-MW81S-190617-GW	Aqueous	Zinc	6020B	12		ug/L	27
003	CMR-MW81D-190617-GW	Aqueous	Acetone	8260B	7.0	J	ug/L	28
003	CMR-MW81D-190617-GW	Aqueous	Benzene	8260B	5.3		ug/L	28
003	CMR-MW81D-190617-GW	Aqueous	2-Butanone (MEK)	8260B	2.1	J	ug/L	28
003	CMR-MW81D-190617-GW	Aqueous	Cyclohexane	8260B	0.50		ug/L	28
003	CMR-MW81D-190617-GW	Aqueous	Isopropylbenzene	8260B	0.48	J	ug/L	28
003	CMR-MW81D-190617-GW	Aqueous	Methylcyclohexane	8260B	0.62	J	ug/L	28
003	CMR-MW81D-190617-GW	Aqueous	Naphthalene	8260B	3.7		ug/L	28
003	CMR-MW81D-190617-GW	Aqueous	Xylenes (total)	8260B	1.8		ug/L	29
003	CMR-MW81D-190617-GW	Aqueous	m+p - Xylenes	8260B	0.73		ug/L	29
003	CMR-MW81D-190617-GW	Aqueous	o - Xylenes	8260B	1.0		ug/L	29
003	CMR-MW81D-190617-GW	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	5.9	BJ	ug/L	30
003	CMR-MW81D-190617-GW	Aqueous	2-Methylnaphthalene	8270D	2.3		ug/L	31
003	CMR-MW81D-190617-GW	Aqueous	Naphthalene	8270D	1.3	J	ug/L	31
003	CMR-MW81D-190617-GW	Aqueous	C9 - C12 Aliphatics,	Montana VPH	33	J	ug/L	34
003	CMR-MW81D-190617-GW	Aqueous	Benzene	Montana VPH	4.8	J	ug/L	35

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-MW81D-190617-GW	Aqueous	C9 - C10 Aromatics	Montana VPH	82		ug/L	35
003	CMR-MW81D-190617-GW	Aqueous	Ethylbenzene	Montana VPH	1.4	J	ug/L	35
003	CMR-MW81D-190617-GW	Aqueous	Naphthalene	Montana VPH	6.3		ug/L	35
003	CMR-MW81D-190617-GW	Aqueous	o - Xylenes	Montana VPH	2.3	J	ug/L	35
003	CMR-MW81D-190617-GW	Aqueous	TPH	Montana VPH	140	J	ug/L	36
003	CMR-MW81D-190617-GW	Aqueous	Antimony	6020B	0.76	J	ug/L	37
003	CMR-MW81D-190617-GW	Aqueous	Arsenic	6020B	1.4	J	ug/L	37
003	CMR-MW81D-190617-GW	Aqueous	Barium	6020B	200		ug/L	37
003	CMR-MW81D-190617-GW	Aqueous	Chromium	6020B	1.6	BJ	ug/L	37
003	CMR-MW81D-190617-GW	Aqueous	Cobalt	6020B	1.8	J	ug/L	37
003	CMR-MW81D-190617-GW	Aqueous	Copper	6020B	4.5	J	ug/L	37
003	CMR-MW81D-190617-GW	Aqueous	Lead	6020B	0.26	J	ug/L	37
003	CMR-MW81D-190617-GW	Aqueous	Nickel	6020B	11		ug/L	37
003	CMR-MW81D-190617-GW	Aqueous	Zinc	6020B	16		ug/L	37

(107 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-001
Description: CMR-EB04D-190617-GW
Matrix: Aqueous
Date Sampled: 06/15/2019 1025
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1844	JM1		20584

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	49		10	2.0	ug/L	1
Benzene	71-43-2	8260B	14		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	15		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	1.4		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	4.2		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	2.3	J	10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	2.5		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	1.2	J	5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	150		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	0.83		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-001
Description: CMR-EB04D-190617-GW
Matrix: Aqueous
Date Sampled: 06/15/2019 1025
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1844	JM1		20584

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	6.9		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	3.6		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	3.3		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		87	70-130
Bromofluorobenzene		93	70-130
Toluene-d8		91	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-001
Description: CMR-EB04D-190617-GW
Matrix: Aqueous
Date Sampled: 06/15/2019 1025
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	06/27/2019 1429	SCD	06/19/2019 1229	19982

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	1.8		1.6	0.40	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		1.6	0.40	ug/L	1
Anthracene	120-12-7	8270D	ND		1.6	0.40	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		1.6	0.40	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		1.6	0.40	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		1.6	0.40	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		8.0	1.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		40	2.1	ug/L	1
Carbazole	86-74-8	8270D	1.2	J	8.0	0.40	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		8.0	1.7	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		8.0	2.6	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		8.0	0.60	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		8.0	1.6	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		8.0	1.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		8.0	1.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		8.0	1.6	ug/L	1
Chrysene	218-01-9	8270D	ND		1.6	0.40	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		1.6	0.40	ug/L	1
Dibenzofuran	132-64-9	8270D	1.9	J	8.0	1.6	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		8.0	1.7	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		8.0	1.8	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		8.0	1.6	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		40	8.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		8.0	1.9	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		40	1.9	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		40	1.8	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		8.0	1.5	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		40	4.2	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		40	8.9	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		40	13	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		16	3.6	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		16	3.4	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		40	4.8	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	4.9	BJ	40	3.8	ug/L	1
Fluoranthene	206-44-0	8270D	ND		1.6	0.40	ug/L	1
Fluorene	86-73-7	8270D	2.1		1.6	0.40	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		8.0	1.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		8.0	1.7	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		40	11	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		8.0	1.7	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		1.6	0.40	ug/L	1
Isophorone	78-59-1	8270D	ND		8.0	2.2	ug/L	1

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-001
Description: CMR-EB04D-190617-GW
Matrix: Aqueous
Date Sampled: 06/15/2019 1025
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	06/27/2019 1429	SCD	06/19/2019 1229	19982

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	190		1.6	0.40	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		8.0	2.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		16	4.6	ug/L	1
Naphthalene	91-20-3	8270D	60		1.6	0.40	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		16	6.6	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		16	1.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		16	13	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		8.0	1.7	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		16	4.4	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		40	21	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		8.0	2.8	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		8.0	5.0	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		40	13	ug/L	1
Phenanthrene	85-01-8	8270D	0.74	J	1.6	0.40	ug/L	1
Phenol	108-95-2	8270D	ND		8.0	1.9	ug/L	1
Pyrene	129-00-0	8270D	ND		1.6	0.40	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		8.0	2.5	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		8.0	5.5	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		8.0	3.7	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		8.0	1.9	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		8.0	2.2	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		38	37-129
2-Fluorophenol		28	24-127
Nitrobenzene-d5		43	38-127
Phenol-d5		29	28-128
Terphenyl-d14		72	10-148
2,4,6-Tribromophenol		68	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-001
Description: CMR-EB04D-190617-GW
Matrix: Aqueous
Date Sampled: 06/15/2019 1025
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1243	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		46	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-001
Description: CMR-EB04D-190617-GW
Matrix: Aqueous
Date Sampled: 06/15/2019 1025
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0112	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	490		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		56	40-140
2-Fluorobiphenyl (fractionation 1)		54	40-140
o - Terphenyl (aromatic)		48	40-140

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-001
Description: CMR-EB04D-190617-GW
Matrix: Aqueous
Date Sampled: 06/15/2019 1025
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/20/2019 1646	JJG		20691

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	110		75	15	ug/L	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	200		75	15	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	840	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-001
Description: CMR-EB04D-190617-GW
Matrix: Aqueous
Date Sampled: 06/15/2019 1025
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/20/2019 1646	JJG		20692

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	12		5.0	0.51	ug/L	2
C9 - C10 Aromatics		Montana VPH	260		25	5.0	ug/L	2
Ethylbenzene	100-41-4	Montana VPH	8.0		5.0	0.62	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	2
Naphthalene	91-20-3	Montana VPH	140		5.0	0.70	ug/L	2
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	2
m+p - Xylenes	179601-23-1	Montana VPH	3.9	J	5.0	1.2	ug/L	2
o - Xylenes	95-47-6	Montana VPH	4.8	J	5.0	0.58	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	544	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF18034-001
Description: CMR-EB04D-190617-GW
Matrix: Aqueous
Date Sampled: 06/15/2019 1025
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/20/2019 1646	JJG		20690

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	620		180	35	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	824	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-001
Description: CMR-EB04D-190617-GW
Matrix: Aqueous
Date Sampled: 06/15/2019 1025
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/21/2019 1104	TJW	06/20/2019 1702	20147
1	3005A	6020B	1	06/25/2019 1901	BNW	06/20/2019 1935	20200

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.88	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	ND		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	950		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	1.8	BJ	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	1.3	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	2.3	J	5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	13		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	5.6	J	10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-002
Description: CMR-MW81S-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1048
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1917	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	7.1	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	48		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	2.2	J	10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	0.64		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	38		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	4.6		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	19		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	23		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	130		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	1.0		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-002
Description: CMR-MW81S-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1048
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1917	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	8.9		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	3.4		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	5.5		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		89	70-130
Bromofluorobenzene		108	70-130
Toluene-d8		103	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-002
Description: CMR-MW81S-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1048
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	06/27/2019 1226	SCD	06/19/2019 1229	19982

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	1.6		1.6	0.40	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		1.6	0.40	ug/L	1
Anthracene	120-12-7	8270D	ND		1.6	0.40	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		1.6	0.40	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		1.6	0.40	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		1.6	0.40	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		8.0	1.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		40	2.1	ug/L	1
Carbazole	86-74-8	8270D	1.1	J	8.0	0.40	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		8.0	1.7	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		8.0	2.6	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		8.0	0.60	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		8.0	1.6	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		8.0	1.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		8.0	1.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		8.0	1.6	ug/L	1
Chrysene	218-01-9	8270D	ND		1.6	0.40	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		1.6	0.40	ug/L	1
Dibenzofuran	132-64-9	8270D	1.9	J	8.0	1.6	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		8.0	1.7	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		8.0	1.8	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		8.0	1.6	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		40	8.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		8.0	1.9	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		40	1.9	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		40	1.8	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		8.0	1.5	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		40	4.2	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		40	8.9	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		40	13	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		16	3.6	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		16	3.4	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		40	4.8	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	4.8	BJ	40	3.8	ug/L	1
Fluoranthene	206-44-0	8270D	ND		1.6	0.40	ug/L	1
Fluorene	86-73-7	8270D	2.7		1.6	0.40	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		8.0	1.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		8.0	1.7	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		40	11	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		8.0	1.7	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		1.6	0.40	ug/L	1
Isophorone	78-59-1	8270D	ND		8.0	2.2	ug/L	1

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-002
Description: CMR-MW81S-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1048
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	06/27/2019 1226	SCD	06/19/2019 1229	19982

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	41		1.6	0.40	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		8.0	2.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		16	4.6	ug/L	1
Naphthalene	91-20-3	8270D	20		1.6	0.40	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		16	6.6	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		16	1.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		16	13	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		8.0	1.7	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		16	4.4	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		40	21	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		8.0	2.8	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		8.0	5.0	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		40	13	ug/L	1
Phenanthrene	85-01-8	8270D	1.2	J	1.6	0.40	ug/L	1
Phenol	108-95-2	8270D	1.9	J	8.0	1.9	ug/L	1
Pyrene	129-00-0	8270D	ND		1.6	0.40	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		8.0	2.5	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		8.0	5.5	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		8.0	3.7	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		8.0	1.9	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		8.0	2.2	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		59	37-129
2-Fluorophenol		28	24-127
Nitrobenzene-d5		41	38-127
Phenol-d5		39	28-128
Terphenyl-d14		74	10-148
2,4,6-Tribromophenol		77	35-144

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J = Estimated result < LOQ and ≥ DL
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-002
Description: CMR-MW81S-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1048
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1313	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		43	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-002
Description: CMR-MW81S-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1048
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0142	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	300		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		44	40-140
2-Fluorobiphenyl (fractionation 1)		59	40-140
o - Terphenyl (aromatic)		45	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-002
Description: CMR-MW81S-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1048
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/20/2019 1714	JJG		20691

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	310		75	15	ug/L	2
C9 - C12 Aliphatics, Adjusted		Montana VPH	310		75	15	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	752	70-130

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-002
Description: CMR-MW81S-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1048
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/20/2019 1714	JJG		20692

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	45		5.0	0.51	ug/L	2
C9 - C10 Aromatics		Montana VPH	360		25	5.0	ug/L	2
Ethylbenzene	100-41-4	Montana VPH	7.6		5.0	0.62	ug/L	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	2
Naphthalene	91-20-3	Montana VPH	160		5.0	0.70	ug/L	2
Toluene	108-88-3	Montana VPH	1.1	J	5.0	0.53	ug/L	2
m+p - Xylenes	179601-23-1	Montana VPH	3.6	J	5.0	1.2	ug/L	2
o - Xylenes	95-47-6	Montana VPH	8.2		5.0	0.58	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	516	70-130

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF18034-002
Description: CMR-MW81S-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1048
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/20/2019 1714	JJG		20690

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1100		180	35	ug/L	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	792	70-130

LOQ = Limit of Quantitation
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-002
Description: CMR-MW81S-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1048
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/21/2019 1106	TJW	06/20/2019 1702	20147
1	3005A	6020B	1	06/25/2019 1907	BNW	06/20/2019 1935	20200

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	49		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	5000		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	1.7	BJ	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	1.4	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	1.3	J	5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	6.0		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	12		10	2.5	ug/L	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-003
Description: CMR-MW81D-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1229
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1940	JJG		20531
2	5030B	8260B	1	06/27/2019 0440	STM		20878

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	7.0	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	5.3		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	2.1	J	10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	0.50		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	0.48	J	0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	0.62	J	5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	3.7		0.50	0.40	ug/L	2
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-003
Description: CMR-MW81D-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1229
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1940	JJG		20531
2	5030B	8260B	1	06/27/2019 0440	STM		20878

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	1.8		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	0.73		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	1.0		0.50	0.40	ug/L	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
1,2-Dichloroethane-d4		88	70-130		97	70-130
Bromofluorobenzene		107	70-130		109	70-130
Toluene-d8		102	70-130		106	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-003
Description: CMR-MW81D-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1229
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	06/27/2019 1454	SCD	06/19/2019 1229	19982

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		1.6	0.40	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		1.6	0.40	ug/L	1
Anthracene	120-12-7	8270D	ND		1.6	0.40	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		1.6	0.40	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		1.6	0.40	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		1.6	0.40	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		1.6	0.40	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		8.0	1.5	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		40	2.1	ug/L	1
Carbazole	86-74-8	8270D	ND		8.0	0.40	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		8.0	1.7	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		8.0	2.6	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		8.0	0.60	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		8.0	1.6	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		8.0	1.5	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		8.0	1.5	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		8.0	1.6	ug/L	1
Chrysene	218-01-9	8270D	ND		1.6	0.40	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		1.6	0.40	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		8.0	1.6	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		8.0	1.7	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		8.0	1.8	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		8.0	1.6	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		40	8.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		8.0	1.9	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		40	1.9	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		40	1.8	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		8.0	1.5	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		40	4.2	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		40	8.9	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		40	13	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		16	3.6	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		16	3.4	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		40	4.8	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	5.9	BJ	40	3.8	ug/L	1
Fluoranthene	206-44-0	8270D	ND		1.6	0.40	ug/L	1
Fluorene	86-73-7	8270D	ND		1.6	0.40	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		8.0	1.5	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		8.0	1.7	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		40	11	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		8.0	1.7	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		1.6	0.40	ug/L	1
Isophorone	78-59-1	8270D	ND		8.0	2.2	ug/L	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-003
Description: CMR-MW81D-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1229
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	10	06/27/2019 1454	SCD	06/19/2019 1229	19982

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	2.3		1.6	0.40	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		8.0	2.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		16	4.6	ug/L	1
Naphthalene	91-20-3	8270D	1.3	J	1.6	0.40	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		16	6.6	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		16	1.5	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		16	13	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		8.0	1.7	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		16	4.4	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		40	21	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		8.0	2.8	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		8.0	5.0	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		40	13	ug/L	1
Phenanthrene	85-01-8	8270D	ND		1.6	0.40	ug/L	1
Phenol	108-95-2	8270D	ND		8.0	1.9	ug/L	1
Pyrene	129-00-0	8270D	ND		1.6	0.40	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		8.0	2.5	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		8.0	5.5	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		8.0	3.7	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		8.0	1.9	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		8.0	2.2	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		57	37-129
2-Fluorophenol		32	24-127
Nitrobenzene-d5		50	38-127
Phenol-d5		40	28-128
Terphenyl-d14		82	10-148
2,4,6-Tribromophenol		74	35-144

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-003
Description: CMR-MW81D-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1229
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1343	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		42	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-003
Description: CMR-MW81D-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1229
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0211	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		43	40-140
2-Fluorobiphenyl (fractionation 1)		62	40-140
o - Terphenyl (aromatic)		44	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-003
Description: CMR-MW81D-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1229
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1314	JJG		20575

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	33	J	75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF18034-003
Description: CMR-MW81D-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1229
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1314	JJG		20574

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	4.8	J	5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	82		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	1.4	J	5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	6.3		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	2.3	J	5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		88	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF18034-003
Description: CMR-MW81D-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1229
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/19/2019 1314	JJG		20573

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	140	J	180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-003
Description: CMR-MW81D-190617-GW
Matrix: Aqueous
Date Sampled: 06/17/2019 1229
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/21/2019 1109	TJW	06/20/2019 1702	20147
1	3005A	6020B	1	06/25/2019 1913	BNW	06/20/2019 1935	20200

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.76	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	1.4	J	2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	200		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	1.6	BJ	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	1.8	J	5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	4.5	J	5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	0.26	J	1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	11		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	16		10	2.5	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-004
Description: TB-14-20190617
Matrix: Aqueous
Date Sampled: 06/17/2019
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1352	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF18034-004
Description: TB-14-20190617
Matrix: Aqueous
Date Sampled: 06/17/2019
Date Received: 06/18/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1352	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		104	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20531-001
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/24/2019 1159
Benzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromoform	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/24/2019 1159
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloroform	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Cyclohexane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/24/2019 1159
1,4-Dioxane	ND		1	20	13	ug/L	06/24/2019 1159
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
2-Hexanone	ND		1	10	2.0	ug/L	06/24/2019 1159
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Methyl acetate	ND		1	1.0	0.40	ug/L	06/24/2019 1159
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/24/2019 1159
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/24/2019 1159
Methylene chloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Naphthalene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Styrene	ND		1	0.50	0.41	ug/L	06/24/2019 1159
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Toluene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/24/2019 1159

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20531-001
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Trichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/24/2019 1159
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/24/2019 1159
o - Xylenes	ND		1	0.50	0.40	ug/L	06/24/2019 1159

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		98	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20531-002
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	74		1	74	60-140	06/24/2019 1100
Benzene	50	48		1	96	70-130	06/24/2019 1100
Bromochloromethane	50	47		1	94	70-130	06/24/2019 1100
Bromodichloromethane	50	49		1	98	70-130	06/24/2019 1100
Bromoform	50	47		1	95	70-130	06/24/2019 1100
Bromomethane (Methyl bromide)	50	44		1	88	70-130	06/24/2019 1100
2-Butanone (MEK)	100	95		1	95	70-130	06/24/2019 1100
Carbon disulfide	50	45		1	90	70-130	06/24/2019 1100
Carbon tetrachloride	50	48		1	96	70-130	06/24/2019 1100
Chlorobenzene	50	47		1	93	70-130	06/24/2019 1100
Chloroethane	50	47		1	94	70-130	06/24/2019 1100
Chloroform	50	46		1	92	70-130	06/24/2019 1100
Chloromethane (Methyl chloride)	50	51		1	102	60-140	06/24/2019 1100
Cyclohexane	50	45		1	91	70-130	06/24/2019 1100
1,2-Dibromo-3-chloropropane (DBCP)	50	50		1	100	70-130	06/24/2019 1100
Dibromochloromethane	50	50		1	99	70-130	06/24/2019 1100
1,2-Dibromoethane (EDB)	50	50		1	100	70-130	06/24/2019 1100
1,2-Dichlorobenzene	50	46		1	92	70-130	06/24/2019 1100
1,3-Dichlorobenzene	50	45		1	89	70-130	06/24/2019 1100
1,4-Dichlorobenzene	50	44		1	88	70-130	06/24/2019 1100
Dichlorodifluoromethane	50	54		1	107	60-140	06/24/2019 1100
1,1-Dichloroethane	50	46		1	92	70-130	06/24/2019 1100
1,2-Dichloroethane	50	50		1	100	70-130	06/24/2019 1100
1,1-Dichloroethene	50	50		1	100	70-130	06/24/2019 1100
cis-1,2-Dichloroethene	50	47		1	93	70-130	06/24/2019 1100
trans-1,2-Dichloroethene	50	49		1	99	70-130	06/24/2019 1100
1,2-Dichloropropane	50	45		1	89	70-130	06/24/2019 1100
cis-1,3-Dichloropropene	50	53		1	105	70-130	06/24/2019 1100
trans-1,3-Dichloropropene	50	50		1	101	70-130	06/24/2019 1100
1,4-Dioxane	500	470		1	93	60-140	06/24/2019 1100
Ethylbenzene	50	50		1	100	70-130	06/24/2019 1100
2-Hexanone	100	100		1	102	70-130	06/24/2019 1100
Isopropylbenzene	50	52		1	104	70-130	06/24/2019 1100
Methyl acetate	50	38		1	77	70-130	06/24/2019 1100
Methyl tertiary butyl ether (MTBE)	50	44		1	88	70-130	06/24/2019 1100
4-Methyl-2-pentanone	100	110		1	105	70-130	06/24/2019 1100
Methylcyclohexane	50	48		1	95	70-130	06/24/2019 1100
Methylene chloride	50	44		1	87	70-130	06/24/2019 1100
Naphthalene	50	49		1	98	70-130	06/24/2019 1100
Styrene	50	52		1	104	70-130	06/24/2019 1100
1,1,2,2-Tetrachloroethane	50	52		1	104	70-130	06/24/2019 1100
Tetrachloroethene	50	48		1	97	70-130	06/24/2019 1100
Toluene	50	48		1	96	70-130	06/24/2019 1100
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	45		1	90	70-130	06/24/2019 1100

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20531-002
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	101	70-130	06/24/2019 1100
1,2,4-Trichlorobenzene	50	48		1	95	70-130	06/24/2019 1100
1,1,1-Trichloroethane	50	45		1	91	70-130	06/24/2019 1100
1,1,2-Trichloroethane	50	49		1	97	70-130	06/24/2019 1100
Trichloroethene	50	48		1	95	70-130	06/24/2019 1100
Trichlorofluoromethane	50	48		1	97	70-130	06/24/2019 1100
Vinyl chloride	50	44		1	88	70-130	06/24/2019 1100
Xylenes (total)	100	100		1	101	70-130	06/24/2019 1100
m+p - Xylenes	50	52		1	103	70-130	06/24/2019 1100
o - Xylenes	50	50		1	99	70-130	06/24/2019 1100

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		102	70-130
Bromofluorobenzene		112	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20584-001
Batch: 20584
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/24/2019 1540
Benzene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Bromoform	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/24/2019 1540
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/24/2019 1540
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Chloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Chloroform	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Cyclohexane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/24/2019 1540
1,4-Dioxane	ND		1	20	13	ug/L	06/24/2019 1540
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
2-Hexanone	ND		1	10	2.0	ug/L	06/24/2019 1540
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Methyl acetate	ND		1	1.0	0.40	ug/L	06/24/2019 1540
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/24/2019 1540
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/24/2019 1540
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/24/2019 1540
Methylene chloride	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Naphthalene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Styrene	ND		1	0.50	0.41	ug/L	06/24/2019 1540
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Toluene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/24/2019 1540

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20584-001
Batch: 20584
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Trichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/24/2019 1540
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/24/2019 1540
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/24/2019 1540
o - Xylenes	ND		1	0.50	0.40	ug/L	06/24/2019 1540

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	70-130
Bromofluorobenzene		94	70-130
Toluene-d8		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20584-002
Batch: 20584
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	77		1	77	60-140	06/24/2019 1456
Benzene	50	46		1	93	70-130	06/24/2019 1456
Bromochloromethane	50	43		1	86	70-130	06/24/2019 1456
Bromodichloromethane	50	47		1	94	70-130	06/24/2019 1456
Bromoform	50	48		1	97	70-130	06/24/2019 1456
Bromomethane (Methyl bromide)	50	47		1	93	70-130	06/24/2019 1456
2-Butanone (MEK)	100	82		1	82	70-130	06/24/2019 1456
Carbon disulfide	50	40		1	80	70-130	06/24/2019 1456
Carbon tetrachloride	50	47		1	94	70-130	06/24/2019 1456
Chlorobenzene	50	46		1	92	70-130	06/24/2019 1456
Chloroethane	50	49		1	98	70-130	06/24/2019 1456
Chloroform	50	43		1	86	70-130	06/24/2019 1456
Chloromethane (Methyl chloride)	50	59		1	118	60-140	06/24/2019 1456
Cyclohexane	50	43		1	87	70-130	06/24/2019 1456
1,2-Dibromo-3-chloropropane (DBCP)	50	45		1	91	70-130	06/24/2019 1456
Dibromochloromethane	50	49		1	97	70-130	06/24/2019 1456
1,2-Dibromoethane (EDB)	50	49		1	97	70-130	06/24/2019 1456
1,2-Dichlorobenzene	50	46		1	92	70-130	06/24/2019 1456
1,3-Dichlorobenzene	50	47		1	94	70-130	06/24/2019 1456
1,4-Dichlorobenzene	50	45		1	91	70-130	06/24/2019 1456
Dichlorodifluoromethane	50	56		1	112	60-140	06/24/2019 1456
1,1-Dichloroethane	50	44		1	88	70-130	06/24/2019 1456
1,2-Dichloroethane	50	44		1	88	70-130	06/24/2019 1456
1,1-Dichloroethene	50	46		1	92	70-130	06/24/2019 1456
cis-1,2-Dichloroethene	50	43		1	86	70-130	06/24/2019 1456
trans-1,2-Dichloroethene	50	46		1	91	70-130	06/24/2019 1456
1,2-Dichloropropane	50	48		1	96	70-130	06/24/2019 1456
cis-1,3-Dichloropropene	50	50		1	101	70-130	06/24/2019 1456
trans-1,3-Dichloropropene	50	49		1	98	70-130	06/24/2019 1456
1,4-Dioxane	500	530		1	107	60-140	06/24/2019 1456
Ethylbenzene	50	47		1	95	70-130	06/24/2019 1456
2-Hexanone	100	100		1	100	70-130	06/24/2019 1456
Isopropylbenzene	50	51		1	101	70-130	06/24/2019 1456
Methyl acetate	50	32	N	1	64	70-130	06/24/2019 1456
Methyl tertiary butyl ether (MTBE)	50	42		1	85	70-130	06/24/2019 1456
4-Methyl-2-pentanone	100	99		1	99	70-130	06/24/2019 1456
Methylcyclohexane	50	51		1	101	70-130	06/24/2019 1456
Methylene chloride	50	39		1	79	70-130	06/24/2019 1456
Naphthalene	50	47		1	95	70-130	06/24/2019 1456
Styrene	50	50		1	99	70-130	06/24/2019 1456
1,1,2,2-Tetrachloroethane	50	48		1	97	70-130	06/24/2019 1456
Tetrachloroethene	50	48		1	96	70-130	06/24/2019 1456
Toluene	50	47		1	94	70-130	06/24/2019 1456
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	44		1	89	70-130	06/24/2019 1456

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20584-002
Batch: 20584
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	49		1	97	70-130	06/24/2019 1456
1,2,4-Trichlorobenzene	50	47		1	94	70-130	06/24/2019 1456
1,1,1-Trichloroethane	50	43		1	87	70-130	06/24/2019 1456
1,1,2-Trichloroethane	50	48		1	97	70-130	06/24/2019 1456
Trichloroethene	50	46		1	92	70-130	06/24/2019 1456
Trichlorofluoromethane	50	50		1	100	70-130	06/24/2019 1456
Vinyl chloride	50	50		1	100	70-130	06/24/2019 1456
Xylenes (total)	100	99		1	99	70-130	06/24/2019 1456
m+p - Xylenes	50	49		1	99	70-130	06/24/2019 1456
o - Xylenes	50	49		1	99	70-130	06/24/2019 1456

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		84	70-130
Bromofluorobenzene		93	70-130
Toluene-d8		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20878-001
Batch: 20878
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Naphthalene	ND		1	0.50	0.40	ug/L	06/26/2019 2215

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		107	70-130
Bromofluorobenzene		103	70-130
Toluene-d8		114	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20878-002
Batch: 20878
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Naphthalene	50	47		1	93	70-130	06/26/2019 2108

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		107	70-130
Bromofluorobenzene		114	70-130
Toluene-d8		107	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19982-001
Batch: 19982
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/19/2019 1229

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Acenaphthylene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Anthracene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	06/27/2019 1137
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	06/27/2019 1137
Carbazole	ND		1	0.80	0.040	ug/L	06/27/2019 1137
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	06/27/2019 1137
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	06/27/2019 1137
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	06/27/2019 1137
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	06/27/2019 1137
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	06/27/2019 1137
2-Chlorophenol	ND		1	0.80	0.15	ug/L	06/27/2019 1137
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	06/27/2019 1137
Chrysene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Dibenzofuran	ND		1	0.80	0.16	ug/L	06/27/2019 1137
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	06/27/2019 1137
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	06/27/2019 1137
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	06/27/2019 1137
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	06/27/2019 1137
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	06/27/2019 1137
Diethylphthalate	ND		1	4.0	0.19	ug/L	06/27/2019 1137
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	06/27/2019 1137
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	06/27/2019 1137
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	06/27/2019 1137
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	06/27/2019 1137
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	06/27/2019 1137
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	06/27/2019 1137
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	06/27/2019 1137
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	06/27/2019 1137
bis(2-Ethylhexyl)phthalate	0.73	J	1	4.0	0.38	ug/L	06/27/2019 1137
Fluoranthene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Fluorene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	06/27/2019 1137
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	06/27/2019 1137
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	06/27/2019 1137
Hexachloroethane	ND		1	0.80	0.17	ug/L	06/27/2019 1137
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Isophorone	ND		1	0.80	0.22	ug/L	06/27/2019 1137

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ19982-001
Batch: 19982
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/19/2019 1229

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
2-Methylphenol	ND		1	0.80	0.21	ug/L	06/27/2019 1137
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	06/27/2019 1137
Naphthalene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
2-Nitroaniline	ND		1	1.6	0.66	ug/L	06/27/2019 1137
3-Nitroaniline	ND		1	1.6	0.15	ug/L	06/27/2019 1137
4-Nitroaniline	ND		1	1.6	1.3	ug/L	06/27/2019 1137
Nitrobenzene	ND		1	0.80	0.17	ug/L	06/27/2019 1137
2-Nitrophenol	ND		1	1.6	0.44	ug/L	06/27/2019 1137
4-Nitrophenol	ND		1	4.0	2.1	ug/L	06/27/2019 1137
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	06/27/2019 1137
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	06/27/2019 1137
Pentachlorophenol	ND		1	4.0	1.3	ug/L	06/27/2019 1137
Phenanthrene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
Phenol	ND		1	0.80	0.19	ug/L	06/27/2019 1137
Pyrene	ND		1	0.16	0.040	ug/L	06/27/2019 1137
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	06/27/2019 1137
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	06/27/2019 1137
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	06/27/2019 1137
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	06/27/2019 1137
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	06/27/2019 1137

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		51	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		55	38-127
Phenol-d5		42	28-128
Terphenyl-d14		79	10-148
2,4,6-Tribromophenol		54	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19982-002
Batch: 19982
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/19/2019 1229

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.7		1	59	30-122	06/27/2019 1201
Acenaphthylene	8.0	5.3		1	66	30-130	06/27/2019 1201
Anthracene	8.0	5.8		1	72	30-123	06/27/2019 1201
Benzo(a)anthracene	8.0	6.2		1	77	40-125	06/27/2019 1201
Benzo(a)pyrene	8.0	5.5		1	68	40-128	06/27/2019 1201
Benzo(b)fluoranthene	8.0	5.4		1	67	30-130	06/27/2019 1201
Benzo(g,h,i)perylene	8.0	6.6		1	83	30-130	06/27/2019 1201
Benzo(k)fluoranthene	8.0	6.0		1	75	30-130	06/27/2019 1201
4-Bromophenyl phenyl ether	8.0	5.0		1	63	30-124	06/27/2019 1201
Butyl benzyl phthalate	8.0	6.6		1	83	54-135	06/27/2019 1201
Carbazole	8.0	5.7		1	71	45-101	06/27/2019 1201
bis (2-Chloro-1-methylethyl) ether	8.0	5.3		1	66	42-124	06/27/2019 1201
4-Chloro-3-methyl phenol	8.0	5.0		1	62	30-123	06/27/2019 1201
bis(2-Chloroethoxy)methane	8.0	5.2		1	65	44-127	06/27/2019 1201
bis(2-Chloroethyl)ether	8.0	4.8		1	60	46-120	06/27/2019 1201
2-Chloronaphthalene	8.0	4.6		1	57	46-100	06/27/2019 1201
2-Chlorophenol	8.0	3.6	N	1	45	50-117	06/27/2019 1201
4-Chlorophenyl phenyl ether	8.0	5.1		1	63	30-121	06/27/2019 1201
Chrysene	8.0	6.0		1	74	30-130	06/27/2019 1201
Dibenzo(a,h)anthracene	8.0	6.1		1	76	30-130	06/27/2019 1201
Dibenzofuran	8.0	4.9		1	62	30-118	06/27/2019 1201
1,2-Dichlorobenzene	8.0	4.0		1	51	32-111	06/27/2019 1201
1,3-Dichlorobenzene	8.0	4.1		1	51	28-110	06/27/2019 1201
1,4-Dichlorobenzene	8.0	4.0		1	50	29-112	06/27/2019 1201
3,3'-Dichlorobenzidine	8.0	3.5		1	43	10-126	06/27/2019 1201
2,4-Dichlorophenol	8.0	4.4		1	55	30-121	06/27/2019 1201
Diethylphthalate	8.0	5.5		1	69	40-125	06/27/2019 1201
Dimethyl phthalate	8.0	5.6		1	70	40-127	06/27/2019 1201
2,4-Dimethylphenol	8.0	6.0		1	75	20-125	06/27/2019 1201
Di-n-butyl phthalate	8.0	6.1		1	76	40-127	06/27/2019 1201
4,6-Dinitro-2-methylphenol	8.0	4.7		1	59	56-128	06/27/2019 1201
2,4-Dinitrophenol	16	7.0		1	44	11-126	06/27/2019 1201
2,4-Dinitrotoluene	8.0	5.7		1	72	59-127	06/27/2019 1201
2,6-Dinitrotoluene	8.0	5.5		1	69	59-126	06/27/2019 1201
Di-n-octylphthalate	8.0	4.8		1	61	50-136	06/27/2019 1201
bis(2-Ethylhexyl)phthalate	8.0	5.9		1	74	56-128	06/27/2019 1201
Fluoranthene	8.0	6.0		1	74	40-128	06/27/2019 1201
Fluorene	8.0	4.9		1	62	30-124	06/27/2019 1201
Hexachlorobenzene	8.0	5.2		1	65	30-125	06/27/2019 1201
Hexachlorobutadiene	8.0	3.9		1	48	24-110	06/27/2019 1201
Hexachlorocyclopentadiene	40	15		1	38	16-96	06/27/2019 1201
Hexachloroethane	8.0	3.9		1	49	31-110	06/27/2019 1201
Indeno(1,2,3-c,d)pyrene	8.0	6.4		1	79	30-130	06/27/2019 1201
Isophorone	8.0	5.7		1	71	57-123	06/27/2019 1201

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ19982-002
Batch: 19982
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/19/2019 1229

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.7		1	59	40-132	06/27/2019 1201
2-Methylphenol	8.0	5.9		1	73	56-119	06/27/2019 1201
3+4-Methylphenol	8.0	4.3		1	54	53-119	06/27/2019 1201
Naphthalene	8.0	4.7		1	58	30-130	06/27/2019 1201
2-Nitroaniline	8.0	5.3		1	67	60-124	06/27/2019 1201
3-Nitroaniline	8.0	4.4		1	55	43-123	06/27/2019 1201
4-Nitroaniline	8.0	5.0		1	63	30-135	06/27/2019 1201
Nitrobenzene	8.0	5.0		1	63	51-122	06/27/2019 1201
2-Nitrophenol	8.0	4.9		1	62	51-118	06/27/2019 1201
4-Nitrophenol	16	7.9	N	1	49	53-130	06/27/2019 1201
N-Nitrosodi-n-propylamine	8.0	5.2		1	65	54-127	06/27/2019 1201
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.3		1	67	30-123	06/27/2019 1201
Pentachlorophenol	16	7.4		1	46	42-131	06/27/2019 1201
Phenanthrene	8.0	5.3		1	66	40-123	06/27/2019 1201
Phenol	8.0	3.9		1	49	49-117	06/27/2019 1201
Pyrene	8.0	6.5		1	81	40-126	06/27/2019 1201
1,2,4,5-Tetrachlorobenzene	8.0	3.9		1	48	30-130	06/27/2019 1201
2,3,4,6-Tetrachlorophenol	8.0	4.7		1	59	30-130	06/27/2019 1201
1,2,4-Trichlorobenzene	8.0	4.1		1	51	20-90	06/27/2019 1201
2,4,5-Trichlorophenol	8.0	4.6		1	57	30-123	06/27/2019 1201
2,4,6-Trichlorophenol	8.0	4.7		1	59	30-125	06/27/2019 1201

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		62	37-129
2-Fluorophenol		39	24-127
Nitrobenzene-d5		63	38-127
Phenol-d5		45	28-128
Terphenyl-d14		91	10-148
2,4,6-Tribromophenol		69	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF18034-002MS
Batch: 19982
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/19/2019 1229

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	1.6	16	11		10	59	30-122	06/27/2019 1519
Acenaphthylene	ND	16	11		10	67	30-130	06/27/2019 1519
Anthracene	ND	16	11		10	70	30-123	06/27/2019 1519
Benzo(a)anthracene	ND	16	11		10	69	40-125	06/27/2019 1519
Benzo(a)pyrene	ND	16	10		10	64	40-128	06/27/2019 1519
Benzo(b)fluoranthene	ND	16	10		10	64	30-130	06/27/2019 1519
Benzo(g,h,i)perylene	ND	16	7.7		10	48	30-130	06/27/2019 1519
Benzo(k)fluoranthene	ND	16	8.6		10	54	30-130	06/27/2019 1519
4-Bromophenyl phenyl ether	ND	16	10		10	65	30-124	06/27/2019 1519
Butyl benzyl phthalate	ND	16	13		10	78	54-135	06/27/2019 1519
Carbazole	1.1	16	13		10	73	45-101	06/27/2019 1519
bis (2-Chloro-1-methylethyl) ether	ND	16	8.2		10	51	42-124	06/27/2019 1519
4-Chloro-3-methyl phenol	ND	16	10		10	63	30-123	06/27/2019 1519
bis(2-Chloroethoxy)methane	ND	16	8.5		10	53	44-127	06/27/2019 1519
bis(2-Chloroethyl)ether	ND	16	7.5		10	47	46-120	06/27/2019 1519
2-Chloronaphthalene	ND	16	8.4		10	53	46-100	06/27/2019 1519
2-Chlorophenol	ND	16	5.8	N	10	36	50-117	06/27/2019 1519
4-Chlorophenyl phenyl ether	ND	16	10		10	65	30-121	06/27/2019 1519
Chrysene	ND	16	10		10	64	30-130	06/27/2019 1519
Dibenzo(a,h)anthracene	ND	16	7.6		10	47	30-130	06/27/2019 1519
Dibenzofuran	1.9	16	12		10	64	30-118	06/27/2019 1519
1,2-Dichlorobenzene	ND	16	6.8		10	42	32-111	06/27/2019 1519
1,3-Dichlorobenzene	ND	16	6.9		10	43	28-110	06/27/2019 1519
1,4-Dichlorobenzene	ND	16	6.9		10	43	29-112	06/27/2019 1519
3,3'-Dichlorobenzidine	ND	16	ND	N	10	0.00	10-126	06/27/2019 1519
2,4-Dichlorophenol	ND	16	8.7		10	54	30-121	06/27/2019 1519
Diethylphthalate	ND	16	11		10	71	40-125	06/27/2019 1519
Dimethyl phthalate	ND	16	12		10	72	40-127	06/27/2019 1519
2,4-Dimethylphenol	ND	16	15		10	97	20-125	06/27/2019 1519
Di-n-butyl phthalate	ND	16	12		10	76	40-127	06/27/2019 1519
4,6-Dinitro-2-methylphenol	ND	16	25	N	10	157	56-128	06/27/2019 1519
2,4-Dinitrophenol	ND	32	47	N	10	148	30-130	06/27/2019 1519
2,4-Dinitrotoluene	ND	16	10		10	63	59-127	06/27/2019 1519
2,6-Dinitrotoluene	ND	16	12		10	73	59-126	06/27/2019 1519
Di-n-octylphthalate	ND	16	16		10	98	50-136	06/27/2019 1519
bis(2-Ethylhexyl)phthalate	4.8	16	15		10	66	56-128	06/27/2019 1519
Fluoranthene	ND	16	11		10	69	40-128	06/27/2019 1519
Fluorene	2.7	16	13		10	64	30-124	06/27/2019 1519
Hexachlorobenzene	ND	16	10		10	63	30-125	06/27/2019 1519
Hexachlorobutadiene	ND	16	6.8		10	43	30-130	06/27/2019 1519
Hexachlorocyclopentadiene	ND	80	17		10	21	16-96	06/27/2019 1519
Hexachloroethane	ND	16	13		10	84	31-110	06/27/2019 1519
Indeno(1,2,3-c,d)pyrene	ND	16	7.3		10	46	30-130	06/27/2019 1519
Isophorone	ND	16	12		10	75	57-123	06/27/2019 1519

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MS

Sample ID: UF18034-002MS
Batch: 19982
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/19/2019 1229

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	41	16	57		10	95	40-132	06/27/2019 1519
2-Methylphenol	ND	16	12		10	76	56-119	06/27/2019 1519
3+4-Methylphenol	ND	16	7.4	N	10	46	53-119	06/27/2019 1519
Naphthalene	20	16	32		10	80	30-130	06/27/2019 1519
2-Nitroaniline	ND	16	10		10	65	60-124	06/27/2019 1519
3-Nitroaniline	ND	16	ND	N	10	0.00	43-123	06/27/2019 1519
4-Nitroaniline	ND	16	ND	N	10	0.00	30-135	06/27/2019 1519
Nitrobenzene	ND	16	9.5		10	59	51-122	06/27/2019 1519
2-Nitrophenol	ND	16	8.5		10	53	51-118	06/27/2019 1519
4-Nitrophenol	ND	32	24		10	75	53-130	06/27/2019 1519
N-Nitrosodi-n-propylamine	ND	16	8.3	N	10	52	54-127	06/27/2019 1519
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	11		10	71	30-123	06/27/2019 1519
Pentachlorophenol	ND	32	21		10	64	42-131	06/27/2019 1519
Phenanthrene	1.2	16	12		10	66	40-123	06/27/2019 1519
Phenol	1.9	16	7.9	N	10	37	49-117	06/27/2019 1519
Pyrene	ND	16	12		10	75	40-126	06/27/2019 1519
1,2,4,5-Tetrachlorobenzene	ND	16	7.0		10	44	30-130	06/27/2019 1519
2,3,4,6-Tetrachlorophenol	ND	16	11		10	70	30-130	06/27/2019 1519
1,2,4-Trichlorobenzene	ND	16	7.5		10	47	20-90	06/27/2019 1519
2,4,5-Trichlorophenol	ND	16	9.7		10	61	30-123	06/27/2019 1519
2,4,6-Trichlorophenol	ND	16	9.1		10	57	30-125	06/27/2019 1519

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		55	37-129
2-Fluorophenol		33	24-127
Nitrobenzene-d5		52	38-127
Phenol-d5		36	28-128
Terphenyl-d14		66	10-148
2,4,6-Tribromophenol		74	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF18034-002MD
Batch: 19982
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/19/2019 1229

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acenaphthene	1.6	16	9.3		10	48	17	30-122	40	06/27/2019 1543
Acenaphthylene	ND	16	9.2		10	57	15	30-130	40	06/27/2019 1543
Anthracene	ND	16	9.7		10	61	15	30-123	40	06/27/2019 1543
Benzo(a)anthracene	ND	16	9.4		10	58	17	40-125	40	06/27/2019 1543
Benzo(a)pyrene	ND	16	8.8		10	55	15	40-128	40	06/27/2019 1543
Benzo(b)fluoranthene	ND	16	8.8		10	55	15	30-130	40	06/27/2019 1543
Benzo(g,h,i)perylene	ND	16	6.3		10	39	20	30-130	40	06/27/2019 1543
Benzo(k)fluoranthene	ND	16	7.1		10	44	19	30-130	40	06/27/2019 1543
4-Bromophenyl phenyl ether	ND	16	9.5		10	59	8.9	30-124	40	06/27/2019 1543
Butyl benzyl phthalate	ND	16	10		10	63	21	54-135	40	06/27/2019 1543
Carbazole	1.1	16	11		10	62	14	45-101	40	06/27/2019 1543
bis (2-Chloro-1-methylethyl) ether	ND	16	9.1		10	57	10	42-124	40	06/27/2019 1543
4-Chloro-3-methyl phenol	ND	16	8.2		10	51	20	30-123	40	06/27/2019 1543
bis(2-Chloroethoxy)methane	ND	16	7.3		10	46	15	44-127	40	06/27/2019 1543
bis(2-Chloroethyl)ether	ND	16	7.6		10	47	1.6	46-120	40	06/27/2019 1543
2-Chloronaphthalene	ND	16	7.4		10	46	13	46-100	40	06/27/2019 1543
2-Chlorophenol	ND	16	5.2	N	10	33	10	50-117	40	06/27/2019 1543
4-Chlorophenyl phenyl ether	ND	16	8.9		10	55	16	30-121	40	06/27/2019 1543
Chrysene	ND	16	8.4		10	53	19	30-130	40	06/27/2019 1543
Dibenzo(a,h)anthracene	ND	16	6.1		10	38	21	30-130	40	06/27/2019 1543
Dibenzofuran	1.9	16	10		10	53	16	30-118	40	06/27/2019 1543
1,2-Dichlorobenzene	ND	16	6.6		10	41	3.4	32-111	20	06/27/2019 1543
1,3-Dichlorobenzene	ND	16	6.3		10	39	9.5	28-110	20	06/27/2019 1543
1,4-Dichlorobenzene	ND	16	6.2		10	39	11	29-112	20	06/27/2019 1543
3,3'-Dichlorobenzidine	ND	16	ND	N	10	0.00	0.00	10-126	40	06/27/2019 1543
2,4-Dichlorophenol	ND	16	7.1		10	44	20	30-121	40	06/27/2019 1543
Diethylphthalate	ND	16	10		10	64	11	40-125	40	06/27/2019 1543
Dimethyl phthalate	ND	16	11		10	66	8.4	40-127	40	06/27/2019 1543
2,4-Dimethylphenol	ND	16	12		10	76	24	20-125	40	06/27/2019 1543
Di-n-butyl phthalate	ND	16	10		10	64	18	40-127	40	06/27/2019 1543
4,6-Dinitro-2-methylphenol	ND	16	24	N	10	148	5.6	56-128	40	06/27/2019 1543
2,4-Dinitrophenol	ND	32	47	N	10	145	1.9	30-130	40	06/27/2019 1543
2,4-Dinitrotoluene	ND	16	8.6	N	10	54	17	59-127	40	06/27/2019 1543
2,6-Dinitrotoluene	ND	16	10		10	63	15	59-126	40	06/27/2019 1543
Di-n-octylphthalate	ND	16	15		10	92	6.6	50-136	40	06/27/2019 1543
bis(2-Ethylhexyl)phthalate	4.8	16	14		10	57	10	56-128	40	06/27/2019 1543
Fluoranthene	ND	16	9.6		10	60	14	40-128	40	06/27/2019 1543
Fluorene	2.7	16	11		10	50	20	30-124	40	06/27/2019 1543
Hexachlorobenzene	ND	16	8.0		10	50	22	30-125	40	06/27/2019 1543
Hexachlorobutadiene	ND	16	5.9		10	37	14	30-130	40	06/27/2019 1543
Hexachlorocyclopentadiene	ND	80	15		10	19	6.6	16-96	40	06/27/2019 1543
Hexachloroethane	ND	16	15		10	95	11	31-110	40	06/27/2019 1543
Indeno(1,2,3-c,d)pyrene	ND	16	6.3		10	39	15	30-130	40	06/27/2019 1543
Isophorone	ND	16	10		10	65	14	57-123	40	06/27/2019 1543

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MSD

Sample ID: UF18034-002MD
Batch: 19982
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/19/2019 1229

Parameter	Sample Amount (ug/L)	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
2-Methylnaphthalene	41	16	50		10	54	12	40-132	40	06/27/2019 1543
2-Methylphenol	ND	16	11		10	69	9.4	56-119	40	06/27/2019 1543
3+4-Methylphenol	ND	16	7.8	N	10	49	5.1	53-119	40	06/27/2019 1543
Naphthalene	20	16	28		10	55	13	30-130	40	06/27/2019 1543
2-Nitroaniline	ND	16	9.3	N	10	58	11	60-124	40	06/27/2019 1543
3-Nitroaniline	ND	16	ND	N	10	0.00	0.00	43-123	40	06/27/2019 1543
4-Nitroaniline	ND	16	ND	N	10	0.00	0.00	30-135	40	06/27/2019 1543
Nitrobenzene	ND	16	8.3		10	52	13	51-122	40	06/27/2019 1543
2-Nitrophenol	ND	16	6.9	N	10	43	20	51-118	40	06/27/2019 1543
4-Nitrophenol	ND	32	13	N,+	10	42	57	53-130	40	06/27/2019 1543
N-Nitrosodi-n-propylamine	ND	16	8.6		10	54	2.7	54-127	40	06/27/2019 1543
N-Nitrosodiphenylamine (Diphenylamine)	ND	16	9.1		10	57	21	30-123	40	06/27/2019 1543
Pentachlorophenol	ND	32	16		10	51	23	42-131	40	06/27/2019 1543
Phenanthrene	1.2	16	10		10	58	12	40-123	40	06/27/2019 1543
Phenol	1.9	16	8.1	N	10	39	3.1	49-117	40	06/27/2019 1543
Pyrene	ND	16	11		10	67	12	40-126	40	06/27/2019 1543
1,2,4,5-Tetrachlorobenzene	ND	16	6.0		10	37	17	30-130	40	06/27/2019 1543
2,3,4,6-Tetrachlorophenol	ND	16	9.2		10	57	20	30-130	40	06/27/2019 1543
1,2,4-Trichlorobenzene	ND	16	6.6		10	41	12	20-90	40	06/27/2019 1543
2,4,5-Trichlorophenol	ND	16	7.9		10	50	20	30-123	40	06/27/2019 1543
2,4,6-Trichlorophenol	ND	16	7.6		10	47	18	30-125	40	06/27/2019 1543

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		49	37-129
2-Fluorophenol		30	24-127
Nitrobenzene-d5		40	38-127
Phenol-d5		36	28-128
Terphenyl-d14		57	10-148
2,4,6-Tribromophenol		64	35-144

LOQ = Limit of Quantitation
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LOD = Limit of Detection
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Montana EPH (aliphatics) - MB

Sample ID: UQ20744-001
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012
C9 - C18 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20744-002
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	260		1	65	40-140	07/08/2019 1042
C9 - C18 Aliphatics	300	140		1	48	40-140	07/08/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		57	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20744-003
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	280		1	69	5.9	40-140	25	07/08/2019 1112
C9 - C18 Aliphatics	300	150		1	51	6.4	40-140	25	07/08/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20745-001
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	07/08/2019 2143

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		45	40-140
2-Fluorobiphenyl (fractionation 1)		60	40-140
o - Terphenyl (aromatic)		52	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20745-002
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	460		1	54	40-140	07/08/2019 2213

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		48	40-140
2-Fluorobiphenyl (fractionation 1)		65	40-140
o - Terphenyl (aromatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20745-003
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	410		1	49	10	40-140	25	07/08/2019 2243

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		61	40-140
2-Fluorobiphenyl (fractionation 1)		62	40-140
o - Terphenyl (aromatic)		54	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ20573-001
Batch: 20573
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	06/19/2019 1113

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ20573-002
Batch: 20573
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	380		1	101	70-130	06/19/2019 1017

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ20573-003
Batch: 20573
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	370		1	98	2.9	70-130	25	06/19/2019 1045

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		85	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ20574-001
Batch: 20574
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/19/2019 1113
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	06/19/2019 1113
Ethylbenzene	ND		1	5.0	0.62	ug/L	06/19/2019 1113
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/19/2019 1113
Naphthalene	ND		1	5.0	0.70	ug/L	06/19/2019 1113
Toluene	ND		1	5.0	0.53	ug/L	06/19/2019 1113
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/19/2019 1113
o - Xylenes	ND		1	5.0	0.58	ug/L	06/19/2019 1113

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		78	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ20574-002
Batch: 20574
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	24		1	95	70-130	06/19/2019 1017
C9 - C10 Aromatics	25	25		1	99	70-130	06/19/2019 1017
Ethylbenzene	25	24		1	96	70-130	06/19/2019 1017
Methyl tertiary butyl ether (MTBE)	25	22		1	87	70-130	06/19/2019 1017
Naphthalene	25	22		1	88	70-130	06/19/2019 1017
Toluene	25	24		1	95	70-130	06/19/2019 1017
m+p - Xylenes	50	48		1	97	70-130	06/19/2019 1017
o - Xylenes	25	24		1	98	70-130	06/19/2019 1017

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ20574-003
Batch: 20574
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	24		1	95	0.42	70-130	25	06/19/2019 1045
C9 - C10 Aromatics	25	24		1	96	2.9	70-130	25	06/19/2019 1045
Ethylbenzene	25	24		1	94	1.7	70-130	25	06/19/2019 1045
Methyl tertiary butyl ether (MTBE)	25	21		1	85	2.3	70-130	25	06/19/2019 1045
Naphthalene	25	21		1	86	3.2	70-130	25	06/19/2019 1045
Toluene	25	23		1	94	1.7	70-130	25	06/19/2019 1045
m+p - Xylenes	50	47		1	95	2.3	70-130	25	06/19/2019 1045
o - Xylenes	25	23		1	94	4.2	70-130	25	06/19/2019 1045

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		81	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ20575-001
Batch: 20575
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/19/2019 1113
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/19/2019 1113

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ20575-002
Batch: 20575
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	100		1	104	70-130	06/19/2019 1017
C9 - C12 Aliphatics, Adjusted	75	75		1	100	70-130	06/19/2019 1017

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (aliphatics) - LCSD

Sample ID: UQ20575-003
Batch: 20575
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	100		1	101	2.9	70-130	25	06/19/2019 1045
C9 - C12 Aliphatics, Adjusted	75	71		1	95	5.3	70-130	25	06/19/2019 1045

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ20690-001
Batch: 20690
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	06/20/2019 1521

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - LCS

Sample ID: UQ20690-002
Batch: 20690
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	350		1	94	70-130	06/20/2019 1424

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ20690-003
Batch: 20690
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	360		1	97	3.4	70-130	25	06/20/2019 1453

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		87	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ20691-001
Batch: 20691
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/20/2019 1521
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/20/2019 1521

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ20691-002
Batch: 20691
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	93		1	93	70-130	06/20/2019 1424
C9 - C12 Aliphatics, Adjusted	75	70		1	93	70-130	06/20/2019 1424

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ20691-003
Batch: 20691
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	97		1	97	4.6	70-130	25	06/20/2019 1453
C9 - C12 Aliphatics, Adjusted	75	72		1	95	3.0	70-130	25	06/20/2019 1453

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (aromatics) - MB

Sample ID: UQ20692-001
Batch: 20692
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/20/2019 1521
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	06/20/2019 1521
Ethylbenzene	ND		1	5.0	0.62	ug/L	06/20/2019 1521
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/20/2019 1521
Naphthalene	ND		1	5.0	0.70	ug/L	06/20/2019 1521
Toluene	ND		1	5.0	0.53	ug/L	06/20/2019 1521
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/20/2019 1521
o - Xylenes	ND		1	5.0	0.58	ug/L	06/20/2019 1521

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		78	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ20692-002
Batch: 20692
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	22		1	88	70-130	06/20/2019 1424
C9 - C10 Aromatics	25	22		1	90	70-130	06/20/2019 1424
Ethylbenzene	25	23		1	90	70-130	06/20/2019 1424
Methyl tertiary butyl ether (MTBE)	25	20		1	80	70-130	06/20/2019 1424
Naphthalene	25	21		1	86	70-130	06/20/2019 1424
Toluene	25	23		1	90	70-130	06/20/2019 1424
m+p - Xylenes	50	45		1	90	70-130	06/20/2019 1424
o - Xylenes	25	22		1	87	70-130	06/20/2019 1424

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		78	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ20692-003
Batch: 20692
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	22		1	88	0.91	70-130	25	06/20/2019 1453
C9 - C10 Aromatics	25	24		1	94	5.2	70-130	25	06/20/2019 1453
Ethylbenzene	25	23		1	92	2.2	70-130	25	06/20/2019 1453
Methyl tertiary butyl ether (MTBE)	25	21		1	85	5.8	70-130	25	06/20/2019 1453
Naphthalene	25	22		1	87	1.4	70-130	25	06/20/2019 1453
Toluene	25	23		1	90	0.44	70-130	25	06/20/2019 1453
m+p - Xylenes	50	47		1	93	3.5	70-130	25	06/20/2019 1453
o - Xylenes	25	23		1	90	4.1	70-130	25	06/20/2019 1453

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20200-001
Batch: 20200
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/20/2019 1935

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	06/25/2019 1849
Arsenic	ND		1	2.0	1.3	ug/L	06/25/2019 1849
Barium	ND		1	5.0	1.3	ug/L	06/25/2019 1849
Beryllium	ND		1	0.40	0.15	ug/L	06/25/2019 1849
Cadmium	ND		1	0.50	0.13	ug/L	06/25/2019 1849
Chromium	1.3	J	1	5.0	1.3	ug/L	06/25/2019 1849
Cobalt	ND		1	5.0	1.3	ug/L	06/25/2019 1849
Copper	ND		1	5.0	1.3	ug/L	06/25/2019 1849
Lead	ND		1	1.0	0.25	ug/L	06/25/2019 1849
Nickel	ND		1	5.0	1.3	ug/L	06/25/2019 1849
Selenium	ND		1	5.0	1.3	ug/L	06/25/2019 1849
Silver	ND		1	1.0	0.25	ug/L	06/25/2019 1849
Vanadium	ND		1	5.0	2.5	ug/L	06/25/2019 1849
Zinc	ND		1	10	2.5	ug/L	06/25/2019 1849

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20200-002
Batch: 20200
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/20/2019 1935

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	98		1	98	80-120	06/25/2019 1855
Arsenic	100	99		1	99	80-120	06/25/2019 1855
Barium	100	97		1	97	80-120	06/25/2019 1855
Beryllium	100	110		1	110	80-120	06/25/2019 1855
Cadmium	100	97		1	97	80-120	06/25/2019 1855
Chromium	100	99		1	99	80-120	06/25/2019 1855
Cobalt	100	96		1	96	80-120	06/25/2019 1855
Copper	100	98		1	98	80-120	06/25/2019 1855
Lead	100	110		1	105	80-120	06/25/2019 1855
Nickel	100	95		1	95	80-120	06/25/2019 1855
Selenium	100	94		1	94	80-120	06/25/2019 1855
Silver	100	98		1	98	80-120	06/25/2019 1855
Vanadium	100	97		1	97	80-120	06/25/2019 1855
Zinc	100	94		1	94	80-120	06/25/2019 1855

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20147-001
Batch: 20147
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/20/2019 1702

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/21/2019 1058

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20147-002
Batch: 20147
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/20/2019 1702

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0020		1	100	80-120	06/21/2019 1101

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Chain of Custody

and

Miscellaneous Documents

SHEALY

Chain of Custody Record

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

Number

Client: Ramboll US Corporation	Report to Contact: Daniel Price/Michael Wilson	Telephone No. / E-mail: (314) 596-8970/dprice@ramboll.com (314) 443-1220/mwilson@ramboll.com	Quote No.
Address: 7500 College Boulevard Suite 1905	Sampler's Signature: x [signature] Elizabeth Borucki	Analysis (Attach list if more space is needed)	Page 1 of 1
City: Overland Park; State: KS; Zip Code: 66210			UF18034
Project Name: CMR RIAIM East Rail			
Project Number: 1690012344-003	P.O. No.		

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous		No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH				Remarks / Cooler I.D.
CMR-EB04D-190617-GW	6/15/2019	10:25	G	X				2		1	7				X	X	X	X	X				Cooler 002
CMR-MW61S-190617-GW	6/17/2019	10:48	G	X				2		1	7				X	X	X	X	X				Cooler 002
CMR-MW81D-190517-GW	6/17/2019	12:28	G	X				2		1	7				X	X	X	X	X				Cooler 002
TB-14	NA	NA	G	X							2				X								Trip Blank/Cooler 002

Turn Around Time Required (Prior lab approval required for expedited TAT): [X] Standard [ ] Rush (Please Specify)

Sample Disposal: [ ] Return to Client [ ] Disposal by Lab

Possible Hazard Identification (List any known hazards in the remarks): [ ] Non-Hazardous [ ] Flammable [ ] Skin Irritant [X] SDS provided [ ] Unknown

QC Requirements

Relinquished by	Date	Time	Received by	Date	Time
1. [signature]	6/17/2019	17:30	1.		
2.			2.		
3.			3.		
4. FedEx	6/17/19	0949	4. Laboratory Received by [signature]	6/18/19	0949

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) [X] Y [ ] N [ ] Ice Pack
Receipt Temp. 4.4 °C

Document Number: ME002OW-01

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: Ramboll Cooler Inspected by/date: JSH / 06/18/19 Lot #: UF18034

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: JSH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

4.4 / 4.4 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☑ Yes	☐ No		21. Was the quote number listed on the container label? If yes, Quote # 21552

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.

Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: JSH Date: 06/18/19

Comments:

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF19039, 6 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF19039 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB13-3.0-3.5-190618	UF19039-001
CMR-WB13-3.0-3.5-190618-DUP	UF19039-002
CMR-WB12-0.0-1.0-190618	UF19039-003
CMR-WB12-2.0-2.5-190618	UF19039-004
CMR-WB11-1.0-2.0-190618	UF19039-005
CMR-WB11-3.0-3.9-190618	UF19039-006
TB-15-20190618	UF19039-007

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of methylcyclohexane and butyl benzyl phthalate. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all methylcyclohexane and butyl benzyl phthalate results have been validated as estimated.

Field Duplicate Samples
One field duplicate sample was submitted with project samples in order to evaluate precision. In general analytes detected above the reporting limit showed acceptable precision. However, barium and copper had results with RPDs above 50% indicating a possible precision issue. Due to this, all detected copper and barium results were validated as estimated (J).

Blank Detections
During analysis, bi-n-butylphthalate was detected in method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All di-n-butylphthalate results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF19039

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 6 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	MS/MSD recoveries slightly out of criteria likely due to high native sample concentrations. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	One field duplicate submitted with samples. Barium and copper show precision bias. All barium and copper detections validated as estimated (J).
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All barium and copper detections validated as estimated (J).

SDG No. UF19039

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 6 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	di-n-butylphthalate detected below the RL in method blank sample. All di-n-butylphthalate results less than 5x the blank result validated as non-detect (U).	
Deuterated Monitoring Compound or Surrogate Spikes	Surrogates out due to sample dilutions/matrix effects. No action taken.	Surrogates out due to sample dilutions/matrix effects. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out high for VOC methylcyclohexane and SVOC butyl benzyl phthalate. All methylcyclohexane and butyl benzyl phthalate detections validated as estimated (J).	No issues
Field Duplicates	One field duplicate sample submitted with project samples. Results show acceptable agreement. No action taken.	One field duplicate submitted with samples. No detections in parent or duplicate samples. No action taken.
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/A
Other Non-conformances	No other non-conformances noted by the lab.	No other non-conformances noted by the lab.
Overall Assessment of Data	All di-n-butylphthalate results less than 5x the blank result validated as non-detect (U). All methylcyclohexane and butyl benzyl phthalate detections validated as estimated (J).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF19039**

Date Completed:07/01/2019

07/02/2019 2:20 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF19039

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 20364 had methylcyclohexane recovered marginally outside of the acceptance limits. The LCS associated with batch 21174 had methyl acetate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Sample -004 was analyzed high level due to the sample matrix. The reporting limits have been raised accordingly.

Semivolatiles
The method blank associated with batch 20184 had di-n-butyl phthalate detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for di-n-butyl phthalate have been flagged with a “B” qualifier.

The LCS associated with batch 20184 had butyl benzyl phthalate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Due to the sample matrix, samples -004 and -005 were diluted 100X. The reporting limits have been raised accordingly. Sample -006 was diluted 100X due to high concentrations of target compounds. The associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
Samples -004, -005, and -006 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Samples -004, -005 and -006 had surrogates recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals
The matrix spike/matrix spike duplicate (MS/MSD) associated with sample -001 had multiple metals recovered outside of the acceptance limits. Additionally, one RPD exceeded the acceptance limit. The LCS was recovered within the required acceptance limits; therefore, this likely demonstrates a matrix effect.

Sample Summary
Ramboll US Corporation
Lot Number: UF19039

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB13-3.0-3.5-190618	Solid	06/18/2019 0950	06/19/2019
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	06/18/2019 0955	06/19/2019
003	CMR-WB12-0.0-1.0-190618	Solid	06/18/2019 1215	06/19/2019
004	CMR-WB12-2.0-2.5-190618	Solid	06/18/2019 1220	06/19/2019
005	CMR-WB11-1.0-2.0-190618	Solid	06/18/2019 1500	06/19/2019
006	CMR-WB11-3.0-3.9-190618	Solid	06/18/2019 1510	06/19/2019
007	TB-15-20190618	Aqueous	06/18/2019	06/19/2019

(7 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF19039

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB13-3.0-3.5-190618	Solid	Acetone	8260B	22		ug/kg	9
001	CMR-WB13-3.0-3.5-190618	Solid	Phenanthrene	8270D	1.4	J	ug/kg	12
001	CMR-WB13-3.0-3.5-190618	Solid	Pyrene	8270D	0.78	J	ug/kg	12
001	CMR-WB13-3.0-3.5-190618	Solid	Antimony	6020B	0.24	J	mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Arsenic	6020B	23		mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Barium	6020B	270		mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Beryllium	6020B	0.65		mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Cadmium	6020B	0.19		mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Chromium	6020B	16		mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Cobalt	6020B	6.1		mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Copper	6020B	21		mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Lead	6020B	8.4		mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Mercury	7471B	0.026	J	mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Nickel	6020B	12		mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Silver	6020B	0.091	J	mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Vanadium	6020B	41		mg/kg	18
001	CMR-WB13-3.0-3.5-190618	Solid	Zinc	6020B	52		mg/kg	18
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Acetone	8260B	27		ug/kg	19
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	2-Butanone (MEK)	8260B	4.3	J	ug/kg	19
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Benzo(a)anthracene	8270D	1.9	J	ug/kg	21
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Benzo(g,h,i)perylene	8270D	1.1	J	ug/kg	21
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Chrysene	8270D	1.3	J	ug/kg	21
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Di-n-butyl phthalate	8270D	16	B	ug/kg	21
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Fluoranthene	8270D	0.82	J	ug/kg	21
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Phenanthrene	8270D	1.5	J	ug/kg	22
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Pyrene	8270D	1.3	J	ug/kg	22
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Arsenic	6020B	23		mg/kg	28
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Barium	6020B	190		mg/kg	28
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Beryllium	6020B	0.62		mg/kg	28
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Cadmium	6020B	0.13	J	mg/kg	28
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Chromium	6020B	14		mg/kg	28
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Cobalt	6020B	5.7		mg/kg	28
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Copper	6020B	9.0		mg/kg	28
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Lead	6020B	7.6		mg/kg	28
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Nickel	6020B	11		mg/kg	28
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Vanadium	6020B	38		mg/kg	28
002	CMR-WB13-3.0-3.5-190618-DUP	Solid	Zinc	6020B	38		mg/kg	28
003	CMR-WB12-0.0-1.0-190618	Solid	Acetone	8260B	15	J	ug/kg	29
003	CMR-WB12-0.0-1.0-190618	Solid	Anthracene	8270D	4.4	J	ug/kg	31
003	CMR-WB12-0.0-1.0-190618	Solid	Benzo(a)anthracene	8270D	21		ug/kg	31
003	CMR-WB12-0.0-1.0-190618	Solid	Benzo(a)pyrene	8270D	28		ug/kg	31
003	CMR-WB12-0.0-1.0-190618	Solid	Benzo(b)fluoranthene	8270D	78		ug/kg	31
003	CMR-WB12-0.0-1.0-190618	Solid	Benzo(g,h,i)perylene	8270D	16		ug/kg	31
003	CMR-WB12-0.0-1.0-190618	Solid	Benzo(k)fluoranthene	8270D	14	J	ug/kg	31
003	CMR-WB12-0.0-1.0-190618	Solid	Chrysene	8270D	40		ug/kg	31

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-WB12-0.0-1.0-190618	Solid	bis(2-Ethylhexyl)phthalate	8270D	1700		ug/kg	31
003	CMR-WB12-0.0-1.0-190618	Solid	Fluoranthene	8270D	48		ug/kg	31
003	CMR-WB12-0.0-1.0-190618	Solid	Indeno(1,2,3-c,d)pyrene	8270D	14	J	ug/kg	31
003	CMR-WB12-0.0-1.0-190618	Solid	Phenanthrene	8270D	40		ug/kg	32
003	CMR-WB12-0.0-1.0-190618	Solid	Pyrene	8270D	53		ug/kg	32
003	CMR-WB12-0.0-1.0-190618	Solid	Antimony	6020B	0.30	J	mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Arsenic	6020B	23		mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Barium	6020B	480		mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Beryllium	6020B	0.69		mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Cadmium	6020B	1.2		mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Chromium	6020B	17		mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Cobalt	6020B	7.6		mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Copper	6020B	42		mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Lead	6020B	31		mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Mercury	7471B	0.070	J	mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Nickel	6020B	16		mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Silver	6020B	0.21	J	mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Vanadium	6020B	47		mg/kg	38
003	CMR-WB12-0.0-1.0-190618	Solid	Zinc	6020B	200		mg/kg	38
004	CMR-WB12-2.0-2.5-190618	Solid	Toluene	8260B	140	J	ug/kg	39
004	CMR-WB12-2.0-2.5-190618	Solid	C19 - C36 Aliphatics	Montana EPH	330		mg/kg	43
004	CMR-WB12-2.0-2.5-190618	Solid	C9 - C18 Aliphatics	Montana EPH	910		mg/kg	43
004	CMR-WB12-2.0-2.5-190618	Solid	C11 - C22 Aromatics	Montana EPH	110		mg/kg	44
004	CMR-WB12-2.0-2.5-190618	Solid	C5 - C8 Aliphatics,	Montana VPH	7.5		mg/kg	45
004	CMR-WB12-2.0-2.5-190618	Solid	C9 - C12 Aliphatics,	Montana VPH	140		mg/kg	45
004	CMR-WB12-2.0-2.5-190618	Solid	C9 - C10 Aromatics	Montana VPH	73		mg/kg	46
004	CMR-WB12-2.0-2.5-190618	Solid	Ethylbenzene	Montana VPH	0.93		mg/kg	46
004	CMR-WB12-2.0-2.5-190618	Solid	Naphthalene	Montana VPH	1.7		mg/kg	46
004	CMR-WB12-2.0-2.5-190618	Solid	o - Xylenes	Montana VPH	1.7		mg/kg	46
004	CMR-WB12-2.0-2.5-190618	Solid	TPH	Montana VPH	230		mg/kg	47
004	CMR-WB12-2.0-2.5-190618	Solid	Arsenic	6020B	9.1		mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Barium	6020B	230		mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Beryllium	6020B	0.60		mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Cadmium	6020B	0.21		mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Chromium	6020B	13		mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Cobalt	6020B	5.8		mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Copper	6020B	8.2		mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Lead	6020B	7.7		mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Mercury	7471B	0.033	J	mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Nickel	6020B	11		mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Silver	6020B	0.052	J	mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Vanadium	6020B	35		mg/kg	48
004	CMR-WB12-2.0-2.5-190618	Solid	Zinc	6020B	40		mg/kg	48
005	CMR-WB11-1.0-2.0-190618	Solid	Cyclohexane	8260B	290		ug/kg	49
005	CMR-WB11-1.0-2.0-190618	Solid	Methylcyclohexane	8260B	1800		ug/kg	49
005	CMR-WB11-1.0-2.0-190618	Solid	Toluene	8260B	140	J	ug/kg	49
005	CMR-WB11-1.0-2.0-190618	Solid	C19 - C36 Aliphatics	Montana EPH	800		mg/kg	53
005	CMR-WB11-1.0-2.0-190618	Solid	C9 - C18 Aliphatics	Montana EPH	2200		mg/kg	53

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
005	CMR-WB11-1.0-2.0-190618	Solid	C11 - C22 Aromatics	Montana EPH	510		mg/kg	54
005	CMR-WB11-1.0-2.0-190618	Solid	C5 - C8 Aliphatics,	Montana VPH	130		mg/kg	55
005	CMR-WB11-1.0-2.0-190618	Solid	C9 - C12 Aliphatics,	Montana VPH	340		mg/kg	55
005	CMR-WB11-1.0-2.0-190618	Solid	C9 - C10 Aromatics	Montana VPH	260		mg/kg	56
005	CMR-WB11-1.0-2.0-190618	Solid	Ethylbenzene	Montana VPH	11		mg/kg	56
005	CMR-WB11-1.0-2.0-190618	Solid	Naphthalene	Montana VPH	8.5		mg/kg	56
005	CMR-WB11-1.0-2.0-190618	Solid	m+p - Xylenes	Montana VPH	0.80	J	mg/kg	56
005	CMR-WB11-1.0-2.0-190618	Solid	TPH	Montana VPH	890		mg/kg	57
005	CMR-WB11-1.0-2.0-190618	Solid	Arsenic	6020B	14		mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Barium	6020B	150		mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Beryllium	6020B	0.60		mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Cadmium	6020B	0.14		mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Chromium	6020B	13		mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Cobalt	6020B	5.2		mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Copper	6020B	8.3		mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Lead	6020B	7.3		mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Mercury	7471B	0.027	J	mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Nickel	6020B	10		mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Vanadium	6020B	33		mg/kg	58
005	CMR-WB11-1.0-2.0-190618	Solid	Zinc	6020B	39		mg/kg	58
006	CMR-WB11-3.0-3.9-190618	Solid	Methylcyclohexane	8260B	1200		ug/kg	59
006	CMR-WB11-3.0-3.9-190618	Solid	Toluene	8260B	310	J	ug/kg	59
006	CMR-WB11-3.0-3.9-190618	Solid	2-Methylnaphthalene	8270D	830		ug/kg	62
006	CMR-WB11-3.0-3.9-190618	Solid	Naphthalene	8270D	600		ug/kg	62
006	CMR-WB11-3.0-3.9-190618	Solid	Phenanthrene	8270D	250	J	ug/kg	62
006	CMR-WB11-3.0-3.9-190618	Solid	C19 - C36 Aliphatics	Montana EPH	510		mg/kg	63
006	CMR-WB11-3.0-3.9-190618	Solid	C9 - C18 Aliphatics	Montana EPH	1400		mg/kg	63
006	CMR-WB11-3.0-3.9-190618	Solid	C11 - C22 Aromatics	Montana EPH	410		mg/kg	64
006	CMR-WB11-3.0-3.9-190618	Solid	C5 - C8 Aliphatics,	Montana VPH	210		mg/kg	65
006	CMR-WB11-3.0-3.9-190618	Solid	C9 - C12 Aliphatics,	Montana VPH	500		mg/kg	65
006	CMR-WB11-3.0-3.9-190618	Solid	C9 - C10 Aromatics	Montana VPH	330		mg/kg	66
006	CMR-WB11-3.0-3.9-190618	Solid	Ethylbenzene	Montana VPH	16		mg/kg	66
006	CMR-WB11-3.0-3.9-190618	Solid	Naphthalene	Montana VPH	12		mg/kg	66
006	CMR-WB11-3.0-3.9-190618	Solid	o - Xylenes	Montana VPH	11		mg/kg	66
006	CMR-WB11-3.0-3.9-190618	Solid	TPH	Montana VPH	1100		mg/kg	67
006	CMR-WB11-3.0-3.9-190618	Solid	Arsenic	6020B	7.1		mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Barium	6020B	220		mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Beryllium	6020B	0.91		mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Cadmium	6020B	0.17		mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Chromium	6020B	20		mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Cobalt	6020B	6.4		mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Copper	6020B	12		mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Lead	6020B	9.0		mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Nickel	6020B	15		mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Silver	6020B	0.071	J	mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Vanadium	6020B	52		mg/kg	68
006	CMR-WB11-3.0-3.9-190618	Solid	Zinc	6020B	50		mg/kg	68

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page

(140 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-001
Description: CMR-WB13-3.0-3.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 0950
% Solids: 85.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/28/2019 1327	JM1		21174	6.16

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	22		19	7.6	ug/kg	1
Benzene	71-43-2	8260B	ND		4.7	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.7	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.7	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.7	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.7	2.8	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.8	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.7	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.7	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.7	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.7	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.7	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.7	2.8	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.7	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.7	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.7	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.7	2.8	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.7	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.7	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.7	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.7	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.7	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		240	24	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.7	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.4	3.8	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.7	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.7	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.7	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.4	3.8	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.7	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.7	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.7	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.7	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.7	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.7	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.7	1.9	ug/kg	1

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-001
Description: CMR-WB13-3.0-3.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 0950
% Solids: 85.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/28/2019 1327	JM1		21174	6.16

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.7	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.7	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.7	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.7	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.7	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.7	2.8	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.4	3.8	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.7	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.7	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		86	53-142
Bromofluorobenzene		98	47-138
Toluene-d8		101	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-001
Description: CMR-WB13-3.0-3.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 0950
% Solids: 85.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	06/26/2019 1830	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		3.0	0.92	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		3.0	1.1	ug/kg	1
Anthracene	120-12-7	8270D	ND		3.0	0.57	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		3.0	0.66	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		3.0	0.73	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		3.0	0.56	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		3.0	0.72	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		3.0	0.53	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		14	5.6	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		14	5.6	ug/kg	1
Carbazole	86-74-8	8270D	ND		14	5.6	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		14	5.6	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		14	5.6	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		14	5.6	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		14	5.6	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		14	5.6	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		14	5.6	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		14	5.6	ug/kg	1
Chrysene	218-01-9	8270D	ND		3.0	0.50	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		3.0	0.57	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		14	5.6	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		75	28	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		75	28	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		75	28	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		14	5.6	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		14	5.6	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		14	5.6	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		14	8.2	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		14	5.6	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		14	5.6	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		75	28	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		75	28	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		30	11	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		30	11	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		14	5.6	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		75	28	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		3.0	0.47	ug/kg	1
Fluorene	86-73-7	8270D	ND		3.0	0.63	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		14	5.6	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		14	5.6	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		75	28	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		14	5.6	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		3.0	1.1	ug/kg	1
Isophorone	78-59-1	8270D	ND		14	5.6	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-001
Description: CMR-WB13-3.0-3.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 0950
% Solids: 85.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	06/26/2019 1830	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		3.0	1.1	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		14	5.6	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		30	11	ug/kg	1
Naphthalene	91-20-3	8270D	ND		3.0	1.1	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		30	11	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		30	11	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		30	11	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		14	5.6	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		30	11	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		75	28	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		14	5.6	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		14	5.6	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		75	28	ug/kg	1
Phenanthrene	85-01-8	8270D	1.4	J	3.0	0.80	ug/kg	1
Phenol	108-95-2	8270D	ND		14	5.6	ug/kg	1
Pyrene	129-00-0	8270D	0.78	J	3.0	0.56	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		37	11	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		75	11	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		75	28	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		14	5.6	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		14	5.6	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		56	33-102
2-Fluorophenol		53	35-115
Nitrobenzene-d5		54	22-109
Phenol-d5		55	33-122
Terphenyl-d14		91	41-120
2,4,6-Tribromophenol		54	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-001
Description: CMR-WB13-3.0-3.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 0950
% Solids: 85.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/26/2019 2159	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		67	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-001
Description: CMR-WB13-3.0-3.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 0950
% Solids: 85.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1008	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		86	40-140
2-Fluorobiphenyl (fractionation 1)		87	40-140
o - Terphenyl (aromatic)		69	40-140

LOQ = Limit of Quantitation
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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-001
Description: CMR-WB13-3.0-3.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 0950
% Solids: 85.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1603	JJG		20855

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.1	0.82	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.1	0.82	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		87	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-001
Description: CMR-WB13-3.0-3.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 0950
% Solids: 85.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1603	JJG		20854

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.27	0.037	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.4	0.55	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.27	0.034	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.27	0.059	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.27	0.14	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.27	0.044	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.27	0.061	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.27	0.031	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		81	70-130

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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF19039-001
Description: CMR-WB13-3.0-3.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 0950
% Solids: 85.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1603	JJG		20853

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-001
Description: CMR-WB13-3.0-3.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 0950
% Solids: 85.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1209	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1509	TJW	06/24/2019 1843	20451

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.24	J	0.58	0.23	mg/kg	1
Arsenic	7440-38-2	6020B	23		0.58	0.23	mg/kg	1
Barium	7440-39-3	6020B	270		1.5	0.36	mg/kg	1
Beryllium	7440-41-7	6020B	0.65		0.12	0.039	mg/kg	1
Cadmium	7440-43-9	6020B	0.19		0.15	0.029	mg/kg	1
Chromium	7440-47-3	6020B	16		1.5	0.64	mg/kg	1
Cobalt	7440-48-4	6020B	6.1		1.5	0.35	mg/kg	1
Copper	7440-50-8	6020B	21		1.5	0.38	mg/kg	1
Lead	7439-92-1	6020B	8.4		0.29	0.079	mg/kg	1
Mercury	7439-97-6	7471B	0.026	J	0.086	0.021	mg/kg	1
Nickel	7440-02-0	6020B	12		1.5	0.35	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.5	0.55	mg/kg	1
Silver	7440-22-4	6020B	0.091	J	0.29	0.070	mg/kg	1
Vanadium	7440-62-2	6020B	41		1.5	0.29	mg/kg	1
Zinc	7440-66-6	6020B	52		2.9	0.58	mg/kg	1

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W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-002
Description: CMR-WB13-3.0-3.5-190618-DUP
Matrix: Solid
Date Sampled: 06/18/2019 0955
% Solids: 85.5 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/28/2019 1350	JM1		21174	6.27

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	27		19	7.5	ug/kg	1
Benzene	71-43-2	8260B	ND		4.7	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.7	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.7	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.7	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.7	2.8	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	4.3	J	19	3.7	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.7	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.7	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.7	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.7	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.7	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.7	2.8	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.7	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.7	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.7	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.7	2.8	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.7	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.7	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.7	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.7	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.7	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		230	23	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.7	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.3	3.7	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.7	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.7	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.7	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.3	3.7	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.7	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.7	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.7	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.7	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.7	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.7	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.7	1.9	ug/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-002
Description: CMR-WB13-3.0-3.5-190618-DUP
Matrix: Solid
Date Sampled: 06/18/2019 0955
% Solids: 85.5 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/28/2019 1350	JM1		21174	6.27

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.7	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.7	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.7	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.7	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.7	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.7	2.8	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.3	3.7	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.7	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.7	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		100	47-138
Toluene-d8		103	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-002
Description: CMR-WB13-3.0-3.5-190618-DUP
Matrix: Solid
Date Sampled: 06/18/2019 0955
% Solids: 85.5 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	06/26/2019 1855	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		3.0	0.92	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		3.0	1.0	ug/kg	1
Anthracene	120-12-7	8270D	ND		3.0	0.56	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	1.9	J	3.0	0.65	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		3.0	0.73	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		3.0	0.55	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	1.1	J	3.0	0.72	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		3.0	0.53	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		14	5.5	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		14	5.5	ug/kg	1
Carbazole	86-74-8	8270D	ND		14	5.5	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		14	5.5	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		14	5.5	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		14	5.5	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		14	5.5	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		14	5.5	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		14	5.5	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		14	5.5	ug/kg	1
Chrysene	218-01-9	8270D	1.3	J	3.0	0.50	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		3.0	0.56	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		14	5.5	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		74	28	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		74	28	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		74	28	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		14	5.5	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		14	5.5	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		14	5.5	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		14	8.2	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		14	5.5	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	16	B	14	5.5	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		74	28	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		74	28	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		30	11	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		30	11	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		14	5.5	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		74	28	ug/kg	1
Fluoranthene	206-44-0	8270D	0.82	J	3.0	0.46	ug/kg	1
Fluorene	86-73-7	8270D	ND		3.0	0.63	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		14	5.5	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		14	5.5	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		74	28	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		14	5.5	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		3.0	1.1	ug/kg	1
Isophorone	78-59-1	8270D	ND		14	5.5	ug/kg	1

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DL = Detection Limit
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-002
Description: CMR-WB13-3.0-3.5-190618-DUP
Matrix: Solid
Date Sampled: 06/18/2019 0955
% Solids: 85.5 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	06/26/2019 1855	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		3.0	1.1	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		14	5.5	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		30	11	ug/kg	1
Naphthalene	91-20-3	8270D	ND		3.0	1.1	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		30	11	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		30	11	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		30	11	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		14	5.5	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		30	11	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		74	28	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		14	5.5	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		14	5.5	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		74	28	ug/kg	1
Phenanthrene	85-01-8	8270D	1.5	J	3.0	0.79	ug/kg	1
Phenol	108-95-2	8270D	ND		14	5.5	ug/kg	1
Pyrene	129-00-0	8270D	1.3	J	3.0	0.55	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		36	11	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		74	11	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		74	28	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		14	5.5	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		14	5.5	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		45	33-102
2-Fluorophenol		40	35-115
Nitrobenzene-d5		40	22-109
Phenol-d5		45	33-122
Terphenyl-d14		92	41-120
2,4,6-Tribromophenol		54	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-002
Description: CMR-WB13-3.0-3.5-190618-DUP
Matrix: Solid
Date Sampled: 06/18/2019 0955
% Solids: 85.5 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/26/2019 2229	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		70	40-140

LOQ = Limit of Quantitation
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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-002
Description: CMR-WB13-3.0-3.5-190618-DUP
Matrix: Solid
Date Sampled: 06/18/2019 0955
% Solids: 85.5 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1038	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		77	40-140
2-Fluorobiphenyl (fractionation 1)		76	40-140
o - Terphenyl (aromatic)		66	40-140

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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-002
Description: CMR-WB13-3.0-3.5-190618-DUP
Matrix: Solid
Date Sampled: 06/18/2019 0955
% Solids: 85.5 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1631	JJG		20855

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		3.8	0.75	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		3.8	0.75	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		101	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-002
Description: CMR-WB13-3.0-3.5-190618-DUP
Matrix: Solid
Date Sampled: 06/18/2019 0955
% Solids: 85.5 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1631	JJG		20854

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.25	0.034	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.3	0.50	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.25	0.031	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.25	0.054	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.25	0.13	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.25	0.040	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.25	0.056	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.25	0.028	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF19039-002
Description: CMR-WB13-3.0-3.5-190618-DUP
Matrix: Solid
Date Sampled: 06/18/2019 0955
% Solids: 85.5 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1631	JJG		20853

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		104	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-002
Description: CMR-WB13-3.0-3.5-190618-DUP
Matrix: Solid
Date Sampled: 06/18/2019 0955
% Solids: 85.5 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1239	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1511	TJW	06/24/2019 1843	20451

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.56	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	23		0.56	0.22	mg/kg	1
Barium	7440-39-3	6020B	190		1.5	0.35	mg/kg	1
Beryllium	7440-41-7	6020B	0.62		0.11	0.038	mg/kg	1
Cadmium	7440-43-9	6020B	0.13	J	0.15	0.028	mg/kg	1
Chromium	7440-47-3	6020B	14		1.5	0.62	mg/kg	1
Cobalt	7440-48-4	6020B	5.7		1.5	0.34	mg/kg	1
Copper	7440-50-8	6020B	9.0		1.5	0.37	mg/kg	1
Lead	7439-92-1	6020B	7.6		0.28	0.076	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.091	0.022	mg/kg	1
Nickel	7440-02-0	6020B	11		1.5	0.34	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.5	0.53	mg/kg	1
Silver	7440-22-4	6020B	ND		0.28	0.067	mg/kg	1
Vanadium	7440-62-2	6020B	38		1.5	0.28	mg/kg	1
Zinc	7440-66-6	6020B	38		2.8	0.56	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-003
Description: CMR-WB12-0.0-1.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1215
% Solids: 87.1 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/28/2019 1413	JM1		21174	5.55

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	15	J	21	8.3	ug/kg	1
Benzene	71-43-2	8260B	ND		5.2	2.1	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		5.2	2.1	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		5.2	2.1	ug/kg	1
Bromoform	75-25-2	8260B	ND		5.2	2.1	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.2	3.1	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		21	4.1	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		5.2	2.1	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		5.2	2.1	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		5.2	2.1	ug/kg	1
Chloroethane	75-00-3	8260B	ND		5.2	2.1	ug/kg	1
Chloroform	67-66-3	8260B	ND		5.2	2.1	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.2	3.1	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.2	2.1	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.2	2.1	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.2	2.1	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.2	2.1	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		5.2	3.1	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		5.2	2.1	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		5.2	2.1	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.2	2.1	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.2	2.1	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		5.2	2.1	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.2	2.1	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.2	2.1	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		260	26	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		5.2	2.1	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		10	4.1	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		5.2	2.1	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		5.2	2.1	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.2	2.1	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	4.1	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		5.2	2.1	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		5.2	2.1	ug/kg	1
Naphthalene	91-20-3	8260B	ND		5.2	2.1	ug/kg	1
Styrene	100-42-5	8260B	ND		5.2	2.1	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.2	2.1	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		5.2	2.1	ug/kg	1
Toluene	108-88-3	8260B	ND		5.2	2.1	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.2	2.1	ug/kg	1

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-003
Description: CMR-WB12-0.0-1.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1215
% Solids: 87.1 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/28/2019 1413	JM1		21174	5.55

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.2	2.1	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.2	2.1	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.2	2.1	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.2	2.1	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		5.2	2.1	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		5.2	2.1	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		5.2	3.1	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		10	4.1	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		5.2	2.1	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		5.2	2.1	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		86	53-142
Bromofluorobenzene		96	47-138
Toluene-d8		102	68-124

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J = Estimated result < LOQ and ≥ DL
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-003
Description: CMR-WB12-0.0-1.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1215
% Solids: 87.1 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/26/2019 1920	SCD	06/20/2019 1813	20184
2	3546	8270D	5	06/27/2019 1251	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		15	4.7	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		15	5.4	ug/kg	1
Anthracene	120-12-7	8270D	4.4	J	15	2.9	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	21		15	3.3	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	28		15	3.7	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	78		15	2.8	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	16		15	3.7	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	14	J	15	2.7	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		74	28	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		74	28	ug/kg	1
Carbazole	86-74-8	8270D	ND		74	28	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		74	28	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		74	28	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		74	28	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		74	28	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		74	28	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		74	28	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		74	28	ug/kg	1
Chrysene	218-01-9	8270D	40		15	2.5	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		15	2.9	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		74	28	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		380	140	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		380	140	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		380	140	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		74	28	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		74	28	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		74	28	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		74	42	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		74	28	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		74	28	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		380	140	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		380	140	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		150	57	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		150	57	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		74	28	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	1700		380	140	ug/kg	2
Fluoranthene	206-44-0	8270D	48		15	2.4	ug/kg	1
Fluorene	86-73-7	8270D	ND		15	3.2	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		74	28	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		74	28	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		380	140	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		74	28	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	14	J	15	5.7	ug/kg	1

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W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-003
Description: CMR-WB12-0.0-1.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1215
% Solids: 87.1 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	5	06/26/2019 1920	SCD	06/20/2019 1813	20184
2	3546	8270D	5	06/27/2019 1251	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Isophorone	78-59-1	8270D	ND		74	28	ug/kg	1
2-Methylnaphthalene	91-57-6	8270D	ND		15	5.6	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		74	28	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		150	57	ug/kg	1
Naphthalene	91-20-3	8270D	ND		15	5.5	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		150	57	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		150	57	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		150	57	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		74	28	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		150	57	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		380	140	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		74	28	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		74	28	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		380	140	ug/kg	1
Phenanthrene	85-01-8	8270D	40		15	4.1	ug/kg	1
Phenol	108-95-2	8270D	ND		74	28	ug/kg	1
Pyrene	129-00-0	8270D	53		15	2.8	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		190	57	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		380	57	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		380	140	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		74	28	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		74	28	ug/kg	1

Surrogate	Run 1 Q	Run 1 % Recovery	Run 1 Acceptance Limits	Run 2 Q	Run 2 % Recovery	Run 2 Acceptance Limits
2-Fluorobiphenyl		47	33-102		57	33-102
2-Fluorophenol		39	35-115		45	35-115
Nitrobenzene-d5		48	22-109		52	22-109
Phenol-d5		39	33-122		44	33-122
Terphenyl-d14		66	41-120		88	41-120
2,4,6-Tribromophenol		40	30-117		69	30-117

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DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-003
Description: CMR-WB12-0.0-1.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1215
% Solids: 87.1 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/26/2019 2258	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		72	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-003
Description: CMR-WB12-0.0-1.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1215
% Solids: 87.1 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1107	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		77	40-140
2-Fluorobiphenyl (fractionation 1)		75	40-140
o - Terphenyl (aromatic)		68	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-003
Description: CMR-WB12-0.0-1.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1215
% Solids: 87.1 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1659	JJG		20855

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.8	0.97	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.8	0.97	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-003
Description: CMR-WB12-0.0-1.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1215
% Solids: 87.1 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1659	JJG		20854

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.32	0.044	mg/kg	1
C9 - C10 Aromatics		Montana VPH	ND		1.6	0.64	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	ND		0.32	0.040	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.32	0.070	mg/kg	1
Naphthalene	91-20-3	Montana VPH	ND		0.32	0.17	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.32	0.052	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.32	0.072	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		0.32	0.036	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		93	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF19039-003
Description: CMR-WB12-0.0-1.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1215
% Solids: 87.1 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1659	JJG		20853

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB12-0.0-1.0-190618
Date Sampled: 06/18/2019 1215
Date Received: 06/19/2019

Laboratory ID: UF19039-003
Matrix: Solid
% Solids: 87.1 06/20/2019 0150

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1245	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1514	TJW	06/24/2019 1843	20451

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.30	J	0.56	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	23		0.56	0.22	mg/kg	1
Barium	7440-39-3	6020B	480		1.5	0.35	mg/kg	1
Beryllium	7440-41-7	6020B	0.69		0.11	0.038	mg/kg	1
Cadmium	7440-43-9	6020B	1.2		0.15	0.028	mg/kg	1
Chromium	7440-47-3	6020B	17		1.5	0.62	mg/kg	1
Cobalt	7440-48-4	6020B	7.6		1.5	0.34	mg/kg	1
Copper	7440-50-8	6020B	42		1.5	0.36	mg/kg	1
Lead	7439-92-1	6020B	31		0.28	0.076	mg/kg	1
Mercury	7439-97-6	7471B	0.070	J	0.084	0.020	mg/kg	1
Nickel	7440-02-0	6020B	16		1.5	0.34	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.5	0.53	mg/kg	1
Silver	7440-22-4	6020B	0.21	J	0.28	0.067	mg/kg	1
Vanadium	7440-62-2	6020B	47		1.5	0.28	mg/kg	1
Zinc	7440-66-6	6020B	200		2.8	0.56	mg/kg	1

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DL = Detection Limit
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-004
Description: CMR-WB12-2.0-2.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 1220
% Solids: 86.2 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/21/2019 1731	JM1		20364	6.32

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1100	220	ug/kg	1
Benzene	71-43-2	8260B	ND		270	110	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		270	110	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		270	110	ug/kg	1
Bromoform	75-25-2	8260B	ND		270	110	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		270	110	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1100	220	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		270	110	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		270	110	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		270	110	ug/kg	1
Chloroethane	75-00-3	8260B	ND		270	110	ug/kg	1
Chloroform	67-66-3	8260B	ND		270	110	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		270	110	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		270	110	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		270	110	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		270	110	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		270	110	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		270	110	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		270	110	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		270	110	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		270	110	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		270	110	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		270	110	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		270	110	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		270	110	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		270	110	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		270	110	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		270	110	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		270	110	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		13000	1300	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		270	110	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		540	220	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		270	110	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		270	110	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		270	110	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		540	220	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		270	110	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		270	110	ug/kg	1
Naphthalene	91-20-3	8260B	ND		270	110	ug/kg	1
Styrene	100-42-5	8260B	ND		270	110	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		270	110	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		270	110	ug/kg	1
Toluene	108-88-3	8260B	140	J	270	110	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		270	110	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-004
Description: CMR-WB12-2.0-2.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 1220
% Solids: 86.2 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/21/2019 1731	JM1		20364	6.32

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		270	110	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		270	110	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		270	110	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		270	110	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		270	110	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		270	110	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		270	110	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		540	220	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		270	110	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		270	110	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		124	53-142
Bromofluorobenzene		125	47-138
Toluene-d8		121	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-004
Description: CMR-WB12-2.0-2.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 1220
% Solids: 86.2 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/27/2019 1315	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		300	92	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		300	110	ug/kg	1
Anthracene	120-12-7	8270D	ND		300	57	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		300	65	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		300	73	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		300	55	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		300	72	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		300	53	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		1400	550	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		1400	550	ug/kg	1
Carbazole	86-74-8	8270D	ND		1400	550	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		1400	550	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		1400	550	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		1400	550	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		1400	550	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		1400	550	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		1400	550	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		1400	550	ug/kg	1
Chrysene	218-01-9	8270D	ND		300	50	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		300	57	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		1400	550	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		7400	2800	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		7400	2800	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		7400	2800	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		1400	550	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1400	550	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		1400	550	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		1400	820	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		1400	550	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		1400	550	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		7400	2800	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		7400	2800	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		3000	1100	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		3000	1100	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		1400	550	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		7400	2800	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		300	47	ug/kg	1
Fluorene	86-73-7	8270D	ND		300	63	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		1400	550	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		1400	550	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		7400	2800	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		1400	550	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		300	110	ug/kg	1
Isophorone	78-59-1	8270D	ND		1400	550	ug/kg	1

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W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-004
Description: CMR-WB12-2.0-2.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 1220
% Solids: 86.2 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/27/2019 1315	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		300	110	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		1400	550	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		3000	1100	ug/kg	1
Naphthalene	91-20-3	8270D	ND		300	110	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		3000	1100	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		3000	1100	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		3000	1100	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		1400	550	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		3000	1100	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		7400	2800	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		1400	550	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		1400	550	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		7400	2800	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		300	80	ug/kg	1
Phenol	108-95-2	8270D	ND		1400	550	ug/kg	1
Pyrene	129-00-0	8270D	ND		300	55	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		3700	1100	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		7400	1100	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		7400	2800	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		1400	550	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		1400	550	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl	N	107	33-102
2-Fluorophenol		36	35-115
Nitrobenzene-d5		82	22-109
Phenol-d5		56	33-122
Terphenyl-d14	N	160	41-120
2,4,6-Tribromophenol		67	30-117

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-004
Description: CMR-WB12-2.0-2.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 1220
% Solids: 86.2 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/26/2019 2328	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	330		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	910		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		61	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-004
Description: CMR-WB12-2.0-2.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 1220
% Solids: 86.2 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1137	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	110		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		96	40-140
2-Fluorobiphenyl (fractionation 1)		94	40-140
o - Terphenyl (aromatic)		78	40-140

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-004
Description: CMR-WB12-2.0-2.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 1220
% Solids: 86.2 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1727	JJG		20855

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	7.5		4.4	0.87	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	140		4.4	0.87	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	800	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-004
Description: CMR-WB12-2.0-2.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 1220
% Solids: 86.2 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1727	JJG		20854

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.29	0.039	mg/kg	1
C9 - C10 Aromatics		Montana VPH	73		1.5	0.58	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	0.93		0.29	0.036	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.29	0.063	mg/kg	1
Naphthalene	91-20-3	Montana VPH	1.7		0.29	0.15	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		0.29	0.046	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.29	0.065	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	1.7		0.29	0.032	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	275	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF19039-004
Description: CMR-WB12-2.0-2.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 1220
% Solids: 86.2 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/26/2019 1727	JJG		20853

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	230		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	789	70-130

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-004
Description: CMR-WB12-2.0-2.5-190618
Matrix: Solid
Date Sampled: 06/18/2019 1220
% Solids: 86.2 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1251	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1516	TJW	06/24/2019 1843	20451

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.43	0.17	mg/kg	1
Arsenic	7440-38-2	6020B	9.1		0.43	0.17	mg/kg	1
Barium	7440-39-3	6020B	230		1.1	0.27	mg/kg	1
Beryllium	7440-41-7	6020B	0.60		0.086	0.029	mg/kg	1
Cadmium	7440-43-9	6020B	0.21		0.11	0.022	mg/kg	1
Chromium	7440-47-3	6020B	13		1.1	0.48	mg/kg	1
Cobalt	7440-48-4	6020B	5.8		1.1	0.26	mg/kg	1
Copper	7440-50-8	6020B	8.2		1.1	0.28	mg/kg	1
Lead	7439-92-1	6020B	7.7		0.22	0.059	mg/kg	1
Mercury	7439-97-6	7471B	0.033	J	0.091	0.022	mg/kg	1
Nickel	7440-02-0	6020B	11		1.1	0.26	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.1	0.41	mg/kg	1
Silver	7440-22-4	6020B	0.052	J	0.22	0.052	mg/kg	1
Vanadium	7440-62-2	6020B	35		1.1	0.22	mg/kg	1
Zinc	7440-66-6	6020B	40		2.2	0.43	mg/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-005
Description: CMR-WB11-1.0-2.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1500
% Solids: 88.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/21/2019 1753	JM1		20364	5.58

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1100	230	ug/kg	1
Benzene	71-43-2	8260B	ND		280	110	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		280	110	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		280	110	ug/kg	1
Bromoform	75-25-2	8260B	ND		280	110	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		280	110	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1100	230	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		280	110	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		280	110	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		280	110	ug/kg	1
Chloroethane	75-00-3	8260B	ND		280	110	ug/kg	1
Chloroform	67-66-3	8260B	ND		280	110	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		280	110	ug/kg	1
Cyclohexane	110-82-7	8260B	290		280	110	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		280	110	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		280	110	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		280	110	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		280	110	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		280	110	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		280	110	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		280	110	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		280	110	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		280	110	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		280	110	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		280	110	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		280	110	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		280	110	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		280	110	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		280	110	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		14000	1400	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		280	110	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		570	230	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		280	110	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		280	110	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		280	110	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		570	230	ug/kg	1
Methylcyclohexane	108-87-2	8260B	1800		280	110	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		280	110	ug/kg	1
Naphthalene	91-20-3	8260B	ND		280	110	ug/kg	1
Styrene	100-42-5	8260B	ND		280	110	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		280	110	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		280	110	ug/kg	1
Toluene	108-88-3	8260B	140	J	280	110	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		280	110	ug/kg	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-005
Description: CMR-WB11-1.0-2.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1500
% Solids: 88.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/21/2019 1753	JM1		20364	5.58

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		280	110	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		280	110	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		280	110	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		280	110	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		280	110	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		280	110	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		280	110	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		570	230	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		280	110	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		280	110	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		116	53-142
Bromofluorobenzene		115	47-138
Toluene-d8		122	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-005
Description: CMR-WB11-1.0-2.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1500
% Solids: 88.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/27/2019 1340	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		290	90	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		290	100	ug/kg	1
Anthracene	120-12-7	8270D	ND		290	55	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		290	64	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		290	72	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		290	54	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		290	71	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		290	52	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		1400	540	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		1400	540	ug/kg	1
Carbazole	86-74-8	8270D	ND		1400	540	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		1400	540	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		1400	540	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		1400	540	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		1400	540	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		1400	540	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		1400	540	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		1400	540	ug/kg	1
Chrysene	218-01-9	8270D	ND		290	49	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		290	55	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		1400	540	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		7300	2700	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		7300	2700	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		7300	2700	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		1400	540	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1400	540	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		1400	540	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		1400	810	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		1400	540	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		1400	540	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		7300	2700	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		7300	2700	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		2900	1100	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		2900	1100	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		1400	540	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		7300	2700	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		290	46	ug/kg	1
Fluorene	86-73-7	8270D	ND		290	62	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		1400	540	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		1400	540	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		7300	2700	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		1400	540	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		290	110	ug/kg	1
Isophorone	78-59-1	8270D	ND		1400	540	ug/kg	1

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W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-005
Description: CMR-WB11-1.0-2.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1500
% Solids: 88.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/27/2019 1340	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		290	110	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		1400	540	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		2900	1100	ug/kg	1
Naphthalene	91-20-3	8270D	ND		290	110	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		2900	1100	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		2900	1100	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		2900	1100	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		1400	540	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		2900	1100	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		7300	2700	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		1400	540	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		1400	540	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		7300	2700	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		290	78	ug/kg	1
Phenol	108-95-2	8270D	ND		1400	540	ug/kg	1
Pyrene	129-00-0	8270D	ND		290	54	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		3600	1100	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		7300	1100	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		7300	2700	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		1400	540	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		1400	540	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl	N	119	33-102
2-Fluorophenol		41	35-115
Nitrobenzene-d5	N	178	22-109
Phenol-d5		114	33-122
Terphenyl-d14		117	41-120
2,4,6-Tribromophenol		81	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-005
Description: CMR-WB11-1.0-2.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1500
% Solids: 88.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/26/2019 2358	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	800		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	2200		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		50	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-005
Description: CMR-WB11-1.0-2.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1500
% Solids: 88.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1207	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	510		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		117	40-140
2-Fluorobiphenyl (fractionation 1)		112	40-140
o - Terphenyl (aromatic)		83	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-005
Description: CMR-WB11-1.0-2.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1500
% Solids: 88.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	06/26/2019 1755	JJG		20855

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	130		18	3.6	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	340		18	3.6	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	776	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-005
Description: CMR-WB11-1.0-2.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1500
% Solids: 88.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	06/26/2019 1755	JJG		20854

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		1.2	0.16	mg/kg	1
C9 - C10 Aromatics		Montana VPH	260		6.0	2.4	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	11		1.2	0.15	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		1.2	0.26	mg/kg	1
Naphthalene	91-20-3	Montana VPH	8.5		1.2	0.62	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		1.2	0.19	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	0.80	J	1.2	0.27	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	ND		1.2	0.13	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	440	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF19039-005
Description: CMR-WB11-1.0-2.0-190618
Matrix: Solid
Date Sampled: 06/18/2019 1500
% Solids: 88.9 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	06/26/2019 1755	JJG		20853

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	890		45	8.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1630	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB11-1.0-2.0-190618
Date Sampled: 06/18/2019 1500
Date Received: 06/19/2019

Laboratory ID: UF19039-005
Matrix: Solid
% Solids: 88.9 06/20/2019 0150

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1308	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1519	TJW	06/24/2019 1843	20451

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.52	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	14		0.52	0.21	mg/kg	1
Barium	7440-39-3	6020B	150		1.4	0.32	mg/kg	1
Beryllium	7440-41-7	6020B	0.60		0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	0.14		0.14	0.026	mg/kg	1
Chromium	7440-47-3	6020B	13		1.4	0.58	mg/kg	1
Cobalt	7440-48-4	6020B	5.2		1.4	0.31	mg/kg	1
Copper	7440-50-8	6020B	8.3		1.4	0.34	mg/kg	1
Lead	7439-92-1	6020B	7.3		0.26	0.071	mg/kg	1
Mercury	7439-97-6	7471B	0.027	J	0.091	0.022	mg/kg	1
Nickel	7440-02-0	6020B	10		1.4	0.31	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.49	mg/kg	1
Silver	7440-22-4	6020B	ND		0.26	0.063	mg/kg	1
Vanadium	7440-62-2	6020B	33		1.4	0.26	mg/kg	1
Zinc	7440-66-6	6020B	39		2.6	0.52	mg/kg	1

LOQ = Limit of Quantitation
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H = Out of holding time
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E = Quantitation of compound exceeded the calibration range
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-006
Description: CMR-WB11-3.0-3.9-190618
Matrix: Solid
Date Sampled: 06/18/2019 1510
% Solids: 84.0 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	2	06/21/2019 1815	JM1		20364	5.36

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		2600	520	ug/kg	1
Benzene	71-43-2	8260B	ND		650	260	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		650	260	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		650	260	ug/kg	1
Bromoform	75-25-2	8260B	ND		650	260	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		650	260	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		2600	520	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		650	260	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		650	260	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		650	260	ug/kg	1
Chloroethane	75-00-3	8260B	ND		650	260	ug/kg	1
Chloroform	67-66-3	8260B	ND		650	260	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		650	260	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		650	260	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		650	260	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		650	260	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		650	260	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		650	260	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		650	260	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		650	260	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		650	260	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		650	260	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		650	260	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		650	260	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		650	260	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		650	260	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		650	260	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		650	260	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		650	260	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		33000	3300	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		650	260	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		1300	520	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		650	260	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		650	260	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		650	260	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		1300	520	ug/kg	1
Methylcyclohexane	108-87-2	8260B	1200		650	260	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		650	260	ug/kg	1
Naphthalene	91-20-3	8260B	ND		650	260	ug/kg	1
Styrene	100-42-5	8260B	ND		650	260	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		650	260	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		650	260	ug/kg	1
Toluene	108-88-3	8260B	310	J	650	260	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		650	260	ug/kg	1

LOQ = Limit of Quantitation
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DL = Detection Limit
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N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-006
Description: CMR-WB11-3.0-3.9-190618
Matrix: Solid
Date Sampled: 06/18/2019 1510
% Solids: 84.0 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	2	06/21/2019 1815	JM1		20364	5.36

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		650	260	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		650	260	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		650	260	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		650	260	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		650	260	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		650	260	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		650	260	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		1300	520	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		650	260	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		650	260	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		121	53-142
Bromofluorobenzene		122	47-138
Toluene-d8		122	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
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DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-006
Description: CMR-WB11-3.0-3.9-190618
Matrix: Solid
Date Sampled: 06/18/2019 1510
% Solids: 84.0 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/27/2019 1405	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		320	97	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		320	110	ug/kg	1
Anthracene	120-12-7	8270D	ND		320	60	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		320	69	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		320	77	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		320	58	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		320	76	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		320	56	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		1500	580	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		1500	580	ug/kg	1
Carbazole	86-74-8	8270D	ND		1500	580	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		1500	580	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		1500	580	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		1500	580	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		1500	580	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		1500	580	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		1500	580	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		1500	580	ug/kg	1
Chrysene	218-01-9	8270D	ND		320	53	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		320	60	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		1500	580	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		7800	2900	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		7800	2900	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		7800	2900	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		1500	580	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		1500	580	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		1500	580	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		1500	860	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		1500	580	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		1500	580	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		7800	2900	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		7800	2900	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		3200	1200	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		3200	1200	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		1500	580	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		7800	2900	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		320	49	ug/kg	1
Fluorene	86-73-7	8270D	ND		320	67	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		1500	580	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		1500	580	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		7800	2900	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		1500	580	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		320	120	ug/kg	1
Isophorone	78-59-1	8270D	ND		1500	580	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-006
Description: CMR-WB11-3.0-3.9-190618
Matrix: Solid
Date Sampled: 06/18/2019 1510
% Solids: 84.0 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	100	06/27/2019 1405	SCD	06/20/2019 1813	20184

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	830		320	120	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		1500	580	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		3200	1200	ug/kg	1
Naphthalene	91-20-3	8270D	600		320	110	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		3200	1200	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		3200	1200	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		3200	1200	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		1500	580	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		3200	1200	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		7800	2900	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		1500	580	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		1500	580	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		7800	2900	ug/kg	1
Phenanthrene	85-01-8	8270D	250	J	320	84	ug/kg	1
Phenol	108-95-2	8270D	ND		1500	580	ug/kg	1
Pyrene	129-00-0	8270D	ND		320	58	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		3900	1200	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		7800	1200	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		7800	2900	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		1500	580	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		1500	580	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl	N	125	33-102
2-Fluorophenol		49	35-115
Nitrobenzene-d5	N	210	22-109
Phenol-d5		110	33-122
Terphenyl-d14	N	122	41-120
2,4,6-Tribromophenol		66	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-006
Description: CMR-WB11-3.0-3.9-190618
Matrix: Solid
Date Sampled: 06/18/2019 1510
% Solids: 84.0 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 0027	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	510		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	1400		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		50	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-006
Description: CMR-WB11-3.0-3.9-190618
Matrix: Solid
Date Sampled: 06/18/2019 1510
% Solids: 84.0 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1237	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	410		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		123	40-140
2-Fluorobiphenyl (fractionation 1)		132	40-140
o - Terphenyl (aromatic)		86	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-006
Description: CMR-WB11-3.0-3.9-190618
Matrix: Solid
Date Sampled: 06/18/2019 1510
% Solids: 84.0 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	06/26/2019 1823	JJG		20855

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	210		20	4.1	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	500		20	4.1	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	1360	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19039-006
Description: CMR-WB11-3.0-3.9-190618
Matrix: Solid
Date Sampled: 06/18/2019 1510
% Solids: 84.0 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	06/26/2019 1823	JJG		20854

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		1.4	0.18	mg/kg	1
C9 - C10 Aromatics		Montana VPH	330		6.8	2.7	mg/kg	1
Ethylbenzene	100-41-4	Montana VPH	16		1.4	0.17	mg/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		1.4	0.29	mg/kg	1
Naphthalene	91-20-3	Montana VPH	12		1.4	0.70	mg/kg	1
Toluene	108-88-3	Montana VPH	ND		1.4	0.22	mg/kg	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		1.4	0.30	mg/kg	1
o - Xylenes	95-47-6	Montana VPH	11		1.4	0.15	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	464	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF19039-006
Description: CMR-WB11-3.0-3.9-190618
Matrix: Solid
Date Sampled: 06/18/2019 1510
% Solids: 84.0 06/20/2019 0150
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	5	06/26/2019 1823	JJG		20853

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	1100		45	8.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	0.00	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB11-3.0-3.9-190618
Date Sampled: 06/18/2019 1510
Date Received: 06/19/2019

Laboratory ID: UF19039-006
Matrix: Solid
% Solids: 84.0 06/20/2019 0150

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1314	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1522	TJW	06/24/2019 1843	20451

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.51	0.20	mg/kg	1
Arsenic	7440-38-2	6020B	7.1		0.51	0.20	mg/kg	1
Barium	7440-39-3	6020B	220		1.3	0.31	mg/kg	1
Beryllium	7440-41-7	6020B	0.91		0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	0.17		0.13	0.025	mg/kg	1
Chromium	7440-47-3	6020B	20		1.3	0.56	mg/kg	1
Cobalt	7440-48-4	6020B	6.4		1.3	0.30	mg/kg	1
Copper	7440-50-8	6020B	12		1.3	0.33	mg/kg	1
Lead	7439-92-1	6020B	9.0		0.25	0.069	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.099	0.024	mg/kg	1
Nickel	7440-02-0	6020B	15		1.3	0.30	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.3	0.48	mg/kg	1
Silver	7440-22-4	6020B	0.071	J	0.25	0.061	mg/kg	1
Vanadium	7440-62-2	6020B	52		1.3	0.25	mg/kg	1
Zinc	7440-66-6	6020B	50		2.5	0.51	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-007
Description: TB-15-20190618
Matrix: Aqueous
Date Sampled: 06/18/2019
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1854	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19039-007
Description: TB-15-20190618
Matrix: Aqueous
Date Sampled: 06/18/2019
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1854	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20364-001
Batch: 20364
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	06/20/2019 1758
Benzene	ND		1	250	100	ug/kg	06/20/2019 1758
Bromochloromethane	ND		1	250	100	ug/kg	06/20/2019 1758
Bromodichloromethane	ND		1	250	100	ug/kg	06/20/2019 1758
Bromoform	ND		1	250	100	ug/kg	06/20/2019 1758
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	06/20/2019 1758
2-Butanone (MEK)	ND		1	1000	200	ug/kg	06/20/2019 1758
Carbon disulfide	ND		1	250	100	ug/kg	06/20/2019 1758
Carbon tetrachloride	ND		1	250	100	ug/kg	06/20/2019 1758
Chlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
Chloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
Chloroform	ND		1	250	100	ug/kg	06/20/2019 1758
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	06/20/2019 1758
Cyclohexane	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	06/20/2019 1758
Dibromochloromethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
Dichlorodifluoromethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,1-Dichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,1-Dichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
1,2-Dichloropropane	ND		1	250	100	ug/kg	06/20/2019 1758
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/20/2019 1758
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/20/2019 1758
1,4-Dioxane	ND		1	13000	1300	ug/kg	06/20/2019 1758
Ethylbenzene	ND		1	250	100	ug/kg	06/20/2019 1758
2-Hexanone	ND		1	500	200	ug/kg	06/20/2019 1758
Isopropylbenzene	ND		1	250	100	ug/kg	06/20/2019 1758
Methyl acetate	ND		1	250	100	ug/kg	06/20/2019 1758
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	06/20/2019 1758
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	06/20/2019 1758
Methylcyclohexane	ND		1	250	100	ug/kg	06/20/2019 1758
Methylene chloride	ND		1	250	100	ug/kg	06/20/2019 1758
Naphthalene	ND		1	250	100	ug/kg	06/20/2019 1758
Styrene	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
Tetrachloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
Toluene	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	06/20/2019 1758

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20364-001
Batch: 20364
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	06/20/2019 1758
Trichloroethene	ND		1	250	100	ug/kg	06/20/2019 1758
Trichlorofluoromethane	ND		1	250	100	ug/kg	06/20/2019 1758
Vinyl chloride	ND		1	250	100	ug/kg	06/20/2019 1758
Xylenes (total)	ND		1	500	200	ug/kg	06/20/2019 1758
m+p - Xylenes	ND		1	250	100	ug/kg	06/20/2019 1758
o - Xylenes	ND		1	250	100	ug/kg	06/20/2019 1758

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		98	53-142
Bromofluorobenzene		98	47-138
Toluene-d8		99	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20364-002
Batch: 20364
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	3000		1	60	60-140	06/21/2019 1050
Benzene	2500	2700		1	110	70-130	06/21/2019 1050
Bromochloromethane	2500	2600		1	106	70-130	06/21/2019 1050
Bromodichloromethane	2500	2700		1	106	70-130	06/21/2019 1050
Bromoform	2500	2300		1	94	70-130	06/21/2019 1050
Bromomethane (Methyl bromide)	2500	2500		1	98	70-130	06/21/2019 1050
2-Butanone (MEK)	5000	3700		1	74	60-140	06/21/2019 1050
Carbon disulfide	2500	2800		1	112	70-130	06/21/2019 1050
Carbon tetrachloride	2500	2900		1	115	70-130	06/21/2019 1050
Chlorobenzene	2500	2600		1	105	70-130	06/21/2019 1050
Chloroethane	2500	3000		1	119	70-130	06/21/2019 1050
Chloroform	2500	2700		1	110	70-130	06/21/2019 1050
Chloromethane (Methyl chloride)	2500	2400		1	95	60-140	06/21/2019 1050
Cyclohexane	2500	3000		1	120	70-130	06/21/2019 1050
1,2-Dibromo-3-chloropropane (DBCP)	2500	2300		1	91	70-130	06/21/2019 1050
Dibromochloromethane	2500	2600		1	104	70-130	06/21/2019 1050
1,2-Dibromoethane (EDB)	2500	2500		1	100	70-130	06/21/2019 1050
1,2-Dichlorobenzene	2500	2600		1	102	70-130	06/21/2019 1050
1,3-Dichlorobenzene	2500	2600		1	105	70-130	06/21/2019 1050
1,4-Dichlorobenzene	2500	2700		1	107	70-130	06/21/2019 1050
Dichlorodifluoromethane	2500	2300		1	92	60-140	06/21/2019 1050
1,1-Dichloroethane	2500	2800		1	111	70-130	06/21/2019 1050
1,2-Dichloroethane	2500	2600		1	104	70-130	06/21/2019 1050
1,1-Dichloroethene	2500	3200		1	130	70-130	06/21/2019 1050
cis-1,2-Dichloroethene	2500	2800		1	111	70-130	06/21/2019 1050
trans-1,2-Dichloroethene	2500	3000		1	121	70-130	06/21/2019 1050
1,2-Dichloropropane	2500	2700		1	106	70-130	06/21/2019 1050
cis-1,3-Dichloropropene	2500	2700		1	109	70-130	06/21/2019 1050
trans-1,3-Dichloropropene	2500	2500		1	99	70-130	06/21/2019 1050
1,4-Dioxane	25000	26000		1	105	60-140	06/21/2019 1050
Ethylbenzene	2500	2700		1	109	70-130	06/21/2019 1050
2-Hexanone	5000	3600		1	72	70-130	06/21/2019 1050
Isopropylbenzene	2500	2700		1	106	70-130	06/21/2019 1050
Methyl acetate	2500	2200		1	88	70-130	06/21/2019 1050
Methyl tertiary butyl ether (MTBE)	2500	2700		1	108	70-130	06/21/2019 1050
4-Methyl-2-pentanone	5000	4800		1	95	70-130	06/21/2019 1050
Methylcyclohexane	2500	3400	N	1	135	70-130	06/21/2019 1050
Methylene chloride	2500	2800		1	111	70-130	06/21/2019 1050
Naphthalene	2500	2400		1	98	70-130	06/21/2019 1050
Styrene	2500	2600		1	105	70-130	06/21/2019 1050
1,1,2,2-Tetrachloroethane	2500	2500		1	100	70-130	06/21/2019 1050
Tetrachloroethene	2500	2800		1	110	70-130	06/21/2019 1050
Toluene	2500	2600		1	102	70-130	06/21/2019 1050
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3200		1	127	70-130	06/21/2019 1050

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20364-002
Batch: 20364
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	2800		1	113	70-130	06/21/2019 1050
1,2,4-Trichlorobenzene	2500	2900		1	114	70-130	06/21/2019 1050
1,1,1-Trichloroethane	2500	2700		1	109	70-130	06/21/2019 1050
1,1,2-Trichloroethane	2500	2400		1	97	70-130	06/21/2019 1050
Trichloroethene	2500	2700		1	107	70-130	06/21/2019 1050
Trichlorofluoromethane	2500	3200		1	130	70-130	06/21/2019 1050
Vinyl chloride	2500	2600		1	104	70-130	06/21/2019 1050
Xylenes (total)	5000	5400		1	107	70-130	06/21/2019 1050
m+p - Xylenes	2500	2700		1	109	70-130	06/21/2019 1050
o - Xylenes	2500	2700		1	106	70-130	06/21/2019 1050

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		104	53-142
Bromofluorobenzene		102	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20531-001
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/24/2019 1159
Benzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromoform	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/24/2019 1159
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloroform	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Cyclohexane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/24/2019 1159
1,4-Dioxane	ND		1	20	13	ug/L	06/24/2019 1159
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
2-Hexanone	ND		1	10	2.0	ug/L	06/24/2019 1159
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Methyl acetate	ND		1	1.0	0.40	ug/L	06/24/2019 1159
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/24/2019 1159
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/24/2019 1159
Methylene chloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Naphthalene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Styrene	ND		1	0.50	0.41	ug/L	06/24/2019 1159
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Toluene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/24/2019 1159

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20531-001
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Trichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/24/2019 1159
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/24/2019 1159
o - Xylenes	ND		1	0.50	0.40	ug/L	06/24/2019 1159

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		98	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
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+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20531-002
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	74		1	74	60-140	06/24/2019 1100
Benzene	50	48		1	96	70-130	06/24/2019 1100
Bromochloromethane	50	47		1	94	70-130	06/24/2019 1100
Bromodichloromethane	50	49		1	98	70-130	06/24/2019 1100
Bromoform	50	47		1	95	70-130	06/24/2019 1100
Bromomethane (Methyl bromide)	50	44		1	88	70-130	06/24/2019 1100
2-Butanone (MEK)	100	95		1	95	70-130	06/24/2019 1100
Carbon disulfide	50	45		1	90	70-130	06/24/2019 1100
Carbon tetrachloride	50	48		1	96	70-130	06/24/2019 1100
Chlorobenzene	50	47		1	93	70-130	06/24/2019 1100
Chloroethane	50	47		1	94	70-130	06/24/2019 1100
Chloroform	50	46		1	92	70-130	06/24/2019 1100
Chloromethane (Methyl chloride)	50	51		1	102	60-140	06/24/2019 1100
Cyclohexane	50	45		1	91	70-130	06/24/2019 1100
1,2-Dibromo-3-chloropropane (DBCP)	50	50		1	100	70-130	06/24/2019 1100
Dibromochloromethane	50	50		1	99	70-130	06/24/2019 1100
1,2-Dibromoethane (EDB)	50	50		1	100	70-130	06/24/2019 1100
1,2-Dichlorobenzene	50	46		1	92	70-130	06/24/2019 1100
1,3-Dichlorobenzene	50	45		1	89	70-130	06/24/2019 1100
1,4-Dichlorobenzene	50	44		1	88	70-130	06/24/2019 1100
Dichlorodifluoromethane	50	54		1	107	60-140	06/24/2019 1100
1,1-Dichloroethane	50	46		1	92	70-130	06/24/2019 1100
1,2-Dichloroethane	50	50		1	100	70-130	06/24/2019 1100
1,1-Dichloroethene	50	50		1	100	70-130	06/24/2019 1100
cis-1,2-Dichloroethene	50	47		1	93	70-130	06/24/2019 1100
trans-1,2-Dichloroethene	50	49		1	99	70-130	06/24/2019 1100
1,2-Dichloropropane	50	45		1	89	70-130	06/24/2019 1100
cis-1,3-Dichloropropene	50	53		1	105	70-130	06/24/2019 1100
trans-1,3-Dichloropropene	50	50		1	101	70-130	06/24/2019 1100
1,4-Dioxane	500	470		1	93	60-140	06/24/2019 1100
Ethylbenzene	50	50		1	100	70-130	06/24/2019 1100
2-Hexanone	100	100		1	102	70-130	06/24/2019 1100
Isopropylbenzene	50	52		1	104	70-130	06/24/2019 1100
Methyl acetate	50	38		1	77	70-130	06/24/2019 1100
Methyl tertiary butyl ether (MTBE)	50	44		1	88	70-130	06/24/2019 1100
4-Methyl-2-pentanone	100	110		1	105	70-130	06/24/2019 1100
Methylcyclohexane	50	48		1	95	70-130	06/24/2019 1100
Methylene chloride	50	44		1	87	70-130	06/24/2019 1100
Naphthalene	50	49		1	98	70-130	06/24/2019 1100
Styrene	50	52		1	104	70-130	06/24/2019 1100
1,1,2,2-Tetrachloroethane	50	52		1	104	70-130	06/24/2019 1100
Tetrachloroethene	50	48		1	97	70-130	06/24/2019 1100
Toluene	50	48		1	96	70-130	06/24/2019 1100
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	45		1	90	70-130	06/24/2019 1100

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LOD = Limit of Detection

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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20531-002
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	101	70-130	06/24/2019 1100
1,2,4-Trichlorobenzene	50	48		1	95	70-130	06/24/2019 1100
1,1,1-Trichloroethane	50	45		1	91	70-130	06/24/2019 1100
1,1,2-Trichloroethane	50	49		1	97	70-130	06/24/2019 1100
Trichloroethene	50	48		1	95	70-130	06/24/2019 1100
Trichlorofluoromethane	50	48		1	97	70-130	06/24/2019 1100
Vinyl chloride	50	44		1	88	70-130	06/24/2019 1100
Xylenes (total)	100	100		1	101	70-130	06/24/2019 1100
m+p - Xylenes	50	52		1	103	70-130	06/24/2019 1100
o - Xylenes	50	50		1	99	70-130	06/24/2019 1100

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		102	70-130
Bromofluorobenzene		112	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21174-001
Batch: 21174
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	06/28/2019 1146
Benzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Bromochloromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Bromoform	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	06/28/2019 1146
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	06/28/2019 1146
Carbon disulfide	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Chlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Chloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Chloroform	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	06/28/2019 1146
Cyclohexane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	06/28/2019 1146
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,4-Dioxane	ND		1	250	25	ug/kg	06/28/2019 1146
Ethylbenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
2-Hexanone	ND		1	10	4.0	ug/kg	06/28/2019 1146
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Methyl acetate	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	06/28/2019 1146
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Methylene chloride	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Naphthalene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Styrene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Toluene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21174-001
Batch: 21174
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Trichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
Vinyl chloride	ND		1	5.0	3.0	ug/kg	06/28/2019 1146
Xylenes (total)	ND		1	10	4.0	ug/kg	06/28/2019 1146
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	06/28/2019 1146
o - Xylenes	ND		1	5.0	2.0	ug/kg	06/28/2019 1146

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		88	53-142
Bromofluorobenzene		104	47-138
Toluene-d8		103	68-124

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21174-002
Batch: 21174
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	88		1	88	60-140	06/28/2019 1240
Benzene	50	52		1	104	70-130	06/28/2019 1240
Bromochloromethane	50	47		1	93	70-130	06/28/2019 1240
Bromodichloromethane	50	49		1	98	70-130	06/28/2019 1240
Bromoform	50	47		1	94	70-130	06/28/2019 1240
Bromomethane (Methyl bromide)	50	58		1	116	70-130	06/28/2019 1240
2-Butanone (MEK)	100	97		1	97	60-140	06/28/2019 1240
Carbon disulfide	50	54		1	108	70-130	06/28/2019 1240
Carbon tetrachloride	50	54		1	108	70-130	06/28/2019 1240
Chlorobenzene	50	54		1	108	70-130	06/28/2019 1240
Chloroethane	50	59		1	119	70-130	06/28/2019 1240
Chloroform	50	49		1	99	70-130	06/28/2019 1240
Chloromethane (Methyl chloride)	50	35		1	70	60-140	06/28/2019 1240
Cyclohexane	50	47		1	94	70-130	06/28/2019 1240
1,2-Dibromo-3-chloropropane (DBCP)	50	49		1	97	70-130	06/28/2019 1240
Dibromochloromethane	50	49		1	98	70-130	06/28/2019 1240
1,2-Dibromoethane (EDB)	50	48		1	97	70-130	06/28/2019 1240
1,2-Dichlorobenzene	50	54		1	107	70-130	06/28/2019 1240
1,3-Dichlorobenzene	50	56		1	111	70-130	06/28/2019 1240
1,4-Dichlorobenzene	50	55		1	110	70-130	06/28/2019 1240
Dichlorodifluoromethane	50	50		1	101	60-140	06/28/2019 1240
1,1-Dichloroethane	50	51		1	103	70-130	06/28/2019 1240
1,2-Dichloroethane	50	45		1	91	70-130	06/28/2019 1240
1,1-Dichloroethene	50	54		1	108	70-130	06/28/2019 1240
cis-1,2-Dichloroethene	50	50		1	99	70-130	06/28/2019 1240
trans-1,2-Dichloroethene	50	53		1	107	70-130	06/28/2019 1240
1,2-Dichloropropane	50	49		1	97	70-130	06/28/2019 1240
cis-1,3-Dichloropropene	50	50		1	99	70-130	06/28/2019 1240
trans-1,3-Dichloropropene	50	50		1	101	70-130	06/28/2019 1240
1,4-Dioxane	500	460		1	92	60-140	06/28/2019 1240
Ethylbenzene	50	56		1	112	70-130	06/28/2019 1240
2-Hexanone	100	100		1	104	70-130	06/28/2019 1240
Isopropylbenzene	50	59		1	119	70-130	06/28/2019 1240
Methyl acetate	50	31	N	1	62	70-130	06/28/2019 1240
Methyl tertiary butyl ether (MTBE)	50	47		1	94	70-130	06/28/2019 1240
4-Methyl-2-pentanone	100	84		1	84	70-130	06/28/2019 1240
Methylcyclohexane	50	50		1	101	70-130	06/28/2019 1240
Methylene chloride	50	48		1	96	70-130	06/28/2019 1240
Naphthalene	50	50		1	100	70-130	06/28/2019 1240
Styrene	50	53		1	106	70-130	06/28/2019 1240
1,1,2,2-Tetrachloroethane	50	48		1	95	70-130	06/28/2019 1240
Tetrachloroethene	50	60		1	120	70-130	06/28/2019 1240
Toluene	50	51		1	103	70-130	06/28/2019 1240
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	51		1	103	70-130	06/28/2019 1240

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21174-002
Batch: 21174
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	56		1	111	70-130	06/28/2019 1240
1,2,4-Trichlorobenzene	50	57		1	113	70-130	06/28/2019 1240
1,1,1-Trichloroethane	50	53		1	107	70-130	06/28/2019 1240
1,1,2-Trichloroethane	50	48		1	95	70-130	06/28/2019 1240
Trichloroethene	50	55		1	109	70-130	06/28/2019 1240
Trichlorofluoromethane	50	54		1	107	70-130	06/28/2019 1240
Vinyl chloride	50	46		1	93	70-130	06/28/2019 1240
Xylenes (total)	100	110		1	110	70-130	06/28/2019 1240
m+p - Xylenes	50	56		1	112	70-130	06/28/2019 1240
o - Xylenes	50	54		1	109	70-130	06/28/2019 1240

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		86	53-142
Bromofluorobenzene		103	47-138
Toluene-d8		104	68-124

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20184-001
Batch: 20184
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/20/2019 1813

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	06/25/2019 1110
Acenaphthylene	ND		1	2.7	0.95	ug/kg	06/25/2019 1110
Anthracene	ND		1	2.7	0.51	ug/kg	06/25/2019 1110
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	06/25/2019 1110
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	06/25/2019 1110
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	06/25/2019 1110
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	06/25/2019 1110
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	06/25/2019 1110
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/25/2019 1110
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	06/25/2019 1110
Carbazole	ND		1	13	5.0	ug/kg	06/25/2019 1110
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	06/25/2019 1110
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	06/25/2019 1110
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	06/25/2019 1110
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	06/25/2019 1110
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	06/25/2019 1110
2-Chlorophenol	ND		1	13	5.0	ug/kg	06/25/2019 1110
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	06/25/2019 1110
Chrysene	ND		1	2.7	0.45	ug/kg	06/25/2019 1110
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	06/25/2019 1110
Dibenzofuran	ND		1	13	5.0	ug/kg	06/25/2019 1110
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	06/25/2019 1110
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	06/25/2019 1110
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	06/25/2019 1110
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	06/25/2019 1110
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	06/25/2019 1110
Diethylphthalate	ND		1	13	5.0	ug/kg	06/25/2019 1110
Dimethyl phthalate	ND		1	13	7.4	ug/kg	06/25/2019 1110
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	06/25/2019 1110
Di-n-butyl phthalate	8.4	J	1	13	5.0	ug/kg	06/25/2019 1110
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	06/25/2019 1110
2,4-Dinitrophenol	ND		1	67	25	ug/kg	06/25/2019 1110
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	06/25/2019 1110
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	06/25/2019 1110
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	06/25/2019 1110
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	06/25/2019 1110
Fluoranthene	ND		1	2.7	0.42	ug/kg	06/25/2019 1110
Fluorene	ND		1	2.7	0.57	ug/kg	06/25/2019 1110
Hexachlorobenzene	ND		1	13	5.0	ug/kg	06/25/2019 1110
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	06/25/2019 1110
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	06/25/2019 1110
Hexachloroethane	ND		1	13	5.0	ug/kg	06/25/2019 1110
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	06/25/2019 1110
Isophorone	ND		1	13	5.0	ug/kg	06/25/2019 1110

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20184-001
Batch: 20184
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/20/2019 1813

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	06/25/2019 1110
2-Methylphenol	ND		1	13	5.0	ug/kg	06/25/2019 1110
3+4-Methylphenol	ND		1	27	10	ug/kg	06/25/2019 1110
Naphthalene	ND		1	2.7	0.97	ug/kg	06/25/2019 1110
2-Nitroaniline	ND		1	27	10	ug/kg	06/25/2019 1110
3-Nitroaniline	ND		1	27	10	ug/kg	06/25/2019 1110
4-Nitroaniline	ND		1	27	10	ug/kg	06/25/2019 1110
Nitrobenzene	ND		1	13	5.0	ug/kg	06/25/2019 1110
2-Nitrophenol	ND		1	27	10	ug/kg	06/25/2019 1110
4-Nitrophenol	ND		1	67	25	ug/kg	06/25/2019 1110
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	06/25/2019 1110
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	06/25/2019 1110
Pentachlorophenol	ND		1	67	25	ug/kg	06/25/2019 1110
Phenanthrene	ND		1	2.7	0.72	ug/kg	06/25/2019 1110
Phenol	ND		1	13	5.0	ug/kg	06/25/2019 1110
Pyrene	ND		1	2.7	0.50	ug/kg	06/25/2019 1110
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	06/25/2019 1110
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	06/25/2019 1110
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	06/25/2019 1110
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	06/25/2019 1110
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	06/25/2019 1110

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		54	33-102
2-Fluorophenol		47	35-115
Nitrobenzene-d5		64	22-109
Phenol-d5		56	33-122
Terphenyl-d14		97	41-120
2,4,6-Tribromophenol		49	30-117

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20184-002
Batch: 20184
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/20/2019 1813

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	81		1	61	12-111	06/25/2019 1224
Acenaphthylene	130	92		1	70	44-122	06/25/2019 1224
Anthracene	130	110		1	83	16-122	06/25/2019 1224
Benzo(a)anthracene	130	130		1	101	40-121	06/25/2019 1224
Benzo(a)pyrene	130	130		1	100	36-114	06/25/2019 1224
Benzo(b)fluoranthene	130	120		1	92	38-123	06/25/2019 1224
Benzo(g,h,i)perylene	130	150		1	114	43-120	06/25/2019 1224
Benzo(k)fluoranthene	130	140		1	106	40-126	06/25/2019 1224
4-Bromophenyl phenyl ether	130	92		1	69	30-130	06/25/2019 1224
Butyl benzyl phthalate	130	170	N	1	128	48-124	06/25/2019 1224
Carbazole	130	130		1	96	47-125	06/25/2019 1224
bis (2-Chloro-1-methylethyl) ether	130	80		1	60	41-113	06/25/2019 1224
4-Chloro-3-methyl phenol	130	93		1	70	48-120	06/25/2019 1224
bis(2-Chloroethoxy)methane	130	83		1	63	38-115	06/25/2019 1224
bis(2-Chloroethyl)ether	130	79		1	59	46-122	06/25/2019 1224
2-Chloronaphthalene	130	81		1	61	37-106	06/25/2019 1224
2-Chlorophenol	130	71		1	53	44-122	06/25/2019 1224
4-Chlorophenyl phenyl ether	130	89		1	67	32-107	06/25/2019 1224
Chrysene	130	130		1	99	41-124	06/25/2019 1224
Dibenzo(a,h)anthracene	130	150		1	112	38-125	06/25/2019 1224
Dibenzofuran	130	88		1	66	45-128	06/25/2019 1224
1,2-Dichlorobenzene	130	71		1	54	39-94	06/25/2019 1224
1,3-Dichlorobenzene	130	70		1	53	30-130	06/25/2019 1224
1,4-Dichlorobenzene	130	70		1	53	39-92	06/25/2019 1224
3,3'-Dichlorobenzidine	130	110		1	84	10-119	06/25/2019 1224
2,4-Dichlorophenol	130	81		1	61	30-96	06/25/2019 1224
Diethylphthalate	130	98		1	74	30-130	06/25/2019 1224
Dimethyl phthalate	130	95		1	71	24-127	06/25/2019 1224
2,4-Dimethylphenol	130	130		1	99	30-130	06/25/2019 1224
Di-n-butyl phthalate	130	140		1	106	35-108	06/25/2019 1224
4,6-Dinitro-2-methylphenol	130	85		1	64	53-150	06/25/2019 1224
2,4-Dinitrophenol	270	120		1	46	32-115	06/25/2019 1224
2,4-Dinitrotoluene	130	99		1	74	40-130	06/25/2019 1224
2,6-Dinitrotoluene	130	95		1	72	46-118	06/25/2019 1224
Di-n-octylphthalate	130	140		1	103	49-118	06/25/2019 1224
bis(2-Ethylhexyl)phthalate	130	150		1	111	33-123	06/25/2019 1224
Fluoranthene	130	130		1	95	26-133	06/25/2019 1224
Fluorene	130	88		1	66	19-108	06/25/2019 1224
Hexachlorobenzene	130	93		1	70	10-125	06/25/2019 1224
Hexachlorobutadiene	130	68		1	51	47-116	06/25/2019 1224
Hexachlorocyclopentadiene	670	320		1	49	48-127	06/25/2019 1224
Hexachloroethane	130	70		1	53	18-154	06/25/2019 1224
Indeno(1,2,3-c,d)pyrene	130	150		1	112	42-123	06/25/2019 1224
Isophorone	130	91		1	68	30-130	06/25/2019 1224

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20184-002
Batch: 20184
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 06/20/2019 1813

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	82		1	62	10-107	06/25/2019 1224
2-Methylphenol	130	75		1	57	33-103	06/25/2019 1224
3+4-Methylphenol	130	74		1	56	18-121	06/25/2019 1224
Naphthalene	130	81		1	61	10-112	06/25/2019 1224
2-Nitroaniline	130	96		1	72	46-128	06/25/2019 1224
3-Nitroaniline	130	79		1	60	30-130	06/25/2019 1224
4-Nitroaniline	130	120		1	88	51-129	06/25/2019 1224
Nitrobenzene	130	82		1	62	49-142	06/25/2019 1224
2-Nitrophenol	130	78		1	58	33-114	06/25/2019 1224
4-Nitrophenol	270	190		1	71	27-138	06/25/2019 1224
N-Nitrosodi-n-propylamine	130	83		1	62	45-112	06/25/2019 1224
N-Nitrosodiphenylamine (Diphenylamine)	130	100		1	77	49-123	06/25/2019 1224
Pentachlorophenol	270	210		1	78	36-108	06/25/2019 1224
Phenanthrene	130	100		1	76	16-123	06/25/2019 1224
Phenol	130	78		1	59	39-108	06/25/2019 1224
Pyrene	130	130		1	101	34-121	06/25/2019 1224
1,2,4,5-Tetrachlorobenzene	130	69		1	52	30-130	06/25/2019 1224
2,3,4,6-Tetrachlorophenol	130	95		1	71	53-125	06/25/2019 1224
1,2,4-Trichlorobenzene	130	73		1	55	30-130	06/25/2019 1224
2,4,5-Trichlorophenol	130	85		1	64	32-105	06/25/2019 1224
2,4,6-Trichlorophenol	130	83		1	62	31-102	06/25/2019 1224

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		64	33-102
2-Fluorophenol		55	35-115
Nitrobenzene-d5		62	22-109
Phenol-d5		57	33-122
Terphenyl-d14		120	41-120
2,4,6-Tribromophenol		81	30-117

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20483-001
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/26/2019 1830
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/26/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		82	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20483-002
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	40-140	06/26/2019 1900
C9 - C18 Aliphatics	30	20		1	68	40-140	06/26/2019 1900

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		78	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20483-003
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	37		1	92	6.2	40-140	25	06/26/2019 1930
C9 - C18 Aliphatics	30	23		1	76	10	40-140	25	06/26/2019 1930

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		79	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20484-001
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/27/2019 0424

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		83	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20484-002
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	64		1	75	40-140	06/27/2019 0453

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		83	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20484-003
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	63		1	74	0.98	40-140	25	06/27/2019 0523

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		84	40-140
2-Fluorobiphenyl (fractionation 1)		87	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ20853-001
Batch: 20853
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/26/2019 1116

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		93	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ20853-002
Batch: 20853
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	19		1	99	70-130	06/26/2019 1019

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ20853-003
Batch: 20853
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	18		1	97	1.6	70-130	25	06/26/2019 1047

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ20854-001
Batch: 20854
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	0.25	0.034	mg/kg	06/26/2019 1116
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/26/2019 1116
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/26/2019 1116
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/26/2019 1116
Naphthalene	ND		1	0.25	0.13	mg/kg	06/26/2019 1116
Toluene	ND		1	0.25	0.040	mg/kg	06/26/2019 1116
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/26/2019 1116
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/26/2019 1116

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ20854-002
Batch: 20854
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.2		1	96	70-130	06/26/2019 1019
C9 - C10 Aromatics	1.3	1.2		1	96	70-130	06/26/2019 1019
Ethylbenzene	1.3	1.2		1	96	70-130	06/26/2019 1019
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	70-130	06/26/2019 1019
Naphthalene	1.3	1.0		1	80	70-130	06/26/2019 1019
Toluene	1.3	1.2		1	96	70-130	06/26/2019 1019
m+p - Xylenes	2.5	2.4		1	96	70-130	06/26/2019 1019
o - Xylenes	1.3	1.2		1	96	70-130	06/26/2019 1019

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Montana VPH (aromatics) - LCSD

Sample ID: UQ20854-003
Batch: 20854
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.1		1	88	8.7	70-130	25	06/26/2019 1047
C9 - C10 Aromatics	1.3	1.2		1	96	0.00	70-130	25	06/26/2019 1047
Ethylbenzene	1.3	1.2		1	96	0.00	70-130	25	06/26/2019 1047
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	0.00	70-130	25	06/26/2019 1047
Naphthalene	1.3	0.98		1	78	2.0	70-130	25	06/26/2019 1047
Toluene	1.3	1.1		1	88	8.7	70-130	25	06/26/2019 1047
m+p - Xylenes	2.5	2.4		1	96	0.00	70-130	25	06/26/2019 1047
o - Xylenes	1.3	1.2		1	96	0.00	70-130	25	06/26/2019 1047

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ20855-001
Batch: 20855
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/26/2019 1116
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/26/2019 1116

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ20855-002
Batch: 20855
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	4.9		1	98	70-130	06/26/2019 1019
C9 - C12 Aliphatics, Adjusted	3.8	3.8		1	101	70-130	06/26/2019 1019

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ20855-003
Batch: 20855
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.1		1	102	3.3	70-130	25	06/26/2019 1047
C9 - C12 Aliphatics, Adjusted	3.8	3.8		1	101	0.95	70-130	25	06/26/2019 1047

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20446-001
Batch: 20446
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/24/2019 1154

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	06/27/2019 1157
Arsenic	ND		1	0.50	0.20	mg/kg	06/27/2019 1157
Barium	ND		1	1.3	0.31	mg/kg	06/27/2019 1157
Beryllium	ND		1	0.10	0.034	mg/kg	06/27/2019 1157
Cadmium	ND		1	0.13	0.025	mg/kg	06/27/2019 1157
Chromium	ND		1	1.3	0.55	mg/kg	06/27/2019 1157
Cobalt	ND		1	1.3	0.30	mg/kg	06/27/2019 1157
Copper	ND		1	1.3	0.33	mg/kg	06/27/2019 1157
Lead	ND		1	0.25	0.068	mg/kg	06/27/2019 1157
Nickel	ND		1	1.3	0.30	mg/kg	06/27/2019 1157
Selenium	ND		1	1.3	0.47	mg/kg	06/27/2019 1157
Silver	ND		1	0.25	0.060	mg/kg	06/27/2019 1157
Vanadium	ND		1	1.3	0.25	mg/kg	06/27/2019 1157
Zinc	ND		1	2.5	0.50	mg/kg	06/27/2019 1157

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20446-002
Batch: 20446
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/24/2019 1154

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	52		1	104	80-120	06/27/2019 1203
Arsenic	50	53		1	106	80-120	06/27/2019 1203
Barium	50	52		1	104	80-120	06/27/2019 1203
Beryllium	50	56		1	112	80-120	06/27/2019 1203
Cadmium	50	51		1	101	80-120	06/27/2019 1203
Chromium	50	53		1	107	80-120	06/27/2019 1203
Cobalt	50	55		1	110	80-120	06/27/2019 1203
Copper	50	53		1	105	80-120	06/27/2019 1203
Lead	50	53		1	105	80-120	06/27/2019 1203
Nickel	50	52		1	104	80-120	06/27/2019 1203
Selenium	50	48		1	97	80-120	06/27/2019 1203
Silver	50	56		1	111	80-120	06/27/2019 1203
Vanadium	50	55		1	109	80-120	06/27/2019 1203
Zinc	50	49		1	98	80-120	06/27/2019 1203

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MS

Sample ID: UF19039-001MS
Batch: 20446
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/24/2019 1154

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	0.24	57	49		1	86	75-125	06/27/2019 1215
Arsenic	23	57	88		1	116	75-125	06/27/2019 1215
Barium	270	57	810	N	1	952	75-125	06/27/2019 1215
Beryllium	0.65	57	68		1	119	75-125	06/27/2019 1215
Cadmium	0.19	57	65		1	114	75-125	06/27/2019 1215
Chromium	16	57	87	N	1	126	75-125	06/27/2019 1215
Cobalt	6.1	57	71		1	115	75-125	06/27/2019 1215
Copper	21	57	87		1	115	75-125	06/27/2019 1215
Lead	8.4	57	79		1	125	75-125	06/27/2019 1215
Nickel	12	57	73		1	108	75-125	06/27/2019 1215
Selenium	ND	57	60		1	105	75-125	06/27/2019 1215
Silver	0.091	57	66		1	117	75-125	06/27/2019 1215
Vanadium	41	57	120	N	1	147	75-125	06/27/2019 1215
Zinc	52	57	130	N	1	132	75-125	06/27/2019 1215

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MSD

Sample ID: UF19039-001MD
Batch: 20446
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/24/2019 1154

Parameter	Sample Amount (mg/kg)	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Antimony	0.24	54	48		1	89	1.4	75-125	20	06/27/2019 1221
Arsenic	23	54	88		1	122	0.29	75-125	20	06/27/2019 1221
Barium	270	54	430	N,+	1	295	61	75-125	20	06/27/2019 1221
Beryllium	0.65	54	68		1	125	0.073	75-125	20	06/27/2019 1221
Cadmium	0.19	54	64		1	118	1.6	75-125	20	06/27/2019 1221
Chromium	16	54	85	N	1	128	2.7	75-125	20	06/27/2019 1221
Cobalt	6.1	54	70		1	118	1.7	75-125	20	06/27/2019 1221
Copper	21	54	91	N	1	129	5.2	75-125	20	06/27/2019 1221
Lead	8.4	54	79	N	1	130	0.22	75-125	20	06/27/2019 1221
Nickel	12	54	71		1	110	2.3	75-125	20	06/27/2019 1221
Selenium	ND	54	59		1	109	1.6	75-125	20	06/27/2019 1221
Silver	0.091	54	65		1	120	1.8	75-125	20	06/27/2019 1221
Vanadium	41	54	120	N	1	144	4.4	75-125	20	06/27/2019 1221
Zinc	52	54	130	N	1	139	0.47	75-125	20	06/27/2019 1221

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20451-001
Batch: 20451
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1843

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/25/2019 1436

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20451-002
Batch: 20451
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1843

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.89		1	107	80-120	06/25/2019 1438

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Chain of Custody

and

Miscellaneous Documents

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

Chain of Custody Record

Number

Client	Report to Contact	Telephone No. / E-mail	Quote No.
Ramboll US Corporation	Daniel Price/Michael Wilson	(314) 590-2970/dpr cs@ramboll.com (218) 449-7868/mwilson@ramboll.com	

Address	Sampler's Signature	Analysis (Attach list if more space is needed)	Page
7500 College Boulevard Suite 1905	X Brooks Bailey		1 of 1

City	State	Zip Code
Overland Park	KS	66210

Project Name: CMR RIAIM East Rail

Project Number: 1590012344-003

P.O No.:

UF19039

KMN2

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous		No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH				Remarks / Cooler I.D.
CMR-WB13-3.0-3.5-190618	6/18/2019	09:50	G		X			2					1	2	X	X	X	X	X				Cooler 001
CMR-WB13-3.0-3.5-190618-DUP	6/18/2019	09:55	G		X			2					1	2	X	X	X	X	X				Cooler 001
CMR-WB12-0.0-1.0-190618	6/18/2019	12:15	G		X			2					1	2	X	X	X	X	X				Cooler 001
CMR-WB12-2.0-2.5-190618	6/18/2019	12:20	G		X			2					1	2	X	X	X	X	X				Cooler 001
CMR-WB11-1.0-2.0-190618	6/18/2019	15:00	G		X			2					1	2	X	X	X	X	X				Cooler 001
CMR-WB11-3.0-3.9-190618	6/18/2019	15:10	G		X			2					1	2	X	X	X	X	X				Cooler 001
TB-15	NA	NA	G	X							2				X								Trip Blank/Cooler 001

Turn Around Time Required (Prior lab approval required for expedited TAT)	Sample Disposal	Possible Hazard Identification (List any known hazards in the remarks)	QC Requirements
[X] Standard [ ] Rush (Please Specify)	[ ] Return to Client [ ] Disposal by Lab	[ ] Non-Hazardous [ ] Flammab [ ] Skin Irrit [ ] SDS prov [X] Unknown	

1. Relinquished by: Brooks Bailey (Ramboll)	Date: 6/18/2019	Time: 17:45	1. Received by	Date	Time
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by: Fed EX	Date: 6-19-19	Time: 1005	4. Laboratory Received by: L Hite	Date: 6-19-19	Time: 1005

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) [X] Y [ ] N [ ] Ice Pack

Receipt Temp. 2.6 °C

Document Number: ME002OW-01

SHEALY ENVIRONMENTAL SERVICES, INC.

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Shealy Environmental Services, Inc.
Document Number: MB0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 06/19/19 Lot #: UF19039

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: 19-611

2.6 / 2.6 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)? _____
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.

Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: LKH Date: 06/19/19

Comments:

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF19040, 3 Groundwater Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF19040 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB07-190618-GW	UF19040-001
CMR-WB08-190618-GW	UF19040-002
CMR-WB09S-190618-GW	UF19040-003
TB-16-20190618	UF19040-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Blank Detections
During analysis, chromium was detected in method blank samples. This indicates a possible cross-contamination issue. Due to this, all low level detections should be evaluated for possible contamination bias. All chromium results below the RL or below 5x the blank result have been validated as non-detect (U).

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF19040

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 GW, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Chromium detected in method blank sample. All Cr detections (all below the RL) validated as non-detect (U).
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	All Cr detections (all below the RL) validated as non-detect (U).

SDG No. UF19040

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 GW, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	No issues	No issues
Deuterated Monitoring Compound or Surrogate Spikes	No issues	No issues
Matrix Spike/Matrix Spike Duplicate	No MS/MSDs reported with results. No action taken.	No MS/MSDs reported with results. No action taken.
Laboratory Control Sample	No issues	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab. No action taken.	N/A
Other Non-conformances	RLs raised due to dilutions. No action taken.	No other non-conformances noted.
Overall Assessment of Data	No validation action warranted.	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM East Rail

Project Number: 1690012344-003

Lot Number:**UF19040**

Date Completed:07/09/2019

07/09/2019 5:06 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
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Case Narrative
Ramboll US Corporation
Lot Number: UF19040

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Semivolatiles
Sample -003 was diluted 5X due to the sample matrix. The reporting limits have been raised accordingly.

Montana VPH
Sample -003 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

Metals
The method blank associated with batch 20200 had chromium detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for chromium have been flagged with a “B” qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF19040

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB07-190618-GW	Aqueous	06/18/2019 1011	06/19/2019
002	CMR-WB08-190618-GW	Aqueous	06/18/2019 1205	06/19/2019
003	CMR-WB09S-190618-GW	Aqueous	06/18/2019 1453	06/19/2019
004	TB-16-20190618	Aqueous	06/18/2019	06/19/2019

(4 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF19040

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB07-190618-GW	Aqueous	Acetone	8260B	2.1	J	ug/L	6
001	CMR-WB07-190618-GW	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.48	J	ug/L	8
001	CMR-WB07-190618-GW	Aqueous	Arsenic	6020B	3.3		ug/L	15
001	CMR-WB07-190618-GW	Aqueous	Barium	6020B	33		ug/L	15
001	CMR-WB07-190618-GW	Aqueous	Chromium	6020B	1.9	BJ	ug/L	15
001	CMR-WB07-190618-GW	Aqueous	Copper	6020B	4.3	J	ug/L	15
001	CMR-WB07-190618-GW	Aqueous	Nickel	6020B	7.1		ug/L	15
001	CMR-WB07-190618-GW	Aqueous	Selenium	6020B	1.3	J	ug/L	15
001	CMR-WB07-190618-GW	Aqueous	Vanadium	6020B	2.7	J	ug/L	15
001	CMR-WB07-190618-GW	Aqueous	Zinc	6020B	12		ug/L	15
002	CMR-WB08-190618-GW	Aqueous	Acetone	8260B	4.4	J	ug/L	16
002	CMR-WB08-190618-GW	Aqueous	Benzene	8260B	6.5		ug/L	16
002	CMR-WB08-190618-GW	Aqueous	Toluene	8260B	1.0		ug/L	16
002	CMR-WB08-190618-GW	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	0.38	J	ug/L	18
002	CMR-WB08-190618-GW	Aqueous	C19 - C36 Aliphatics	Montana EPH	150		ug/L	20
002	CMR-WB08-190618-GW	Aqueous	C9 - C18 Aliphatics	Montana EPH	300		ug/L	20
002	CMR-WB08-190618-GW	Aqueous	C9 - C12 Aliphatics,	Montana VPH	79		ug/L	22
002	CMR-WB08-190618-GW	Aqueous	Benzene	Montana VPH	7.1		ug/L	23
002	CMR-WB08-190618-GW	Aqueous	C9 - C10 Aromatics	Montana VPH	13	J	ug/L	23
002	CMR-WB08-190618-GW	Aqueous	Toluene	Montana VPH	1.1	J	ug/L	23
002	CMR-WB08-190618-GW	Aqueous	TPH	Montana VPH	92	J	ug/L	24
002	CMR-WB08-190618-GW	Aqueous	Antimony	6020B	0.57	J	ug/L	25
002	CMR-WB08-190618-GW	Aqueous	Arsenic	6020B	10		ug/L	25
002	CMR-WB08-190618-GW	Aqueous	Barium	6020B	75		ug/L	25
002	CMR-WB08-190618-GW	Aqueous	Chromium	6020B	1.7	BJ	ug/L	25
002	CMR-WB08-190618-GW	Aqueous	Cobalt	6020B	12		ug/L	25
002	CMR-WB08-190618-GW	Aqueous	Copper	6020B	3.1	J	ug/L	25
002	CMR-WB08-190618-GW	Aqueous	Nickel	6020B	19		ug/L	25
002	CMR-WB08-190618-GW	Aqueous	Zinc	6020B	11		ug/L	25
003	CMR-WB09S-190618-GW	Aqueous	Acetone	8260B	6.8	J	ug/L	26
003	CMR-WB09S-190618-GW	Aqueous	Benzene	8260B	46		ug/L	26
003	CMR-WB09S-190618-GW	Aqueous	2-Butanone (MEK)	8260B	21		ug/L	26
003	CMR-WB09S-190618-GW	Aqueous	Cyclohexane	8260B	1.5		ug/L	26
003	CMR-WB09S-190618-GW	Aqueous	Ethylbenzene	8260B	40		ug/L	26
003	CMR-WB09S-190618-GW	Aqueous	Isopropylbenzene	8260B	3.6		ug/L	26
003	CMR-WB09S-190618-GW	Aqueous	Methylcyclohexane	8260B	3.2	J	ug/L	26
003	CMR-WB09S-190618-GW	Aqueous	Naphthalene	8260B	0.41	J	ug/L	26
003	CMR-WB09S-190618-GW	Aqueous	Xylenes (total)	8260B	2.5		ug/L	27
003	CMR-WB09S-190618-GW	Aqueous	m+p - Xylenes	8260B	2.5		ug/L	27
003	CMR-WB09S-190618-GW	Aqueous	C9 - C18 Aliphatics	Montana EPH	130		ug/L	30
003	CMR-WB09S-190618-GW	Aqueous	C11 - C22 Aromatics	Montana EPH	130		ug/L	31
003	CMR-WB09S-190618-GW	Aqueous	C5 - C8 Aliphatics,	Montana VPH	75		ug/L	32
003	CMR-WB09S-190618-GW	Aqueous	C9 - C12 Aliphatics,	Montana VPH	480		ug/L	32
003	CMR-WB09S-190618-GW	Aqueous	Benzene	Montana VPH	47		ug/L	33
003	CMR-WB09S-190618-GW	Aqueous	C9 - C10 Aromatics	Montana VPH	390		ug/L	33

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
003	CMR-WB09S-190618-GW	Aqueous	Ethylbenzene	Montana VPH	43		ug/L	33
003	CMR-WB09S-190618-GW	Aqueous	Naphthalene	Montana VPH	8.5		ug/L	33
003	CMR-WB09S-190618-GW	Aqueous	m+p - Xylenes	Montana VPH	3.6	J	ug/L	33
003	CMR-WB09S-190618-GW	Aqueous	o - Xylenes	Montana VPH	1.4	J	ug/L	33
003	CMR-WB09S-190618-GW	Aqueous	TPH	Montana VPH	950		ug/L	34
003	CMR-WB09S-190618-GW	Aqueous	Arsenic	6020B	31		ug/L	35
003	CMR-WB09S-190618-GW	Aqueous	Barium	6020B	520		ug/L	35
003	CMR-WB09S-190618-GW	Aqueous	Cobalt	6020B	8.7		ug/L	35
003	CMR-WB09S-190618-GW	Aqueous	Lead	6020B	0.27	J	ug/L	35
003	CMR-WB09S-190618-GW	Aqueous	Nickel	6020B	14		ug/L	35
003	CMR-WB09S-190618-GW	Aqueous	Vanadium	6020B	3.0	J	ug/L	35
003	CMR-WB09S-190618-GW	Aqueous	Zinc	6020B	13		ug/L	35

(57 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-001
Description: CMR-WB07-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1011
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1721	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	2.1	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-001
Description: CMR-WB07-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1011
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1721	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		110	70-130
Toluene-d8		104	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-001
Description: CMR-WB07-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1011
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/26/2019 1353	JCG	06/21/2019 1700	20322

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.48	J	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-001
Description: CMR-WB07-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1011
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/26/2019 1353	JCG	06/21/2019 1700	20322

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		52	37-129
2-Fluorophenol		30	24-127
Nitrobenzene-d5		54	38-127
Phenol-d5		43	28-128
Terphenyl-d14		81	10-148
2,4,6-Tribromophenol		52	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-001
Description: CMR-WB07-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1011
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1413	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		53	40-140

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-001
Description: CMR-WB07-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1011
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0241	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		66	40-140
2-Fluorobiphenyl (fractionation 1)		65	40-140
o - Terphenyl (aromatic)		54	40-140

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J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-001
Description: CMR-WB07-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1011
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 1850	JJG		20972

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		100	70-130

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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-001
Description: CMR-WB07-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1011
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 1850	JJG		20971

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		93	70-130

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DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF19040-001
Description: CMR-WB07-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1011
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 1850	JJG		20970

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-001
Description: CMR-WB07-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1011
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/21/2019 1156	TJW	06/20/2019 1702	20147
1	3005A	6020B	1	06/25/2019 1918	BNW	06/20/2019 1935	20200

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	3.3		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	33		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	1.9	BJ	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	ND		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	4.3	J	5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	7.1		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	1.3	J	5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	2.7	J	5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	12		10	2.5	ug/L	1

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DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-002
Description: CMR-WB08-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1205
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1744	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	4.4	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	6.5		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	1.0		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-002
Description: CMR-WB08-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1205
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1744	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		108	70-130
Toluene-d8		104	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-002
Description: CMR-WB08-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1205
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/26/2019 1418	JCG	06/21/2019 1700	20322

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	0.38	J	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-002
Description: CMR-WB08-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1205
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/26/2019 1418	JCG	06/21/2019 1700	20322

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		50	37-129
2-Fluorophenol		37	24-127
Nitrobenzene-d5		58	38-127
Phenol-d5		53	28-128
Terphenyl-d14		81	10-148
2,4,6-Tribromophenol		108	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-002
Description: CMR-WB08-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1205
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1443	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	150		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	300		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		54	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-002
Description: CMR-WB08-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1205
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0311	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		48	40-140
2-Fluorobiphenyl (fractionation 1)		48	40-140
o - Terphenyl (aromatic)		44	40-140

LOQ = Limit of Quantitation
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W = Reported on wet weight basis
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-002
Description: CMR-WB08-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1205
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 1918	JJG		20972

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	79		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-002
Description: CMR-WB08-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1205
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 1918	JJG		20971

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	7.1		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	13	J	25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	1.1	J	5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		84	70-130

LOQ = Limit of Quantitation
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF19040-002
Description: CMR-WB08-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1205
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 1918	JJG		20970

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	92	J	180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		90	70-130

LOQ = Limit of Quantitation
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-002
Description: CMR-WB08-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1205
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/21/2019 1159	TJW	06/20/2019 1702	20147
1	3005A	6020B	1	06/25/2019 1924	BNW	06/20/2019 1935	20200

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.57	J	2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	10		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	75		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	1.7	BJ	5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	12		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	3.1	J	5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	ND		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	19		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	ND		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	11		10	2.5	ug/L	1

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-003
Description: CMR-WB09S-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1453
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1808	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	6.8	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	46		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	21		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	1.5		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	40		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	3.6		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	3.2	J	5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	0.41	J	0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-003
Description: CMR-WB09S-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1453
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1808	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	2.5		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	2.5		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		89	70-130
Bromofluorobenzene		109	70-130
Toluene-d8		103	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-003
Description: CMR-WB09S-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1453
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	06/26/2019 1443	JCG	06/21/2019 1700	20322

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.80	0.20	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.80	0.20	ug/L	1
Anthracene	120-12-7	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.80	0.20	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.80	0.20	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.80	0.20	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.80	0.20	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		4.0	0.75	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		20	1.1	ug/L	1
Carbazole	86-74-8	8270D	ND		4.0	0.20	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		4.0	0.85	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		4.0	1.3	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		4.0	0.30	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		4.0	0.80	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		4.0	0.75	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		4.0	0.75	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		4.0	0.80	ug/L	1
Chrysene	218-01-9	8270D	ND		0.80	0.20	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.80	0.20	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		4.0	0.80	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		4.0	0.85	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		4.0	0.90	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		4.0	0.80	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		20	4.1	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		4.0	0.95	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		20	0.95	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		20	0.90	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		4.0	0.75	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		20	2.1	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		20	4.5	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		20	6.6	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		8.0	1.8	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		8.0	1.7	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		20	2.4	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		20	1.9	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.80	0.20	ug/L	1
Fluorene	86-73-7	8270D	ND		0.80	0.20	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		4.0	0.75	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		4.0	0.85	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		20	5.5	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		4.0	0.85	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.80	0.20	ug/L	1
Isophorone	78-59-1	8270D	ND		4.0	1.1	ug/L	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-003
Description: CMR-WB09S-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1453
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	5	06/26/2019 1443	JCG	06/21/2019 1700	20322

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.80	0.20	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		4.0	1.1	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		8.0	2.3	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.80	0.20	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		8.0	3.3	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		8.0	0.75	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		8.0	6.6	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		4.0	0.85	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		8.0	2.2	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		20	10	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		4.0	1.4	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		4.0	2.5	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		20	6.7	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.80	0.20	ug/L	1
Phenol	108-95-2	8270D	ND		4.0	0.95	ug/L	1
Pyrene	129-00-0	8270D	ND		0.80	0.20	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		4.0	1.3	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		4.0	2.8	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		4.0	1.9	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		4.0	0.95	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		4.0	1.1	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		51	37-129
2-Fluorophenol		39	24-127
Nitrobenzene-d5		61	38-127
Phenol-d5		52	28-128
Terphenyl-d14		58	10-148
2,4,6-Tribromophenol		94	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-003
Description: CMR-WB09S-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1453
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1513	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	130		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		61	40-140

LOQ = Limit of Quantitation
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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-003
Description: CMR-WB09S-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1453
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0341	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	130		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		58	40-140
2-Fluorobiphenyl (fractionation 1)		77	40-140
o - Terphenyl (aromatic)		76	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-003
Description: CMR-WB09S-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1453
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 1946	JJG		20972

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	75		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	480		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF19040-003
Description: CMR-WB09S-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1453
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 1946	JJG		20971

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	47		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	390		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	43		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	8.5		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	3.6	J	5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	1.4	J	5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		93	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF19040-003
Description: CMR-WB09S-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1453
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 1946	JJG		20970

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	950		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-003
Description: CMR-WB09S-190618-GW
Matrix: Aqueous
Date Sampled: 06/18/2019 1453
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/21/2019 1202	TJW	06/20/2019 1702	20147
1	3005A	6020B	1	06/25/2019 1942	BNW	06/20/2019 1935	20200

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	31		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	520		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	ND		0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	ND		0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	ND		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	8.7		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	ND		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	0.27	J	1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	14		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	3.0	J	5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	13		10	2.5	ug/L	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-004
Description: TB-16-20190618
Matrix: Aqueous
Date Sampled: 06/18/2019
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1831	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF19040-004
Description: TB-16-20190618
Matrix: Aqueous
Date Sampled: 06/18/2019
Date Received: 06/19/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	06/24/2019 1831	JJG		20531

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	70-130
Bromofluorobenzene		107	70-130
Toluene-d8		103	70-130

LOQ = Limit of Quantitation
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E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20531-001
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	06/24/2019 1159
Benzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromochloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromodichloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromoform	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
2-Butanone (MEK)	ND		1	10	2.0	ug/L	06/24/2019 1159
Carbon disulfide	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloroform	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Cyclohexane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Dibromochloromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	06/24/2019 1159
1,4-Dioxane	ND		1	20	13	ug/L	06/24/2019 1159
Ethylbenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
2-Hexanone	ND		1	10	2.0	ug/L	06/24/2019 1159
Isopropylbenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Methyl acetate	ND		1	1.0	0.40	ug/L	06/24/2019 1159
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	06/24/2019 1159
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	06/24/2019 1159
Methylcyclohexane	ND		1	5.0	0.40	ug/L	06/24/2019 1159
Methylene chloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Naphthalene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Styrene	ND		1	0.50	0.41	ug/L	06/24/2019 1159
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Tetrachloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Toluene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	06/24/2019 1159

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ20531-001
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Trichloroethene	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Vinyl chloride	ND		1	0.50	0.40	ug/L	06/24/2019 1159
Xylenes (total)	ND		1	1.0	0.40	ug/L	06/24/2019 1159
m+p - Xylenes	ND		1	0.50	0.40	ug/L	06/24/2019 1159
o - Xylenes	ND		1	0.50	0.40	ug/L	06/24/2019 1159

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	70-130
Bromofluorobenzene		98	70-130
Toluene-d8		102	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20531-002
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	74		1	74	60-140	06/24/2019 1100
Benzene	50	48		1	96	70-130	06/24/2019 1100
Bromochloromethane	50	47		1	94	70-130	06/24/2019 1100
Bromodichloromethane	50	49		1	98	70-130	06/24/2019 1100
Bromoform	50	47		1	95	70-130	06/24/2019 1100
Bromomethane (Methyl bromide)	50	44		1	88	70-130	06/24/2019 1100
2-Butanone (MEK)	100	95		1	95	70-130	06/24/2019 1100
Carbon disulfide	50	45		1	90	70-130	06/24/2019 1100
Carbon tetrachloride	50	48		1	96	70-130	06/24/2019 1100
Chlorobenzene	50	47		1	93	70-130	06/24/2019 1100
Chloroethane	50	47		1	94	70-130	06/24/2019 1100
Chloroform	50	46		1	92	70-130	06/24/2019 1100
Chloromethane (Methyl chloride)	50	51		1	102	60-140	06/24/2019 1100
Cyclohexane	50	45		1	91	70-130	06/24/2019 1100
1,2-Dibromo-3-chloropropane (DBCP)	50	50		1	100	70-130	06/24/2019 1100
Dibromochloromethane	50	50		1	99	70-130	06/24/2019 1100
1,2-Dibromoethane (EDB)	50	50		1	100	70-130	06/24/2019 1100
1,2-Dichlorobenzene	50	46		1	92	70-130	06/24/2019 1100
1,3-Dichlorobenzene	50	45		1	89	70-130	06/24/2019 1100
1,4-Dichlorobenzene	50	44		1	88	70-130	06/24/2019 1100
Dichlorodifluoromethane	50	54		1	107	60-140	06/24/2019 1100
1,1-Dichloroethane	50	46		1	92	70-130	06/24/2019 1100
1,2-Dichloroethane	50	50		1	100	70-130	06/24/2019 1100
1,1-Dichloroethene	50	50		1	100	70-130	06/24/2019 1100
cis-1,2-Dichloroethene	50	47		1	93	70-130	06/24/2019 1100
trans-1,2-Dichloroethene	50	49		1	99	70-130	06/24/2019 1100
1,2-Dichloropropane	50	45		1	89	70-130	06/24/2019 1100
cis-1,3-Dichloropropene	50	53		1	105	70-130	06/24/2019 1100
trans-1,3-Dichloropropene	50	50		1	101	70-130	06/24/2019 1100
1,4-Dioxane	500	470		1	93	60-140	06/24/2019 1100
Ethylbenzene	50	50		1	100	70-130	06/24/2019 1100
2-Hexanone	100	100		1	102	70-130	06/24/2019 1100
Isopropylbenzene	50	52		1	104	70-130	06/24/2019 1100
Methyl acetate	50	38		1	77	70-130	06/24/2019 1100
Methyl tertiary butyl ether (MTBE)	50	44		1	88	70-130	06/24/2019 1100
4-Methyl-2-pentanone	100	110		1	105	70-130	06/24/2019 1100
Methylcyclohexane	50	48		1	95	70-130	06/24/2019 1100
Methylene chloride	50	44		1	87	70-130	06/24/2019 1100
Naphthalene	50	49		1	98	70-130	06/24/2019 1100
Styrene	50	52		1	104	70-130	06/24/2019 1100
1,1,2,2-Tetrachloroethane	50	52		1	104	70-130	06/24/2019 1100
Tetrachloroethene	50	48		1	97	70-130	06/24/2019 1100
Toluene	50	48		1	96	70-130	06/24/2019 1100
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	45		1	90	70-130	06/24/2019 1100

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20531-002
Batch: 20531
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	101	70-130	06/24/2019 1100
1,2,4-Trichlorobenzene	50	48		1	95	70-130	06/24/2019 1100
1,1,1-Trichloroethane	50	45		1	91	70-130	06/24/2019 1100
1,1,2-Trichloroethane	50	49		1	97	70-130	06/24/2019 1100
Trichloroethene	50	48		1	95	70-130	06/24/2019 1100
Trichlorofluoromethane	50	48		1	97	70-130	06/24/2019 1100
Vinyl chloride	50	44		1	88	70-130	06/24/2019 1100
Xylenes (total)	100	100		1	101	70-130	06/24/2019 1100
m+p - Xylenes	50	52		1	103	70-130	06/24/2019 1100
o - Xylenes	50	50		1	99	70-130	06/24/2019 1100

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		102	70-130
Bromofluorobenzene		112	70-130
Toluene-d8		103	70-130

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N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20322-001
Batch: 20322
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/21/2019 1700

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Acenaphthylene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Anthracene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	06/26/2019 1058
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	06/26/2019 1058
Carbazole	ND		1	0.80	0.040	ug/L	06/26/2019 1058
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	06/26/2019 1058
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	06/26/2019 1058
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	06/26/2019 1058
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	06/26/2019 1058
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	06/26/2019 1058
2-Chlorophenol	ND		1	0.80	0.15	ug/L	06/26/2019 1058
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	06/26/2019 1058
Chrysene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Dibenzofuran	ND		1	0.80	0.16	ug/L	06/26/2019 1058
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	06/26/2019 1058
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	06/26/2019 1058
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	06/26/2019 1058
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	06/26/2019 1058
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	06/26/2019 1058
Diethylphthalate	ND		1	4.0	0.19	ug/L	06/26/2019 1058
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	06/26/2019 1058
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	06/26/2019 1058
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	06/26/2019 1058
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	06/26/2019 1058
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	06/26/2019 1058
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	06/26/2019 1058
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	06/26/2019 1058
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	06/26/2019 1058
bis(2-Ethylhexyl)phthalate	ND		1	4.0	0.38	ug/L	06/26/2019 1058
Fluoranthene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Fluorene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	06/26/2019 1058
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	06/26/2019 1058
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	06/26/2019 1058
Hexachloroethane	ND		1	0.80	0.17	ug/L	06/26/2019 1058
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Isophorone	ND		1	0.80	0.22	ug/L	06/26/2019 1058

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20322-001
Batch: 20322
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/21/2019 1700

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
2-Methylphenol	ND		1	0.80	0.21	ug/L	06/26/2019 1058
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	06/26/2019 1058
Naphthalene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
2-Nitroaniline	ND		1	1.6	0.66	ug/L	06/26/2019 1058
3-Nitroaniline	ND		1	1.6	0.15	ug/L	06/26/2019 1058
4-Nitroaniline	ND		1	1.6	1.3	ug/L	06/26/2019 1058
Nitrobenzene	ND		1	0.80	0.17	ug/L	06/26/2019 1058
2-Nitrophenol	ND		1	1.6	0.44	ug/L	06/26/2019 1058
4-Nitrophenol	ND		1	4.0	2.1	ug/L	06/26/2019 1058
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	06/26/2019 1058
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	06/26/2019 1058
Pentachlorophenol	ND		1	4.0	1.3	ug/L	06/26/2019 1058
Phenanthrene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
Phenol	ND		1	0.80	0.19	ug/L	06/26/2019 1058
Pyrene	ND		1	0.16	0.040	ug/L	06/26/2019 1058
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	06/26/2019 1058
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	06/26/2019 1058
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	06/26/2019 1058
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	06/26/2019 1058
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	06/26/2019 1058

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		49	37-129
2-Fluorophenol		42	24-127
Nitrobenzene-d5		57	38-127
Phenol-d5		34	28-128
Terphenyl-d14		98	10-148
2,4,6-Tribromophenol		37	35-144

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20322-002
Batch: 20322
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/21/2019 1700

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	5.0		1	62	30-122	06/26/2019 1123
Acenaphthylene	8.0	5.5		1	68	30-130	06/26/2019 1123
Anthracene	8.0	5.3		1	67	30-123	06/26/2019 1123
Benzo(a)anthracene	8.0	6.8		1	85	40-125	06/26/2019 1123
Benzo(a)pyrene	8.0	6.5		1	82	40-128	06/26/2019 1123
Benzo(b)fluoranthene	8.0	7.6		1	95	30-130	06/26/2019 1123
Benzo(g,h,i)perylene	8.0	6.6		1	82	30-130	06/26/2019 1123
Benzo(k)fluoranthene	8.0	6.0		1	74	30-130	06/26/2019 1123
4-Bromophenyl phenyl ether	8.0	4.1		1	52	30-124	06/26/2019 1123
Butyl benzyl phthalate	8.0	8.7		1	108	54-135	06/26/2019 1123
Carbazole	8.0	5.5		1	68	45-101	06/26/2019 1123
bis (2-Chloro-1-methylethyl) ether	8.0	4.1		1	51	42-124	06/26/2019 1123
4-Chloro-3-methyl phenol	8.0	5.1		1	64	30-123	06/26/2019 1123
bis(2-Chloroethoxy)methane	8.0	5.0		1	62	44-127	06/26/2019 1123
bis(2-Chloroethyl)ether	8.0	5.6		1	70	46-120	06/26/2019 1123
2-Chloronaphthalene	8.0	4.8		1	60	46-100	06/26/2019 1123
2-Chlorophenol	8.0	5.1		1	64	50-117	06/26/2019 1123
4-Chlorophenyl phenyl ether	8.0	4.5		1	57	30-121	06/26/2019 1123
Chrysene	8.0	6.6		1	83	30-130	06/26/2019 1123
Dibenzo(a,h)anthracene	8.0	6.2		1	78	30-130	06/26/2019 1123
Dibenzofuran	8.0	5.0		1	62	30-118	06/26/2019 1123
1,2-Dichlorobenzene	8.0	4.5		1	56	32-111	06/26/2019 1123
1,3-Dichlorobenzene	8.0	4.7		1	58	28-110	06/26/2019 1123
1,4-Dichlorobenzene	8.0	4.7		1	59	29-112	06/26/2019 1123
3,3'-Dichlorobenzidine	8.0	4.5		1	57	10-126	06/26/2019 1123
2,4-Dichlorophenol	8.0	4.3		1	53	30-121	06/26/2019 1123
Diethylphthalate	8.0	6.5		1	81	40-125	06/26/2019 1123
Dimethyl phthalate	8.0	5.9		1	73	40-127	06/26/2019 1123
2,4-Dimethylphenol	8.0	6.7		1	84	20-125	06/26/2019 1123
Di-n-butyl phthalate	8.0	7.1		1	89	40-127	06/26/2019 1123
4,6-Dinitro-2-methylphenol	8.0	5.5		1	69	56-128	06/26/2019 1123
2,4-Dinitrophenol	16	9.2		1	58	11-126	06/26/2019 1123
2,4-Dinitrotoluene	8.0	5.6		1	69	59-127	06/26/2019 1123
2,6-Dinitrotoluene	8.0	5.2		1	65	59-126	06/26/2019 1123
Di-n-octylphthalate	8.0	7.3		1	91	50-136	06/26/2019 1123
bis(2-Ethylhexyl)phthalate	8.0	8.3		1	103	56-128	06/26/2019 1123
Fluoranthene	8.0	5.6		1	70	40-128	06/26/2019 1123
Fluorene	8.0	5.1		1	64	30-124	06/26/2019 1123
Hexachlorobenzene	8.0	4.0		1	50	30-125	06/26/2019 1123
Hexachlorobutadiene	8.0	4.1		1	51	24-110	06/26/2019 1123
Hexachlorocyclopentadiene	40	22		1	56	16-96	06/26/2019 1123
Hexachloroethane	8.0	5.2		1	65	31-110	06/26/2019 1123
Indeno(1,2,3-c,d)pyrene	8.0	6.5		1	82	30-130	06/26/2019 1123
Isophorone	8.0	5.9		1	74	57-123	06/26/2019 1123

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20322-002
Batch: 20322
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/21/2019 1700

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.7		1	59	40-132	06/26/2019 1123
2-Methylphenol	8.0	5.5		1	68	56-119	06/26/2019 1123
3+4-Methylphenol	8.0	7.6		1	95	53-119	06/26/2019 1123
Naphthalene	8.0	4.9		1	61	30-130	06/26/2019 1123
2-Nitroaniline	8.0	5.4		1	67	60-124	06/26/2019 1123
3-Nitroaniline	8.0	3.8		1	48	43-123	06/26/2019 1123
4-Nitroaniline	8.0	5.6		1	70	30-135	06/26/2019 1123
Nitrobenzene	8.0	5.7		1	71	51-122	06/26/2019 1123
2-Nitrophenol	8.0	4.6		1	58	51-118	06/26/2019 1123
4-Nitrophenol	16	14		1	90	53-130	06/26/2019 1123
N-Nitrosodi-n-propylamine	8.0	7.4		1	92	54-127	06/26/2019 1123
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.3		1	66	30-123	06/26/2019 1123
Pentachlorophenol	16	8.7		1	55	42-131	06/26/2019 1123
Phenanthrene	8.0	5.3		1	66	40-123	06/26/2019 1123
Phenol	8.0	5.6		1	70	49-117	06/26/2019 1123
Pyrene	8.0	7.1		1	89	40-126	06/26/2019 1123
1,2,4,5-Tetrachlorobenzene	8.0	4.2		1	52	30-130	06/26/2019 1123
2,3,4,6-Tetrachlorophenol	8.0	4.5		1	56	30-130	06/26/2019 1123
1,2,4-Trichlorobenzene	8.0	4.1		1	51	20-90	06/26/2019 1123
2,4,5-Trichlorophenol	8.0	4.6		1	58	30-123	06/26/2019 1123
2,4,6-Trichlorophenol	8.0	4.6		1	58	30-125	06/26/2019 1123

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		65	37-129
2-Fluorophenol		61	24-127
Nitrobenzene-d5		72	38-127
Phenol-d5		71	28-128
Terphenyl-d14		93	10-148
2,4,6-Tribromophenol		50	35-144

LOQ = Limit of Quantitation
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Montana EPH (aliphatics) - MB

Sample ID: UQ20744-001
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012
C9 - C18 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20744-002
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	260		1	65	40-140	07/08/2019 1042
C9 - C18 Aliphatics	300	140		1	48	40-140	07/08/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		57	40-140

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20744-003
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	280		1	69	5.9	40-140	25	07/08/2019 1112
C9 - C18 Aliphatics	300	150		1	51	6.4	40-140	25	07/08/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana EPH (aromatics) - MB

Sample ID: UQ20745-001
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	07/08/2019 2143

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		45	40-140
2-Fluorobiphenyl (fractionation 1)		60	40-140
o - Terphenyl (aromatic)		52	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20745-002
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	460		1	54	40-140	07/08/2019 2213

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		48	40-140
2-Fluorobiphenyl (fractionation 1)		65	40-140
o - Terphenyl (aromatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana EPH (aromatics) - LCSD

Sample ID: UQ20745-003
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	410		1	49	10	40-140	25	07/08/2019 2243

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		61	40-140
2-Fluorobiphenyl (fractionation 1)		62	40-140
o - Terphenyl (aromatic)		54	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ20970-001
Batch: 20970
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	06/27/2019 1316

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		90	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (TPH) - LCS

Sample ID: UQ20970-002
Batch: 20970
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	380		1	100	70-130	06/27/2019 1220

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ20970-003
Batch: 20970
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	400		1	107	6.7	70-130	25	06/27/2019 1248

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aromatics) - MB

Sample ID: UQ20971-001
Batch: 20971
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/27/2019 1316
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	06/27/2019 1316
Ethylbenzene	ND		1	5.0	0.62	ug/L	06/27/2019 1316
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/27/2019 1316
Naphthalene	ND		1	5.0	0.70	ug/L	06/27/2019 1316
Toluene	ND		1	5.0	0.53	ug/L	06/27/2019 1316
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/27/2019 1316
o - Xylenes	ND		1	5.0	0.58	ug/L	06/27/2019 1316

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ20971-002
Batch: 20971
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	25		1	100	70-130	06/27/2019 1220
C9 - C10 Aromatics	25	25		1	98	70-130	06/27/2019 1220
Ethylbenzene	25	24		1	97	70-130	06/27/2019 1220
Methyl tertiary butyl ether (MTBE)	25	22		1	89	70-130	06/27/2019 1220
Naphthalene	25	23		1	90	70-130	06/27/2019 1220
Toluene	25	25		1	99	70-130	06/27/2019 1220
m+p - Xylenes	50	49		1	98	70-130	06/27/2019 1220
o - Xylenes	25	24		1	96	70-130	06/27/2019 1220

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		87	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ20971-003
Batch: 20971
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	25		1	100	0.40	70-130	25	06/27/2019 1248
C9 - C10 Aromatics	25	27		1	106	8.2	70-130	25	06/27/2019 1248
Ethylbenzene	25	25		1	101	3.6	70-130	25	06/27/2019 1248
Methyl tertiary butyl ether (MTBE)	25	26		1	105	16	70-130	25	06/27/2019 1248
Naphthalene	25	24		1	96	5.6	70-130	25	06/27/2019 1248
Toluene	25	25		1	100	0.81	70-130	25	06/27/2019 1248
m+p - Xylenes	50	51		1	101	3.0	70-130	25	06/27/2019 1248
o - Xylenes	25	26		1	103	6.4	70-130	25	06/27/2019 1248

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		93	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ20972-001
Batch: 20972
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/27/2019 1316
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/27/2019 1316

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ20972-002
Batch: 20972
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	100		1	102	70-130	06/27/2019 1220
C9 - C12 Aliphatics, Adjusted	75	73		1	97	70-130	06/27/2019 1220

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		89	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics) - LCSD

Sample ID: UQ20972-003
Batch: 20972
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	120		1	115	12	70-130	25	06/27/2019 1248
C9 - C12 Aliphatics, Adjusted	75	78		1	105	7.4	70-130	25	06/27/2019 1248

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		96	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20200-001
Batch: 20200
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/20/2019 1935

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	06/25/2019 1849
Arsenic	ND		1	2.0	1.3	ug/L	06/25/2019 1849
Barium	ND		1	5.0	1.3	ug/L	06/25/2019 1849
Beryllium	ND		1	0.40	0.15	ug/L	06/25/2019 1849
Cadmium	ND		1	0.50	0.13	ug/L	06/25/2019 1849
Chromium	1.3	J	1	5.0	1.3	ug/L	06/25/2019 1849
Cobalt	ND		1	5.0	1.3	ug/L	06/25/2019 1849
Copper	ND		1	5.0	1.3	ug/L	06/25/2019 1849
Lead	ND		1	1.0	0.25	ug/L	06/25/2019 1849
Nickel	ND		1	5.0	1.3	ug/L	06/25/2019 1849
Selenium	ND		1	5.0	1.3	ug/L	06/25/2019 1849
Silver	ND		1	1.0	0.25	ug/L	06/25/2019 1849
Vanadium	ND		1	5.0	2.5	ug/L	06/25/2019 1849
Zinc	ND		1	10	2.5	ug/L	06/25/2019 1849

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
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ICP-MS - LCS

Sample ID: UQ20200-002
Batch: 20200
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/20/2019 1935

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	98		1	98	80-120	06/25/2019 1855
Arsenic	100	99		1	99	80-120	06/25/2019 1855
Barium	100	97		1	97	80-120	06/25/2019 1855
Beryllium	100	110		1	110	80-120	06/25/2019 1855
Cadmium	100	97		1	97	80-120	06/25/2019 1855
Chromium	100	99		1	99	80-120	06/25/2019 1855
Cobalt	100	96		1	96	80-120	06/25/2019 1855
Copper	100	98		1	98	80-120	06/25/2019 1855
Lead	100	110		1	105	80-120	06/25/2019 1855
Nickel	100	95		1	95	80-120	06/25/2019 1855
Selenium	100	94		1	94	80-120	06/25/2019 1855
Silver	100	98		1	98	80-120	06/25/2019 1855
Vanadium	100	97		1	97	80-120	06/25/2019 1855
Zinc	100	94		1	94	80-120	06/25/2019 1855

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20147-001
Batch: 20147
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/20/2019 1702

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/21/2019 1058

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20147-002
Batch: 20147
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/20/2019 1702

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0020		1	100	80-120	06/21/2019 1101

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Chain of Custody

and

Miscellaneous Documents

Shealy Environmental Services, Inc.
106 Vantage Point Drive
West Columbia, South Carolina 29172
Telephone No. (803) 791-9700 Fax No. (803) 791-9111
www.shealylab.com

SHEALY

Chain of Custody Record

Number

Client	Report to Contact	Telephone No. / E-mail	Quote No.
Ramboll US Corporation	Daniel Price/Michael Wilson	(214) XX-2270/dprice@ramboll.com (316) 440-7555/mwilson@ramboll.com	

Address	Sampler's Signature	Analysis (Attach list if more space is needed)	Page
7500 College Boulevard Suite 1905	x Brooks Bailey		1 of 1

City	State	Zip Code
Overland Park	KS	66210

Project Name	Project Number	P.O No.
CMR RIAIM East Rail	1690012344-003	

UF19040

KMN2

Sample ID / Description (Containers for each sample may be combined on one line)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	MeOH	VOCs	VPH	SVOC	Metals	EPH	Remarks / Cooler I.D.
CMR-WB07-190618-GW	6/18/2019	10:11	G	X			2		1	7				X	X	X	X	X	Cooler 002
CMR-WB08-190618-GW	6/18/2019	12:05	G	X			2		1	7				X	X	X	X	X	Cooler 002
CMR-WB09S-190618-GW	6/18/2019	14:53	G	X			2		1	7				X	X	X	X	X	Cooler 002
TB-16	NA	NA	G	X						2				X					Trip Blank/Cooler 002

Turn Around Time Required (Prior lab approval required for expedited TAT)	Sample Disposal	Possible Hazard Identification (List any known hazards in the remarks)	QC Requirements
[X] Standard [ ] Rush (Please Specify)	[ ] Return to Client [ ] Disposal by Lab	[ ] Non-Hazardous [ ] Flammable [ ] Skin Irrit. [X] SDS prov. [ ] Unknown	

	Date	Time		Date	Time
1. Relinquished by: Brooks Bailey (Ramboll)	6/19/2019	17:45	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: Fed Ex	6-19-19	1005	4. Laboratory Received by: L Hite	6-19-19	1005

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Check) [X] Y [ ] N [ ] Ice Pack
Receipt Temp. 3.0 °C

Document Number: ME002OW-01

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL Cooler Inspected by/date: LKH / 06/19/19 Lot #: UF19040

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: LKH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

3.0 / 3.0 °C NA / NA °C NA / NA °C NA / NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☑ Yes	☐ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA _____ were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA _____.
Time of preservation NA _____. If more than one preservative is needed, please note in the comments below.

Sample(s) 004(2) _____ were received with bubbles >6 mm in diameter.

Samples(s) NA _____ were received with TRC > 0.5 mg/L (If #19 is *no*) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA _____.

SR barcode labels applied by: LKH Date: 06/19/19

Comments:

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF21028, 3 Soil Samples, 1 Water Sample

Data validation and usability assessment was conducted for data package UF21028 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB05-7.5-8.5-190619	UF21028-001
CMR-WB05-8.0-9.0-190619	UF21028-002
CMR-WB05-5.0-6.0-190619	UF21028-003
TB-17-20190619	UF21028-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

Surrogates/Internal Standards
Surrogates and/or internal standards were out of criteria for several samples analyzes. Surrogates out of criteria can indicate a possible accuracy bias. However, according to the lab narrative the recovery issues were likely due to sample dilutions or matrix effects. Therefore no results have been validated.

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of bromomethane and methyl acetate. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all bromomethane and methyl acetate results have been validated as estimated.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF21028

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	No issues
Matrix Spike/Matrix Spike Duplicate	No issues
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UF21028

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 3 Soil, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	Multiple compounds detected in method blank with no other detections. No action taken.	Benzene detected in method blank with no sample detections. No action taken.
Deuterated Monitoring Compound or Surrogate Spikes	No issues	Surrogates out due to matrix interferences. No action taken.
Matrix Spike/Matrix Spike Duplicate	No MS/MSDs reported with results. No action taken.	No MS/MSDs reported with results. No action taken.
Laboratory Control Sample	LCS out low for bromomethane and methyl acetate. Bromomethane and methyl acetate results validated as estimated (J, UJ).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab. No action taken.	N/A
Other Non-conformances	RLs raised due to dilutions. No action taken.	No other non-conformances noted.
Overall Assessment of Data	Bromomethane and methyl acetate results validated as estimated (J, UJ).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RIAIM - West Rail

Project Number: 1690012344-003

Lot Number:**UF21028**

Date Completed:07/10/2019

07/10/2019 5:33 PM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF21028

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The method blank associated with batch 21394 had 1,2,3-trichlorobenzene and 1,2,4-trichlorobenzene detected at a concentration that was below the LOQ. There were no detections for these compounds in the samples associated with this method blank.

The laboratory control sample (LCS) associated with batch 21176 had bromomethane and methyl acetate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Sample -002 was analyzed high level due to the sample matrix. The reporting limits have been raised accordingly.

Semivolatiles
The LCS associated with batch 21394 had methyl acetate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Sample -002 was diluted 50X due to the sample matrix. The reporting limits have been raised accordingly. The associated surrogates were recovered outside of the acceptance limits. No corrective action was required, as dilutions of 5X and greater impact recovery accuracy.

Montana VPH
Sample -002 had naphthalene detected in the VPH analysis and confirmed via dual detector analysis (FID/PID). However, additional compounds elute at approximately the same times as naphthalene and

MTBE, making it difficult for analysts to distinguish the target compounds from non-target compounds. Second method confirmation was performed via GC/MS analysis. The results via dual detection (FID/PID) were not compared to or adjusted based on results via 8260B GC/MS.

The method blank associated with batches 21459 and 21735 had benzene detected at a concentration that was above ½ the LOQ. There were no detections for this compound in the samples associated with these method blanks.

Samples -002 and -003 had surrogates recovered outside of the acceptance limits due to confirmed matrix interference.

Sample Summary
Ramboll US Corporation
Lot Number: UF21028

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB05-7.5-8.5-190619	Solid	06/19/2019 1110	06/21/2019
002	CMR-WB04-8.0-9.0-190619	Solid	06/19/2019 1505	06/21/2019
003	CMR-WB04-5.0-6.0-190619	Solid	06/19/2019 1510	06/21/2019
004	TB-17-20190619	Aqueous	06/19/2019	06/21/2019

(4 samples)

Detection Summary

Ramboll US Corporation

Lot Number: UF21028

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB05-7.5-8.5-190619	Solid	Acetone	8260B	75		ug/kg	7
001	CMR-WB05-7.5-8.5-190619	Solid	Carbon disulfide	8260B	2.5	J	ug/kg	7
001	CMR-WB05-7.5-8.5-190619	Solid	Anthracene	8270D	4.5		ug/kg	9
001	CMR-WB05-7.5-8.5-190619	Solid	Benzo(a)anthracene	8270D	20		ug/kg	9
001	CMR-WB05-7.5-8.5-190619	Solid	Benzo(a)pyrene	8270D	13		ug/kg	9
001	CMR-WB05-7.5-8.5-190619	Solid	Benzo(b)fluoranthene	8270D	31		ug/kg	9
001	CMR-WB05-7.5-8.5-190619	Solid	Benzo(g,h,i)perylene	8270D	9.2		ug/kg	9
001	CMR-WB05-7.5-8.5-190619	Solid	Benzo(k)fluoranthene	8270D	6.1		ug/kg	9
001	CMR-WB05-7.5-8.5-190619	Solid	Chrysene	8270D	17		ug/kg	9
001	CMR-WB05-7.5-8.5-190619	Solid	Dibenzofuran	8270D	8.6	J	ug/kg	9
001	CMR-WB05-7.5-8.5-190619	Solid	Fluoranthene	8270D	22		ug/kg	9
001	CMR-WB05-7.5-8.5-190619	Solid	Indeno(1,2,3-c,d)pyrene	8270D	8.1		ug/kg	9
001	CMR-WB05-7.5-8.5-190619	Solid	2-Methylnaphthalene	8270D	22		ug/kg	10
001	CMR-WB05-7.5-8.5-190619	Solid	Naphthalene	8270D	15		ug/kg	10
001	CMR-WB05-7.5-8.5-190619	Solid	Phenanthrene	8270D	29		ug/kg	10
001	CMR-WB05-7.5-8.5-190619	Solid	Pyrene	8270D	41		ug/kg	10
001	CMR-WB05-7.5-8.5-190619	Solid	Antimony	6020B	0.20	J	mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Arsenic	6020B	13		mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Barium	6020B	280		mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Beryllium	6020B	0.83		mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Cadmium	6020B	2.4		mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Chromium	6020B	17		mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Cobalt	6020B	6.7		mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Copper	6020B	77		mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Lead	6020B	23		mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Mercury	7471B	0.059	J	mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Nickel	6020B	12		mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Silver	6020B	0.24	J	mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Vanadium	6020B	46		mg/kg	16
001	CMR-WB05-7.5-8.5-190619	Solid	Zinc	6020B	330		mg/kg	16
002	CMR-WB04-8.0-9.0-190619	Solid	Ethylbenzene	8260B	280	J	ug/kg	17
002	CMR-WB04-8.0-9.0-190619	Solid	Isopropylbenzene	8260B	290	J	ug/kg	17
002	CMR-WB04-8.0-9.0-190619	Solid	C19 - C36 Aliphatics	Montana EPH	300		mg/kg	21
002	CMR-WB04-8.0-9.0-190619	Solid	C9 - C18 Aliphatics	Montana EPH	840		mg/kg	21
002	CMR-WB04-8.0-9.0-190619	Solid	C11 - C22 Aromatics	Montana EPH	88		mg/kg	22
002	CMR-WB04-8.0-9.0-190619	Solid	C5 - C8 Aliphatics,	Montana VPH	18		mg/kg	23
002	CMR-WB04-8.0-9.0-190619	Solid	C9 - C12 Aliphatics,	Montana VPH	270		mg/kg	23
002	CMR-WB04-8.0-9.0-190619	Solid	C9 - C10 Aromatics	Montana VPH	180		mg/kg	24
002	CMR-WB04-8.0-9.0-190619	Solid	Ethylbenzene	Montana VPH	1.6		mg/kg	24
002	CMR-WB04-8.0-9.0-190619	Solid	Naphthalene	Montana VPH	6.0		mg/kg	24
002	CMR-WB04-8.0-9.0-190619	Solid	o - Xylenes	Montana VPH	3.4		mg/kg	24
002	CMR-WB04-8.0-9.0-190619	Solid	TPH	Montana VPH	520		mg/kg	25
002	CMR-WB04-8.0-9.0-190619	Solid	Arsenic	6020B	6.1		mg/kg	26
002	CMR-WB04-8.0-9.0-190619	Solid	Barium	6020B	410		mg/kg	26
002	CMR-WB04-8.0-9.0-190619	Solid	Beryllium	6020B	0.55		mg/kg	26

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
002	CMR-WB04-8.0-9.0-190619	Solid	Cadmium	6020B	0.11	J	mg/kg	26
002	CMR-WB04-8.0-9.0-190619	Solid	Chromium	6020B	12		mg/kg	26
002	CMR-WB04-8.0-9.0-190619	Solid	Cobalt	6020B	3.7		mg/kg	26
002	CMR-WB04-8.0-9.0-190619	Solid	Copper	6020B	8.1		mg/kg	26
002	CMR-WB04-8.0-9.0-190619	Solid	Lead	6020B	6.9		mg/kg	26
002	CMR-WB04-8.0-9.0-190619	Solid	Nickel	6020B	8.8		mg/kg	26
002	CMR-WB04-8.0-9.0-190619	Solid	Vanadium	6020B	27		mg/kg	26
002	CMR-WB04-8.0-9.0-190619	Solid	Zinc	6020B	31		mg/kg	26
003	CMR-WB04-5.0-6.0-190619	Solid	Acetone	8260B	110		ug/kg	27
003	CMR-WB04-5.0-6.0-190619	Solid	Anthracene	8270D	2.6	J	ug/kg	29
003	CMR-WB04-5.0-6.0-190619	Solid	Benzo(a)anthracene	8270D	14		ug/kg	29
003	CMR-WB04-5.0-6.0-190619	Solid	Benzo(a)pyrene	8270D	11		ug/kg	29
003	CMR-WB04-5.0-6.0-190619	Solid	Benzo(b)fluoranthene	8270D	26		ug/kg	29
003	CMR-WB04-5.0-6.0-190619	Solid	Benzo(g,h,i)perylene	8270D	8.1		ug/kg	29
003	CMR-WB04-5.0-6.0-190619	Solid	Chrysene	8270D	9.3		ug/kg	29
003	CMR-WB04-5.0-6.0-190619	Solid	Fluoranthene	8270D	11		ug/kg	29
003	CMR-WB04-5.0-6.0-190619	Solid	Indeno(1,2,3-c,d)pyrene	8270D	6.7		ug/kg	29
003	CMR-WB04-5.0-6.0-190619	Solid	2-Methylnaphthalene	8270D	3.9		ug/kg	30
003	CMR-WB04-5.0-6.0-190619	Solid	Naphthalene	8270D	4.5		ug/kg	30
003	CMR-WB04-5.0-6.0-190619	Solid	Phenanthrene	8270D	12		ug/kg	30
003	CMR-WB04-5.0-6.0-190619	Solid	Pyrene	8270D	17		ug/kg	30
003	CMR-WB04-5.0-6.0-190619	Solid	C5 - C8 Aliphatics,	Montana VPH	2.0	J	mg/kg	33
003	CMR-WB04-5.0-6.0-190619	Solid	C9 - C12 Aliphatics,	Montana VPH	1.6	J	mg/kg	33
003	CMR-WB04-5.0-6.0-190619	Solid	Ethylbenzene	Montana VPH	0.077	J	mg/kg	34
003	CMR-WB04-5.0-6.0-190619	Solid	Toluene	Montana VPH	0.34		mg/kg	34
003	CMR-WB04-5.0-6.0-190619	Solid	m+p - Xylenes	Montana VPH	0.16	J	mg/kg	34
003	CMR-WB04-5.0-6.0-190619	Solid	o - Xylenes	Montana VPH	0.14	J	mg/kg	34
003	CMR-WB04-5.0-6.0-190619	Solid	TPH	Montana VPH	4.1	J	mg/kg	35
003	CMR-WB04-5.0-6.0-190619	Solid	Antimony	6020B	0.84		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Arsenic	6020B	56		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Barium	6020B	150		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Beryllium	6020B	1.5		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Cadmium	6020B	0.36		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Chromium	6020B	13		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Cobalt	6020B	6.7		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Copper	6020B	340		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Lead	6020B	22		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Mercury	7471B	0.065	J	mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Nickel	6020B	12		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Silver	6020B	0.52		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Vanadium	6020B	33		mg/kg	36
003	CMR-WB04-5.0-6.0-190619	Solid	Zinc	6020B	69		mg/kg	36

(87 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-001
Description: CMR-WB05-7.5-8.5-190619
Matrix: Solid
Date Sampled: 06/19/2019 1110
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	07/01/2019 1920	JM1		21331	6.95

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	75		17	3.4	ug/kg	2
Benzene	71-43-2	8260B	ND		4.2	1.7	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		4.2	1.7	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		4.2	1.7	ug/kg	2
Bromoform	75-25-2	8260B	ND		4.2	1.7	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.2	1.7	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		17	3.4	ug/kg	2
Carbon disulfide	75-15-0	8260B	2.5	J	4.2	1.7	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		4.2	1.7	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		4.2	1.7	ug/kg	2
Chloroethane	75-00-3	8260B	ND		4.2	1.7	ug/kg	2
Chloroform	67-66-3	8260B	ND		4.2	1.7	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.2	1.7	ug/kg	2
Cyclohexane	110-82-7	8260B	ND		4.2	1.7	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.2	1.7	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		4.2	1.7	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.2	1.7	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.2	1.7	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.2	1.7	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.2	1.7	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		4.2	1.7	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		4.2	1.7	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		4.2	1.7	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		4.2	1.7	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.2	1.7	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.2	1.7	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		4.2	1.7	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.2	1.7	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.2	1.7	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		210	21	ug/kg	2
Ethylbenzene	100-41-4	8260B	ND		4.2	1.7	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		8.5	3.4	ug/kg	2
Isopropylbenzene	98-82-8	8260B	ND		4.2	1.7	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		4.2	1.7	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.2	1.7	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		8.5	3.4	ug/kg	2
Methylcyclohexane	108-87-2	8260B	ND		4.2	1.7	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		4.2	1.7	ug/kg	2
Naphthalene	91-20-3	8260B	ND		4.2	1.7	ug/kg	2
Styrene	100-42-5	8260B	ND		4.2	1.7	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.2	1.7	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		4.2	1.7	ug/kg	2
Toluene	108-88-3	8260B	ND		4.2	1.7	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.2	1.7	ug/kg	2

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Description: CMR-WB05-7.5-8.5-190619
Date Sampled: 06/19/2019 1110
Date Received: 06/21/2019

Laboratory ID: UF21028-001
Matrix: Solid
% Solids: 85.1 06/22/2019 0135

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	07/01/2019 1920	JM1		21331	6.95

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.2	1.7	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.2	1.7	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.2	1.7	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.2	1.7	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		4.2	1.7	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		4.2	1.7	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		4.2	1.7	ug/kg	2
Xylenes (total)	1330-20-7	8260B	ND		8.5	3.4	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	ND		4.2	1.7	ug/kg	2
o - Xylenes	95-47-6	8260B	ND		4.2	1.7	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		98	53-142
Bromofluorobenzene		93	47-138
Toluene-d8		111	68-124

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-001
Description: CMR-WB05-7.5-8.5-190619
Matrix: Solid
Date Sampled: 06/19/2019 1110
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/03/2019 1926	SCD	07/02/2019 1820	20379

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		3.1	0.94	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		3.1	1.1	ug/kg	1
Anthracene	120-12-7	8270D	4.5		3.1	0.58	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	20		3.1	0.67	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	13		3.1	0.75	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	31		3.1	0.57	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	9.2		3.1	0.74	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	6.1		3.1	0.55	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		15	5.7	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		15	5.7	ug/kg	1
Carbazole	86-74-8	8270D	ND		15	5.7	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		15	5.7	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		15	5.7	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		15	5.7	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		15	5.7	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		15	5.7	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		15	5.7	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		15	5.7	ug/kg	1
Chrysene	218-01-9	8270D	17		3.1	0.51	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		3.1	0.58	ug/kg	1
Dibenzofuran	132-64-9	8270D	8.6	J	15	5.7	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		76	28	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		76	28	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		76	28	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		15	5.7	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		15	5.7	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		15	5.7	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		15	8.4	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		15	5.7	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		15	5.7	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		76	28	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		76	28	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		31	11	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		31	11	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		15	5.7	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		76	28	ug/kg	1
Fluoranthene	206-44-0	8270D	22		3.1	0.48	ug/kg	1
Fluorene	86-73-7	8270D	ND		3.1	0.65	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		15	5.7	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		15	5.7	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		76	28	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		15	5.7	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	8.1		3.1	1.1	ug/kg	1
Isophorone	78-59-1	8270D	ND		15	5.7	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-001
Description: CMR-WB05-7.5-8.5-190619
Matrix: Solid
Date Sampled: 06/19/2019 1110
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/03/2019 1926	SCD	07/02/2019 1820	20379

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	22		3.1	1.1	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		15	5.7	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		31	11	ug/kg	1
Naphthalene	91-20-3	8270D	15		3.1	1.1	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		31	11	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		31	11	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		31	11	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		15	5.7	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		31	11	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		76	28	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		15	5.7	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		15	5.7	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		76	28	ug/kg	1
Phenanthrene	85-01-8	8270D	29		3.1	0.82	ug/kg	1
Phenol	108-95-2	8270D	ND		15	5.7	ug/kg	1
Pyrene	129-00-0	8270D	41		3.1	0.57	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		38	11	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		76	11	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		76	28	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		15	5.7	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		15	5.7	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		67	33-102
2-Fluorophenol		61	35-115
Nitrobenzene-d5		61	22-109
Phenol-d5		57	33-122
Terphenyl-d14		83	41-120
2,4,6-Tribromophenol		75	30-117

LOQ = Limit of Quantitation
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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-001
Description: CMR-WB05-7.5-8.5-190619
Matrix: Solid
Date Sampled: 06/19/2019 1110
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 0057	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-001
Description: CMR-WB05-7.5-8.5-190619
Matrix: Solid
Date Sampled: 06/19/2019 1110
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1307	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		80	40-140
2-Fluorobiphenyl (fractionation 1)		89	40-140
o - Terphenyl (aromatic)		70	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-001
Description: CMR-WB05-7.5-8.5-190619
Matrix: Solid
Date Sampled: 06/19/2019 1110
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 2339	STM		21144

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.94	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.7	0.94	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		101	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-001
Description: CMR-WB05-7.5-8.5-190619
Matrix: Solid
Date Sampled: 06/19/2019 1110
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/28/2019 2127	JJG		21459

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.31	0.042	mg/kg	2
C9 - C10 Aromatics		Montana VPH	ND		1.6	0.62	mg/kg	2
Ethylbenzene	100-41-4	Montana VPH	ND		0.31	0.039	mg/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.31	0.067	mg/kg	2
Naphthalene	91-20-3	Montana VPH	ND		0.31	0.16	mg/kg	2
Toluene	108-88-3	Montana VPH	ND		0.31	0.050	mg/kg	2
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.31	0.070	mg/kg	2
o - Xylenes	95-47-6	Montana VPH	ND		0.31	0.035	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		85	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF21028-001
Description: CMR-WB05-7.5-8.5-190619
Matrix: Solid
Date Sampled: 06/19/2019 1110
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/27/2019 2339	STM		21146

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		101	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-001
Description: CMR-WB05-7.5-8.5-190619
Matrix: Solid
Date Sampled: 06/19/2019 1110
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1320	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1615	TJW	06/24/2019 1843	20452

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.20	J	0.51	0.20	mg/kg	1
Arsenic	7440-38-2	6020B	13		0.51	0.20	mg/kg	1
Barium	7440-39-3	6020B	280		1.3	0.32	mg/kg	1
Beryllium	7440-41-7	6020B	0.83		0.10	0.035	mg/kg	1
Cadmium	7440-43-9	6020B	2.4		0.13	0.026	mg/kg	1
Chromium	7440-47-3	6020B	17		1.3	0.57	mg/kg	1
Cobalt	7440-48-4	6020B	6.7		1.3	0.31	mg/kg	1
Copper	7440-50-8	6020B	77		1.3	0.33	mg/kg	1
Lead	7439-92-1	6020B	23		0.26	0.070	mg/kg	1
Mercury	7439-97-6	7471B	0.059	J	0.093	0.022	mg/kg	1
Nickel	7440-02-0	6020B	12		1.3	0.31	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.3	0.48	mg/kg	1
Silver	7440-22-4	6020B	0.24	J	0.26	0.061	mg/kg	1
Vanadium	7440-62-2	6020B	46		1.3	0.26	mg/kg	1
Zinc	7440-66-6	6020B	330		2.6	0.51	mg/kg	1

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-002
Description: CMR-WB04-8.0-9.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1505
% Solids: 85.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/28/2019 2024	JM1		21176	5.51

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		1200	250	ug/kg	1
Benzene	71-43-2	8260B	ND		310	120	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		310	120	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		310	120	ug/kg	1
Bromoform	75-25-2	8260B	ND		310	120	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		310	120	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		1200	250	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		310	120	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		310	120	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		310	120	ug/kg	1
Chloroethane	75-00-3	8260B	ND		310	120	ug/kg	1
Chloroform	67-66-3	8260B	ND		310	120	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		310	120	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		310	120	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		310	120	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		310	120	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		310	120	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		310	120	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		310	120	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		310	120	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		310	120	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		310	120	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		310	120	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		310	120	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		310	120	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		310	120	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		310	120	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		310	120	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		310	120	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		15000	1500	ug/kg	1
Ethylbenzene	100-41-4	8260B	280	J	310	120	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		620	250	ug/kg	1
Isopropylbenzene	98-82-8	8260B	290	J	310	120	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		310	120	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		310	120	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		620	250	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		310	120	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		310	120	ug/kg	1
Naphthalene	91-20-3	8260B	ND		310	120	ug/kg	1
Styrene	100-42-5	8260B	ND		310	120	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		310	120	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		310	120	ug/kg	1
Toluene	108-88-3	8260B	ND		310	120	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		310	120	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-002
Description: CMR-WB04-8.0-9.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1505
% Solids: 85.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035 High	8260B	1	06/28/2019 2024	JM1		21176	5.51

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		310	120	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		310	120	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		310	120	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		310	120	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		310	120	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		310	120	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		310	120	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		620	250	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		310	120	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		310	120	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		108	53-142
Bromofluorobenzene		106	47-138
Toluene-d8		109	68-124

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
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W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-002
Description: CMR-WB04-8.0-9.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1505
% Solids: 85.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	07/05/2019 1451	SCD	07/02/2019 1820	20379

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		160	48	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		160	55	ug/kg	1
Anthracene	120-12-7	8270D	ND		160	30	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		160	34	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		160	38	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		160	29	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		160	38	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		160	28	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		760	290	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		760	290	ug/kg	1
Carbazole	86-74-8	8270D	ND		760	290	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		760	290	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		760	290	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		760	290	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		760	290	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		760	290	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		760	290	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		760	290	ug/kg	1
Chrysene	218-01-9	8270D	ND		160	26	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		160	30	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		760	290	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		3900	1500	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		3900	1500	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		3900	1500	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		760	290	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		760	290	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		760	290	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		760	430	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		760	290	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		760	290	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		3900	1500	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		3900	1500	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1600	580	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1600	580	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		760	290	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		3900	1500	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		160	24	ug/kg	1
Fluorene	86-73-7	8270D	ND		160	33	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		760	290	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		760	290	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		3900	1500	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		760	290	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		160	58	ug/kg	1
Isophorone	78-59-1	8270D	ND		760	290	ug/kg	1

LOQ = Limit of Quantitation
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H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-002
Description: CMR-WB04-8.0-9.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1505
% Solids: 85.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	50	07/05/2019 1451	SCD	07/02/2019 1820	20379

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		160	58	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		760	290	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		1600	580	ug/kg	1
Naphthalene	91-20-3	8270D	ND		160	56	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		1600	580	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		1600	580	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		1600	580	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		760	290	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		1600	580	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		3900	1500	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		760	290	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		760	290	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		3900	1500	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		160	42	ug/kg	1
Phenol	108-95-2	8270D	ND		760	290	ug/kg	1
Pyrene	129-00-0	8270D	ND		160	29	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		1900	580	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		3900	580	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		3900	1500	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		760	290	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		760	290	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		85	33-102
2-Fluorophenol	N	31	35-115
Nitrobenzene-d5		60	22-109
Phenol-d5		34	33-122
Terphenyl-d14	N	122	41-120
2,4,6-Tribromophenol		70	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-002
Description: CMR-WB04-8.0-9.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1505
% Solids: 85.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 0127	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	300		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	840		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		60	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-002
Description: CMR-WB04-8.0-9.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1505
% Solids: 85.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1337	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	88		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		43	40-140
2-Fluorobiphenyl (fractionation 1)		66	40-140
o - Terphenyl (aromatic)		76	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-002
Description: CMR-WB04-8.0-9.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1505
% Solids: 85.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/28/2019 0008	STM		21144

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	18		4.9	0.99	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	270		4.9	0.99	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	864	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-002
Description: CMR-WB04-8.0-9.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1505
% Solids: 85.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	5	07/02/2019 1847	JJG		21735

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		1.6	0.22	mg/kg	2
C9 - C10 Aromatics		Montana VPH	180		8.2	3.3	mg/kg	2
Ethylbenzene	100-41-4	Montana VPH	1.6		1.6	0.20	mg/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		1.6	0.36	mg/kg	2
Naphthalene	91-20-3	Montana VPH	6.0		1.6	0.86	mg/kg	2
Toluene	108-88-3	Montana VPH	ND		1.6	0.26	mg/kg	2
m+p - Xylenes	179601-23-1	Montana VPH	ND		1.6	0.37	mg/kg	2
o - Xylenes	95-47-6	Montana VPH	3.4		1.6	0.18	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	493	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF21028-002
Description: CMR-WB04-8.0-9.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1505
% Solids: 85.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/28/2019 0008	STM		21146

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	520		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)	N	871	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-002
Description: CMR-WB04-8.0-9.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1505
% Solids: 85.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1326	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1618	TJW	06/24/2019 1843	20452

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.53	0.21	mg/kg	1
Arsenic	7440-38-2	6020B	6.1		0.53	0.21	mg/kg	1
Barium	7440-39-3	6020B	410		1.4	0.33	mg/kg	1
Beryllium	7440-41-7	6020B	0.55		0.11	0.036	mg/kg	1
Cadmium	7440-43-9	6020B	0.11	J	0.14	0.026	mg/kg	1
Chromium	7440-47-3	6020B	12		1.4	0.58	mg/kg	1
Cobalt	7440-48-4	6020B	3.7		1.4	0.32	mg/kg	1
Copper	7440-50-8	6020B	8.1		1.4	0.34	mg/kg	1
Lead	7439-92-1	6020B	6.9		0.26	0.072	mg/kg	1
Mercury	7439-97-6	7471B	ND		0.096	0.023	mg/kg	1
Nickel	7440-02-0	6020B	8.8		1.4	0.32	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.50	mg/kg	1
Silver	7440-22-4	6020B	ND		0.26	0.063	mg/kg	1
Vanadium	7440-62-2	6020B	27		1.4	0.26	mg/kg	1
Zinc	7440-66-6	6020B	31		2.6	0.53	mg/kg	1

LOQ = Limit of Quantitation
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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-003
Description: CMR-WB04-5.0-6.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1510
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	07/01/2019 1942	JM1		21331	5.73

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	110		21	4.1	ug/kg	2
Benzene	71-43-2	8260B	ND		5.1	2.1	ug/kg	2
Bromochloromethane	74-97-5	8260B	ND		5.1	2.1	ug/kg	2
Bromodichloromethane	75-27-4	8260B	ND		5.1	2.1	ug/kg	2
Bromoform	75-25-2	8260B	ND		5.1	2.1	ug/kg	2
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		5.1	2.1	ug/kg	2
2-Butanone (MEK)	78-93-3	8260B	ND		21	4.1	ug/kg	2
Carbon disulfide	75-15-0	8260B	ND		5.1	2.1	ug/kg	2
Carbon tetrachloride	56-23-5	8260B	ND		5.1	2.1	ug/kg	2
Chlorobenzene	108-90-7	8260B	ND		5.1	2.1	ug/kg	2
Chloroethane	75-00-3	8260B	ND		5.1	2.1	ug/kg	2
Chloroform	67-66-3	8260B	ND		5.1	2.1	ug/kg	2
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		5.1	2.1	ug/kg	2
Cyclohexane	110-82-7	8260B	ND		5.1	2.1	ug/kg	2
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		5.1	2.1	ug/kg	2
Dibromochloromethane	124-48-1	8260B	ND		5.1	2.1	ug/kg	2
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		5.1	2.1	ug/kg	2
1,2-Dichlorobenzene	95-50-1	8260B	ND		5.1	2.1	ug/kg	2
1,3-Dichlorobenzene	541-73-1	8260B	ND		5.1	2.1	ug/kg	2
1,4-Dichlorobenzene	106-46-7	8260B	ND		5.1	2.1	ug/kg	2
Dichlorodifluoromethane	75-71-8	8260B	ND		5.1	2.1	ug/kg	2
1,1-Dichloroethane	75-34-3	8260B	ND		5.1	2.1	ug/kg	2
1,2-Dichloroethane	107-06-2	8260B	ND		5.1	2.1	ug/kg	2
1,1-Dichloroethene	75-35-4	8260B	ND		5.1	2.1	ug/kg	2
cis-1,2-Dichloroethene	156-59-2	8260B	ND		5.1	2.1	ug/kg	2
trans-1,2-Dichloroethene	156-60-5	8260B	ND		5.1	2.1	ug/kg	2
1,2-Dichloropropane	78-87-5	8260B	ND		5.1	2.1	ug/kg	2
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		5.1	2.1	ug/kg	2
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		5.1	2.1	ug/kg	2
1,4-Dioxane	123-91-1	8260B	ND		260	26	ug/kg	2
Ethylbenzene	100-41-4	8260B	ND		5.1	2.1	ug/kg	2
2-Hexanone	591-78-6	8260B	ND		10	4.1	ug/kg	2
Isopropylbenzene	98-82-8	8260B	ND		5.1	2.1	ug/kg	2
Methyl acetate	79-20-9	8260B	ND		5.1	2.1	ug/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		5.1	2.1	ug/kg	2
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	4.1	ug/kg	2
Methylcyclohexane	108-87-2	8260B	ND		5.1	2.1	ug/kg	2
Methylene chloride	75-09-2	8260B	ND		5.1	2.1	ug/kg	2
Naphthalene	91-20-3	8260B	ND		5.1	2.1	ug/kg	2
Styrene	100-42-5	8260B	ND		5.1	2.1	ug/kg	2
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		5.1	2.1	ug/kg	2
Tetrachloroethene	127-18-4	8260B	ND		5.1	2.1	ug/kg	2
Toluene	108-88-3	8260B	ND		5.1	2.1	ug/kg	2
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		5.1	2.1	ug/kg	2

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-003
Description: CMR-WB04-5.0-6.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1510
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
2	5035	8260B	1	07/01/2019 1942	JM1		21331	5.73

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		5.1	2.1	ug/kg	2
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		5.1	2.1	ug/kg	2
1,1,1-Trichloroethane	71-55-6	8260B	ND		5.1	2.1	ug/kg	2
1,1,2-Trichloroethane	79-00-5	8260B	ND		5.1	2.1	ug/kg	2
Trichloroethene	79-01-6	8260B	ND		5.1	2.1	ug/kg	2
Trichlorofluoromethane	75-69-4	8260B	ND		5.1	2.1	ug/kg	2
Vinyl chloride	75-01-4	8260B	ND		5.1	2.1	ug/kg	2
Xylenes (total)	1330-20-7	8260B	ND		10	4.1	ug/kg	2
m+p - Xylenes	179601-23-1	8260B	ND		5.1	2.1	ug/kg	2
o - Xylenes	95-47-6	8260B	ND		5.1	2.1	ug/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		92	53-142
Bromofluorobenzene		94	47-138
Toluene-d8		106	68-124

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-003
Description: CMR-WB04-5.0-6.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1510
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/03/2019 2015	SCD	07/02/2019 1820	20379

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		3.1	0.94	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		3.1	1.1	ug/kg	1
Anthracene	120-12-7	8270D	2.6	J	3.1	0.58	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	14		3.1	0.67	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	11		3.1	0.75	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	26		3.1	0.57	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	8.1		3.1	0.74	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		3.1	0.55	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		15	5.7	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		15	5.7	ug/kg	1
Carbazole	86-74-8	8270D	ND		15	5.7	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		15	5.7	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		15	5.7	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		15	5.7	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		15	5.7	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		15	5.7	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		15	5.7	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		15	5.7	ug/kg	1
Chrysene	218-01-9	8270D	9.3		3.1	0.51	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		3.1	0.58	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		15	5.7	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		76	28	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		76	28	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		76	28	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		15	5.7	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		15	5.7	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		15	5.7	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		15	8.4	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		15	5.7	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		15	5.7	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		76	28	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		76	28	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		31	11	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		31	11	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		15	5.7	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		76	28	ug/kg	1
Fluoranthene	206-44-0	8270D	11		3.1	0.48	ug/kg	1
Fluorene	86-73-7	8270D	ND		3.1	0.65	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		15	5.7	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		15	5.7	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		76	28	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		15	5.7	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	6.7		3.1	1.1	ug/kg	1
Isophorone	78-59-1	8270D	ND		15	5.7	ug/kg	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-003
Description: CMR-WB04-5.0-6.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1510
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/03/2019 2015	SCD	07/02/2019 1820	20379

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	3.9		3.1	1.1	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		15	5.7	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		31	11	ug/kg	1
Naphthalene	91-20-3	8270D	4.5		3.1	1.1	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		31	11	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		31	11	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		31	11	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		15	5.7	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		31	11	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		76	28	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		15	5.7	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		15	5.7	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		76	28	ug/kg	1
Phenanthrene	85-01-8	8270D	12		3.1	0.82	ug/kg	1
Phenol	108-95-2	8270D	ND		15	5.7	ug/kg	1
Pyrene	129-00-0	8270D	17		3.1	0.57	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		38	11	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		76	11	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		76	28	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		15	5.7	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		15	5.7	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		61	33-102
2-Fluorophenol		56	35-115
Nitrobenzene-d5		59	22-109
Phenol-d5		55	33-122
Terphenyl-d14		72	41-120
2,4,6-Tribromophenol		61	30-117

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-003
Description: CMR-WB04-5.0-6.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1510
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 0156	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		67	40-140

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-003
Description: CMR-WB04-5.0-6.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1510
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1407	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		44	40-140
2-Fluorobiphenyl (fractionation 1)		67	40-140
o - Terphenyl (aromatic)		70	40-140

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J = Estimated result < LOQ and ≥ DL

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-003
Description: CMR-WB04-5.0-6.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1510
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/28/2019 0036	STM		21144

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	2.0	J	5.1	1.0	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	1.6	J	5.1	1.0	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		112	70-130

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21028-003
Description: CMR-WB04-5.0-6.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1510
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/28/2019 2155	JJG		21459

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.34	0.046	mg/kg	2
C9 - C10 Aromatics		Montana VPH	ND		1.7	0.67	mg/kg	2
Ethylbenzene	100-41-4	Montana VPH	0.077	J	0.34	0.042	mg/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.34	0.073	mg/kg	2
Naphthalene	91-20-3	Montana VPH	ND		0.34	0.18	mg/kg	2
Toluene	108-88-3	Montana VPH	0.34		0.34	0.054	mg/kg	2
m+p - Xylenes	179601-23-1	Montana VPH	0.16	J	0.34	0.075	mg/kg	2
o - Xylenes	95-47-6	Montana VPH	0.14	J	0.34	0.038	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)	N	66	70-130

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF21028-003
Description: CMR-WB04-5.0-6.0-190619
Matrix: Solid
Date Sampled: 06/19/2019 1510
% Solids: 85.1 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/28/2019 0036	STM		21146

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	4.1	J	8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		104	70-130

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ICP-MS

Client: Ramboll US Corporation
Description: CMR-WB04-5.0-6.0-190619
Date Sampled: 06/19/2019 1510
Date Received: 06/21/2019

Laboratory ID: UF21028-003
Matrix: Solid
% Solids: 85.1 06/22/2019 0135

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1331	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1620	TJW	06/24/2019 1843	20452

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.84		0.55	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	56		0.55	0.22	mg/kg	1
Barium	7440-39-3	6020B	150		1.4	0.34	mg/kg	1
Beryllium	7440-41-7	6020B	1.5		0.11	0.038	mg/kg	1
Cadmium	7440-43-9	6020B	0.36		0.14	0.028	mg/kg	1
Chromium	7440-47-3	6020B	13		1.4	0.61	mg/kg	1
Cobalt	7440-48-4	6020B	6.7		1.4	0.33	mg/kg	1
Copper	7440-50-8	6020B	340		1.4	0.36	mg/kg	1
Lead	7439-92-1	6020B	22		0.28	0.075	mg/kg	1
Mercury	7439-97-6	7471B	0.065	J	0.086	0.021	mg/kg	1
Nickel	7440-02-0	6020B	12		1.4	0.33	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.52	mg/kg	1
Silver	7440-22-4	6020B	0.52		0.28	0.066	mg/kg	1
Vanadium	7440-62-2	6020B	33		1.4	0.28	mg/kg	1
Zinc	7440-66-6	6020B	69		2.8	0.55	mg/kg	1

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-004
Description: TB-17-20190619
Matrix: Aqueous
Date Sampled: 06/19/2019
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/02/2019 1137	ECB		21394

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21028-004
Description: TB-17-20190619
Matrix: Aqueous
Date Sampled: 06/19/2019
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/02/2019 1137	ECB		21394

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		88	70-130
Bromofluorobenzene		85	70-130
Toluene-d8		101	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21176-001
Batch: 21176
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	1000	200	ug/kg	06/25/2019 2241
Benzene	ND		1	250	100	ug/kg	06/25/2019 2241
Bromochloromethane	ND		1	250	100	ug/kg	06/25/2019 2241
Bromodichloromethane	ND		1	250	100	ug/kg	06/25/2019 2241
Bromoform	ND		1	250	100	ug/kg	06/25/2019 2241
Bromomethane (Methyl bromide)	ND		1	250	100	ug/kg	06/25/2019 2241
2-Butanone (MEK)	ND		1	1000	200	ug/kg	06/25/2019 2241
Carbon disulfide	ND		1	250	100	ug/kg	06/25/2019 2241
Carbon tetrachloride	ND		1	250	100	ug/kg	06/25/2019 2241
Chlorobenzene	ND		1	250	100	ug/kg	06/25/2019 2241
Chloroethane	ND		1	250	100	ug/kg	06/25/2019 2241
Chloroform	ND		1	250	100	ug/kg	06/25/2019 2241
Chloromethane (Methyl chloride)	ND		1	250	100	ug/kg	06/25/2019 2241
Cyclohexane	ND		1	250	100	ug/kg	06/25/2019 2241
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	250	100	ug/kg	06/25/2019 2241
Dibromochloromethane	ND		1	250	100	ug/kg	06/25/2019 2241
1,2-Dibromoethane (EDB)	ND		1	250	100	ug/kg	06/25/2019 2241
1,2-Dichlorobenzene	ND		1	250	100	ug/kg	06/25/2019 2241
1,3-Dichlorobenzene	ND		1	250	100	ug/kg	06/25/2019 2241
1,4-Dichlorobenzene	ND		1	250	100	ug/kg	06/25/2019 2241
Dichlorodifluoromethane	ND		1	250	100	ug/kg	06/25/2019 2241
1,1-Dichloroethane	ND		1	250	100	ug/kg	06/25/2019 2241
1,2-Dichloroethane	ND		1	250	100	ug/kg	06/25/2019 2241
1,1-Dichloroethene	ND		1	250	100	ug/kg	06/25/2019 2241
cis-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/25/2019 2241
trans-1,2-Dichloroethene	ND		1	250	100	ug/kg	06/25/2019 2241
1,2-Dichloropropane	ND		1	250	100	ug/kg	06/25/2019 2241
cis-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/25/2019 2241
trans-1,3-Dichloropropene	ND		1	250	100	ug/kg	06/25/2019 2241
1,4-Dioxane	ND		1	13000	1300	ug/kg	06/25/2019 2241
Ethylbenzene	ND		1	250	100	ug/kg	06/25/2019 2241
2-Hexanone	ND		1	500	200	ug/kg	06/25/2019 2241
Isopropylbenzene	ND		1	250	100	ug/kg	06/25/2019 2241
Methyl acetate	ND		1	250	100	ug/kg	06/25/2019 2241
Methyl tertiary butyl ether (MTBE)	ND		1	250	100	ug/kg	06/25/2019 2241
4-Methyl-2-pentanone	ND		1	500	200	ug/kg	06/25/2019 2241
Methylcyclohexane	ND		1	250	100	ug/kg	06/25/2019 2241
Methylene chloride	ND		1	250	100	ug/kg	06/25/2019 2241
Naphthalene	ND		1	250	100	ug/kg	06/25/2019 2241
Styrene	ND		1	250	100	ug/kg	06/25/2019 2241
1,1,2,2-Tetrachloroethane	ND		1	250	100	ug/kg	06/25/2019 2241
Tetrachloroethene	ND		1	250	100	ug/kg	06/25/2019 2241
Toluene	ND		1	250	100	ug/kg	06/25/2019 2241
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	250	100	ug/kg	06/25/2019 2241

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21176-001
Batch: 21176
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	250	100	ug/kg	06/25/2019 2241
1,2,4-Trichlorobenzene	ND		1	250	100	ug/kg	06/25/2019 2241
1,1,1-Trichloroethane	ND		1	250	100	ug/kg	06/25/2019 2241
1,1,2-Trichloroethane	ND		1	250	100	ug/kg	06/25/2019 2241
Trichloroethene	ND		1	250	100	ug/kg	06/25/2019 2241
Trichlorofluoromethane	ND		1	250	100	ug/kg	06/25/2019 2241
Vinyl chloride	ND		1	250	100	ug/kg	06/25/2019 2241
Xylenes (total)	ND		1	500	200	ug/kg	06/25/2019 2241
m+p - Xylenes	ND		1	250	100	ug/kg	06/25/2019 2241
o - Xylenes	ND		1	250	100	ug/kg	06/25/2019 2241

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		100	53-142
Bromofluorobenzene		93	47-138
Toluene-d8		92	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21176-002
Batch: 21176
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	5000	3500		1	70	60-140	06/26/2019 1222
Benzene	2500	2500		1	101	70-130	06/26/2019 1222
Bromochloromethane	2500	2400		1	96	70-130	06/26/2019 1222
Bromodichloromethane	2500	2400		1	96	70-130	06/26/2019 1222
Bromoform	2500	2400		1	94	70-130	06/26/2019 1222
Bromomethane (Methyl bromide)	2500	1600	N	1	64	70-130	06/26/2019 1222
2-Butanone (MEK)	5000	3900		1	78	60-140	06/26/2019 1222
Carbon disulfide	2500	2500		1	100	70-130	06/26/2019 1222
Carbon tetrachloride	2500	2700		1	109	70-130	06/26/2019 1222
Chlorobenzene	2500	2700		1	106	70-130	06/26/2019 1222
Chloroethane	2500	2500		1	102	70-130	06/26/2019 1222
Chloroform	2500	2500		1	99	70-130	06/26/2019 1222
Chloromethane (Methyl chloride)	2500	1700		1	66	60-140	06/26/2019 1222
Cyclohexane	2500	2800		1	111	70-130	06/26/2019 1222
1,2-Dibromo-3-chloropropane (DBCP)	2500	2400		1	95	70-130	06/26/2019 1222
Dibromochloromethane	2500	2400		1	98	70-130	06/26/2019 1222
1,2-Dibromoethane (EDB)	2500	2500		1	98	70-130	06/26/2019 1222
1,2-Dichlorobenzene	2500	2700		1	107	70-130	06/26/2019 1222
1,3-Dichlorobenzene	2500	2800		1	110	70-130	06/26/2019 1222
1,4-Dichlorobenzene	2500	2700		1	110	70-130	06/26/2019 1222
Dichlorodifluoromethane	2500	2500		1	99	60-140	06/26/2019 1222
1,1-Dichloroethane	2500	2500		1	99	70-130	06/26/2019 1222
1,2-Dichloroethane	2500	2300		1	92	70-130	06/26/2019 1222
1,1-Dichloroethene	2500	2600		1	106	70-130	06/26/2019 1222
cis-1,2-Dichloroethene	2500	2500		1	98	70-130	06/26/2019 1222
trans-1,2-Dichloroethene	2500	2500		1	102	70-130	06/26/2019 1222
1,2-Dichloropropane	2500	2400		1	97	70-130	06/26/2019 1222
cis-1,3-Dichloropropene	2500	2500		1	100	70-130	06/26/2019 1222
trans-1,3-Dichloropropene	2500	2500		1	100	70-130	06/26/2019 1222
1,4-Dioxane	25000	22000		1	88	60-140	06/26/2019 1222
Ethylbenzene	2500	2800		1	111	70-130	06/26/2019 1222
2-Hexanone	5000	4000		1	81	70-130	06/26/2019 1222
Isopropylbenzene	2500	2800		1	113	70-130	06/26/2019 1222
Methyl acetate	2500	1700	N	1	69	70-130	06/26/2019 1222
Methyl tertiary butyl ether (MTBE)	2500	2400		1	95	70-130	06/26/2019 1222
4-Methyl-2-pentanone	5000	4000		1	80	70-130	06/26/2019 1222
Methylcyclohexane	2500	3100		1	125	70-130	06/26/2019 1222
Methylene chloride	2500	2400		1	96	70-130	06/26/2019 1222
Naphthalene	2500	2600		1	104	70-130	06/26/2019 1222
Styrene	2500	2700		1	107	70-130	06/26/2019 1222
1,1,2,2-Tetrachloroethane	2500	2300		1	91	70-130	06/26/2019 1222
Tetrachloroethene	2500	2900		1	117	70-130	06/26/2019 1222
Toluene	2500	2500		1	102	70-130	06/26/2019 1222
1,1,2-Trichloro-1,2,2-Trifluoroethane	2500	3100		1	122	70-130	06/26/2019 1222

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21176-002
Batch: 21176
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035 High

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	2500	3100		1	122	70-130	06/26/2019 1222
1,2,4-Trichlorobenzene	2500	3100		1	123	70-130	06/26/2019 1222
1,1,1-Trichloroethane	2500	2600		1	105	70-130	06/26/2019 1222
1,1,2-Trichloroethane	2500	2400		1	97	70-130	06/26/2019 1222
Trichloroethene	2500	2600		1	105	70-130	06/26/2019 1222
Trichlorofluoromethane	2500	3000		1	121	70-130	06/26/2019 1222
Vinyl chloride	2500	2200		1	88	70-130	06/26/2019 1222
Xylenes (total)	5000	5500		1	109	70-130	06/26/2019 1222
m+p - Xylenes	2500	2800		1	111	70-130	06/26/2019 1222
o - Xylenes	2500	2700		1	108	70-130	06/26/2019 1222

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		99	53-142
Bromofluorobenzene		110	47-138
Toluene-d8		109	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21331-001
Batch: 21331
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	4.0	ug/kg	07/01/2019 1024
Benzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Bromochloromethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Bromoform	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Bromomethane (Methyl bromide)	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	07/01/2019 1024
Carbon disulfide	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Chlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Chloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Chloroform	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Chloromethane (Methyl chloride)	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Cyclohexane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Dichlorodifluoromethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,4-Dioxane	ND		1	250	25	ug/kg	07/01/2019 1024
Ethylbenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
2-Hexanone	ND		1	10	4.0	ug/kg	07/01/2019 1024
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Methyl acetate	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	07/01/2019 1024
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Methylene chloride	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Naphthalene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Styrene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Toluene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21331-001
Batch: 21331
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Trichloroethene	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Vinyl chloride	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
Xylenes (total)	ND		1	10	4.0	ug/kg	07/01/2019 1024
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	07/01/2019 1024
o - Xylenes	ND		1	5.0	2.0	ug/kg	07/01/2019 1024

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21331-002
Batch: 21331
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	94		1	94	60-140	07/01/2019 1001
Benzene	50	51		1	101	70-130	07/01/2019 1001
Bromochloromethane	50	50		1	99	70-130	07/01/2019 1001
Bromodichloromethane	50	51		1	102	70-130	07/01/2019 1001
Bromoform	50	50		1	100	70-130	07/01/2019 1001
Bromomethane (Methyl bromide)	50	48		1	96	70-130	07/01/2019 1001
2-Butanone (MEK)	100	93		1	93	60-140	07/01/2019 1001
Carbon disulfide	50	52		1	103	70-130	07/01/2019 1001
Carbon tetrachloride	50	50		1	100	70-130	07/01/2019 1001
Chlorobenzene	50	52		1	104	70-130	07/01/2019 1001
Chloroethane	50	51		1	103	70-130	07/01/2019 1001
Chloroform	50	50		1	100	70-130	07/01/2019 1001
Chloromethane (Methyl chloride)	50	46		1	91	60-140	07/01/2019 1001
Cyclohexane	50	47		1	94	70-130	07/01/2019 1001
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	93	70-130	07/01/2019 1001
Dibromochloromethane	50	51		1	102	70-130	07/01/2019 1001
1,2-Dibromoethane (EDB)	50	53		1	105	70-130	07/01/2019 1001
1,2-Dichlorobenzene	50	51		1	102	70-130	07/01/2019 1001
1,3-Dichlorobenzene	50	52		1	104	70-130	07/01/2019 1001
1,4-Dichlorobenzene	50	51		1	103	70-130	07/01/2019 1001
Dichlorodifluoromethane	50	41		1	82	60-140	07/01/2019 1001
1,1-Dichloroethane	50	52		1	103	70-130	07/01/2019 1001
1,2-Dichloroethane	50	51		1	101	70-130	07/01/2019 1001
1,1-Dichloroethene	50	50		1	100	70-130	07/01/2019 1001
cis-1,2-Dichloroethene	50	50		1	99	70-130	07/01/2019 1001
trans-1,2-Dichloroethene	50	50		1	101	70-130	07/01/2019 1001
1,2-Dichloropropane	50	51		1	102	70-130	07/01/2019 1001
cis-1,3-Dichloropropene	50	52		1	103	70-130	07/01/2019 1001
trans-1,3-Dichloropropene	50	53		1	106	70-130	07/01/2019 1001
1,4-Dioxane	500	490		1	99	60-140	07/01/2019 1001
Ethylbenzene	50	52		1	103	70-130	07/01/2019 1001
2-Hexanone	100	95		1	95	70-130	07/01/2019 1001
Isopropylbenzene	50	51		1	102	70-130	07/01/2019 1001
Methyl acetate	50	36		1	71	70-130	07/01/2019 1001
Methyl tertiary butyl ether (MTBE)	50	50		1	99	70-130	07/01/2019 1001
4-Methyl-2-pentanone	100	95		1	95	70-130	07/01/2019 1001
Methylcyclohexane	50	47		1	94	70-130	07/01/2019 1001
Methylene chloride	50	48		1	97	70-130	07/01/2019 1001
Naphthalene	50	47		1	94	70-130	07/01/2019 1001
Styrene	50	51		1	102	70-130	07/01/2019 1001
1,1,2,2-Tetrachloroethane	50	49		1	99	70-130	07/01/2019 1001
Tetrachloroethene	50	53		1	106	70-130	07/01/2019 1001
Toluene	50	50		1	101	70-130	07/01/2019 1001
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	98	70-130	07/01/2019 1001

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21331-002
Batch: 21331
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	50		1	100	70-130	07/01/2019 1001
1,2,4-Trichlorobenzene	50	49		1	99	70-130	07/01/2019 1001
1,1,1-Trichloroethane	50	50		1	100	70-130	07/01/2019 1001
1,1,2-Trichloroethane	50	50		1	101	70-130	07/01/2019 1001
Trichloroethene	50	51		1	102	70-130	07/01/2019 1001
Trichlorofluoromethane	50	47		1	95	70-130	07/01/2019 1001
Vinyl chloride	50	44		1	89	70-130	07/01/2019 1001
Xylenes (total)	100	100		1	104	70-130	07/01/2019 1001
m+p - Xylenes	50	52		1	105	70-130	07/01/2019 1001
o - Xylenes	50	52		1	103	70-130	07/01/2019 1001

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		105	47-138
Toluene-d8		102	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21394-001
Batch: 21394
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/02/2019 1053
Benzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Bromoform	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/02/2019 1053
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/02/2019 1053
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Chloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Chloroform	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Cyclohexane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/02/2019 1053
1,4-Dioxane	ND		1	20	13	ug/L	07/02/2019 1053
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
2-Hexanone	ND		1	10	2.0	ug/L	07/02/2019 1053
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Methyl acetate	ND		1	1.0	0.40	ug/L	07/02/2019 1053
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/02/2019 1053
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/02/2019 1053
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/02/2019 1053
Methylene chloride	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Naphthalene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Styrene	ND		1	0.50	0.41	ug/L	07/02/2019 1053
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Toluene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/02/2019 1053

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21394-001
Batch: 21394
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	0.41	J	1	0.50	0.40	ug/L	07/02/2019 1053
1,2,4-Trichlorobenzene	0.47	J	1	0.50	0.40	ug/L	07/02/2019 1053
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Trichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/02/2019 1053
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/02/2019 1053
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/02/2019 1053
o - Xylenes	ND		1	0.50	0.40	ug/L	07/02/2019 1053

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		86	70-130
Bromofluorobenzene		91	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21394-002
Batch: 21394
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	95		1	95	60-140	07/02/2019 0953
Benzene	50	46		1	93	70-130	07/02/2019 0953
Bromochloromethane	50	46		1	92	70-130	07/02/2019 0953
Bromodichloromethane	50	47		1	93	70-130	07/02/2019 0953
Bromoform	50	50		1	100	70-130	07/02/2019 0953
Bromomethane (Methyl bromide)	50	50		1	99	70-130	07/02/2019 0953
2-Butanone (MEK)	100	100		1	102	70-130	07/02/2019 0953
Carbon disulfide	50	48		1	96	70-130	07/02/2019 0953
Carbon tetrachloride	50	47		1	95	70-130	07/02/2019 0953
Chlorobenzene	50	48		1	95	70-130	07/02/2019 0953
Chloroethane	50	55		1	110	70-130	07/02/2019 0953
Chloroform	50	44		1	89	70-130	07/02/2019 0953
Chloromethane (Methyl chloride)	50	51		1	101	60-140	07/02/2019 0953
Cyclohexane	50	47		1	93	70-130	07/02/2019 0953
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	94	70-130	07/02/2019 0953
Dibromochloromethane	50	49		1	97	70-130	07/02/2019 0953
1,2-Dibromoethane (EDB)	50	49		1	97	70-130	07/02/2019 0953
1,2-Dichlorobenzene	50	45		1	89	70-130	07/02/2019 0953
1,3-Dichlorobenzene	50	46		1	93	70-130	07/02/2019 0953
1,4-Dichlorobenzene	50	46		1	91	70-130	07/02/2019 0953
Dichlorodifluoromethane	50	54		1	108	60-140	07/02/2019 0953
1,1-Dichloroethane	50	48		1	97	70-130	07/02/2019 0953
1,2-Dichloroethane	50	44		1	89	70-130	07/02/2019 0953
1,1-Dichloroethene	50	48		1	96	70-130	07/02/2019 0953
cis-1,2-Dichloroethene	50	45		1	91	70-130	07/02/2019 0953
trans-1,2-Dichloroethene	50	47		1	95	70-130	07/02/2019 0953
1,2-Dichloropropane	50	47		1	94	70-130	07/02/2019 0953
cis-1,3-Dichloropropene	50	50		1	100	70-130	07/02/2019 0953
trans-1,3-Dichloropropene	50	52		1	104	70-130	07/02/2019 0953
1,4-Dioxane	500	450		1	90	60-140	07/02/2019 0953
Ethylbenzene	50	49		1	99	70-130	07/02/2019 0953
2-Hexanone	100	100		1	104	70-130	07/02/2019 0953
Isopropylbenzene	50	51		1	102	70-130	07/02/2019 0953
Methyl acetate	50	34	N	1	69	70-130	07/02/2019 0953
Methyl tertiary butyl ether (MTBE)	50	47		1	93	70-130	07/02/2019 0953
4-Methyl-2-pentanone	100	93		1	93	70-130	07/02/2019 0953
Methylcyclohexane	50	53		1	106	70-130	07/02/2019 0953
Methylene chloride	50	47		1	94	70-130	07/02/2019 0953
Naphthalene	50	47		1	94	70-130	07/02/2019 0953
Styrene	50	52		1	103	70-130	07/02/2019 0953
1,1,2,2-Tetrachloroethane	50	48		1	96	70-130	07/02/2019 0953
Tetrachloroethene	50	50		1	99	70-130	07/02/2019 0953
Toluene	50	50		1	100	70-130	07/02/2019 0953
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	53		1	106	70-130	07/02/2019 0953

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21394-002
Batch: 21394
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	46		1	93	70-130	07/02/2019 0953
1,2,4-Trichlorobenzene	50	45		1	89	70-130	07/02/2019 0953
1,1,1-Trichloroethane	50	45		1	90	70-130	07/02/2019 0953
1,1,2-Trichloroethane	50	49		1	98	70-130	07/02/2019 0953
Trichloroethene	50	45		1	90	70-130	07/02/2019 0953
Trichlorofluoromethane	50	53		1	105	70-130	07/02/2019 0953
Vinyl chloride	50	52		1	103	70-130	07/02/2019 0953
Xylenes (total)	100	100		1	101	70-130	07/02/2019 0953
m+p - Xylenes	50	51		1	101	70-130	07/02/2019 0953
o - Xylenes	50	51		1	101	70-130	07/02/2019 0953

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		82	70-130
Bromofluorobenzene		92	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20379-001
Batch: 20379
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 07/02/2019 1820

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	07/03/2019 1046
Acenaphthylene	ND		1	2.7	0.95	ug/kg	07/03/2019 1046
Anthracene	ND		1	2.7	0.51	ug/kg	07/03/2019 1046
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	07/03/2019 1046
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	07/03/2019 1046
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	07/03/2019 1046
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	07/03/2019 1046
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	07/03/2019 1046
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/03/2019 1046
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	07/03/2019 1046
Carbazole	ND		1	13	5.0	ug/kg	07/03/2019 1046
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	07/03/2019 1046
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	07/03/2019 1046
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	07/03/2019 1046
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	07/03/2019 1046
2-Chlorophenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/03/2019 1046
Chrysene	ND		1	2.7	0.45	ug/kg	07/03/2019 1046
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	07/03/2019 1046
Dibenzofuran	ND		1	13	5.0	ug/kg	07/03/2019 1046
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	07/03/2019 1046
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	07/03/2019 1046
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	07/03/2019 1046
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	07/03/2019 1046
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
Diethylphthalate	ND		1	13	5.0	ug/kg	07/03/2019 1046
Dimethyl phthalate	ND		1	13	7.4	ug/kg	07/03/2019 1046
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	07/03/2019 1046
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	07/03/2019 1046
2,4-Dinitrophenol	ND		1	67	25	ug/kg	07/03/2019 1046
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	07/03/2019 1046
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	07/03/2019 1046
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	07/03/2019 1046
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	07/03/2019 1046
Fluoranthene	ND		1	2.7	0.42	ug/kg	07/03/2019 1046
Fluorene	ND		1	2.7	0.57	ug/kg	07/03/2019 1046
Hexachlorobenzene	ND		1	13	5.0	ug/kg	07/03/2019 1046
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	07/03/2019 1046
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	07/03/2019 1046
Hexachloroethane	ND		1	13	5.0	ug/kg	07/03/2019 1046
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	07/03/2019 1046
Isophorone	ND		1	13	5.0	ug/kg	07/03/2019 1046

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20379-001
Batch: 20379
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 07/02/2019 1820

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	07/03/2019 1046
2-Methylphenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
3+4-Methylphenol	ND		1	27	10	ug/kg	07/03/2019 1046
Naphthalene	ND		1	2.7	0.97	ug/kg	07/03/2019 1046
2-Nitroaniline	ND		1	27	10	ug/kg	07/03/2019 1046
3-Nitroaniline	ND		1	27	10	ug/kg	07/03/2019 1046
4-Nitroaniline	ND		1	27	10	ug/kg	07/03/2019 1046
Nitrobenzene	ND		1	13	5.0	ug/kg	07/03/2019 1046
2-Nitrophenol	ND		1	27	10	ug/kg	07/03/2019 1046
4-Nitrophenol	ND		1	67	25	ug/kg	07/03/2019 1046
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	07/03/2019 1046
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	07/03/2019 1046
Pentachlorophenol	ND		1	67	25	ug/kg	07/03/2019 1046
Phenanthrene	ND		1	2.7	0.72	ug/kg	07/03/2019 1046
Phenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
Pyrene	ND		1	2.7	0.50	ug/kg	07/03/2019 1046
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	07/03/2019 1046
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	07/03/2019 1046
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	07/03/2019 1046
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	07/03/2019 1046

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		70	33-102
2-Fluorophenol		64	35-115
Nitrobenzene-d5		64	22-109
Phenol-d5		66	33-122
Terphenyl-d14		78	41-120
2,4,6-Tribromophenol		69	30-117

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20379-002
Batch: 20379
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 07/02/2019 1820

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	95		1	71	12-111	07/03/2019 1111
Acenaphthylene	130	100		1	78	44-122	07/03/2019 1111
Anthracene	130	100		1	77	16-122	07/03/2019 1111
Benzo(a)anthracene	130	110		1	85	40-121	07/03/2019 1111
Benzo(a)pyrene	130	110		1	81	36-114	07/03/2019 1111
Benzo(b)fluoranthene	130	110		1	80	38-123	07/03/2019 1111
Benzo(g,h,i)perylene	130	130		1	97	43-120	07/03/2019 1111
Benzo(k)fluoranthene	130	110		1	81	40-126	07/03/2019 1111
4-Bromophenyl phenyl ether	130	99		1	74	30-130	07/03/2019 1111
Butyl benzyl phthalate	130	140		1	106	48-124	07/03/2019 1111
Carbazole	130	110		1	81	47-125	07/03/2019 1111
bis (2-Chloro-1-methylethyl) ether	130	110		1	79	41-113	07/03/2019 1111
4-Chloro-3-methyl phenol	130	110		1	79	48-120	07/03/2019 1111
bis(2-Chloroethoxy)methane	130	95		1	71	38-115	07/03/2019 1111
bis(2-Chloroethyl)ether	130	100		1	76	46-122	07/03/2019 1111
2-Chloronaphthalene	130	97		1	73	37-106	07/03/2019 1111
2-Chlorophenol	130	96		1	72	44-122	07/03/2019 1111
4-Chlorophenyl phenyl ether	130	100		1	76	32-107	07/03/2019 1111
Chrysene	130	110		1	80	41-124	07/03/2019 1111
Dibenzo(a,h)anthracene	130	120		1	92	38-125	07/03/2019 1111
Dibenzofuran	130	100		1	76	45-128	07/03/2019 1111
1,2-Dichlorobenzene	130	94		1	71	39-94	07/03/2019 1111
1,3-Dichlorobenzene	130	89		1	67	30-130	07/03/2019 1111
1,4-Dichlorobenzene	130	88		1	66	39-92	07/03/2019 1111
3,3'-Dichlorobenzidine	130	100		1	77	10-119	07/03/2019 1111
2,4-Dichlorophenol	130	99		1	74	30-96	07/03/2019 1111
Diethylphthalate	130	100		1	77	30-130	07/03/2019 1111
Dimethyl phthalate	130	110		1	80	24-127	07/03/2019 1111
2,4-Dimethylphenol	130	160		1	120	30-130	07/03/2019 1111
Di-n-butyl phthalate	130	110		1	82	35-108	07/03/2019 1111
4,6-Dinitro-2-methylphenol	130	96		1	72	53-150	07/03/2019 1111
2,4-Dinitrophenol	270	180		1	69	32-115	07/03/2019 1111
2,4-Dinitrotoluene	130	110		1	82	40-130	07/03/2019 1111
2,6-Dinitrotoluene	130	100		1	78	46-118	07/03/2019 1111
Di-n-octylphthalate	130	120		1	90	49-118	07/03/2019 1111
bis(2-Ethylhexyl)phthalate	130	120		1	89	33-123	07/03/2019 1111
Fluoranthene	130	110		1	82	26-133	07/03/2019 1111
Fluorene	130	97		1	73	19-108	07/03/2019 1111
Hexachlorobenzene	130	100		1	75	10-125	07/03/2019 1111
Hexachlorobutadiene	130	99		1	75	47-116	07/03/2019 1111
Hexachlorocyclopentadiene	670	530		1	79	48-127	07/03/2019 1111
Hexachloroethane	130	95		1	71	18-154	07/03/2019 1111
Indeno(1,2,3-c,d)pyrene	130	130		1	94	42-123	07/03/2019 1111
Isophorone	130	110		1	79	30-130	07/03/2019 1111

LOQ = Limit of Quantitation
DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20379-002
Batch: 20379
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 07/02/2019 1820

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	98		1	74	10-107	07/03/2019 1111
2-Methylphenol	130	110		1	83	33-103	07/03/2019 1111
3+4-Methylphenol	130	130		1	98	18-121	07/03/2019 1111
Naphthalene	130	97		1	73	10-112	07/03/2019 1111
2-Nitroaniline	130	110		1	80	46-128	07/03/2019 1111
3-Nitroaniline	130	75		1	57	30-130	07/03/2019 1111
4-Nitroaniline	130	100		1	76	51-129	07/03/2019 1111
Nitrobenzene	130	99		1	74	49-142	07/03/2019 1111
2-Nitrophenol	130	94		1	71	33-114	07/03/2019 1111
4-Nitrophenol	270	180		1	68	27-138	07/03/2019 1111
N-Nitrosodi-n-propylamine	130	110		1	83	45-112	07/03/2019 1111
N-Nitrosodiphenylamine (Diphenylamine)	130	100		1	78	49-123	07/03/2019 1111
Pentachlorophenol	270	190		1	73	36-108	07/03/2019 1111
Phenanthrene	130	96		1	72	16-123	07/03/2019 1111
Phenol	130	99		1	74	39-108	07/03/2019 1111
Pyrene	130	120		1	87	34-121	07/03/2019 1111
1,2,4,5-Tetrachlorobenzene	130	88		1	67	30-130	07/03/2019 1111
2,3,4,6-Tetrachlorophenol	130	100		1	79	53-125	07/03/2019 1111
1,2,4-Trichlorobenzene	130	95		1	71	30-130	07/03/2019 1111
2,4,5-Trichlorophenol	130	110		1	80	32-105	07/03/2019 1111
2,4,6-Trichlorophenol	130	93		1	70	31-102	07/03/2019 1111

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		75	33-102
2-Fluorophenol		73	35-115
Nitrobenzene-d5		73	22-109
Phenol-d5		73	33-122
Terphenyl-d14		92	41-120
2,4,6-Tribromophenol		78	30-117

LOQ = Limit of Quantitation
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LOD = Limit of Detection

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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20483-001
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/26/2019 1830
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/26/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		82	40-140

LOQ = Limit of Quantitation
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Montana EPH (aliphatics) - LCS

Sample ID: UQ20483-002
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	40-140	06/26/2019 1900
C9 - C18 Aliphatics	30	20		1	68	40-140	06/26/2019 1900

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		78	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20483-003
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	37		1	92	6.2	40-140	25	06/26/2019 1930
C9 - C18 Aliphatics	30	23		1	76	10	40-140	25	06/26/2019 1930

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		79	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20484-001
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/27/2019 0424

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		83	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20484-002
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	64		1	75	40-140	06/27/2019 0453

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		83	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20484-003
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	63		1	74	0.98	40-140	25	06/27/2019 0523

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		84	40-140
2-Fluorobiphenyl (fractionation 1)		87	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21144-001
Batch: 21144
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/27/2019 2240
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/27/2019 2240

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21144-002
Batch: 21144
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.3		1	107	70-130	06/27/2019 2120
C9 - C12 Aliphatics, Adjusted	3.8	4.2		1	111	70-130	06/27/2019 2120

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21144-003
Batch: 21144
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.4		1	108	0.81	70-130	25	06/27/2019 2212
C9 - C12 Aliphatics, Adjusted	3.8	4.1		1	110	0.76	70-130	25	06/27/2019 2212

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21146-001
Batch: 21146
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/27/2019 2240

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21146-002
Batch: 21146
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	20		1	107	70-130	06/27/2019 2120

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		93	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21146-003
Batch: 21146
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	106	0.50	70-130	25	06/27/2019 2212

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21459-001
Batch: 21459
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	0.15	J	1	0.25	0.034	mg/kg	06/28/2019 1938
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/28/2019 1938
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/28/2019 1938
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/28/2019 1938
Naphthalene	ND		1	0.25	0.13	mg/kg	06/28/2019 1938
Toluene	ND		1	0.25	0.040	mg/kg	06/28/2019 1938
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/28/2019 1938
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/28/2019 1938

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21459-002
Batch: 21459
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.3		1	104	70-130	06/28/2019 2023
C9 - C10 Aromatics	1.3	1.4		1	112	70-130	06/28/2019 2023
Ethylbenzene	1.3	1.3		1	104	70-130	06/28/2019 2023
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	70-130	06/28/2019 2023
Naphthalene	1.3	1.2		1	96	70-130	06/28/2019 2023
Toluene	1.3	1.3		1	104	70-130	06/28/2019 2023
m+p - Xylenes	2.5	2.7		1	108	70-130	06/28/2019 2023
o - Xylenes	1.3	1.3		1	104	70-130	06/28/2019 2023

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21459-003
Batch: 21459
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	0.00	70-130	25	06/28/2019 1910
C9 - C10 Aromatics	1.3	1.3		1	104	7.4	70-130	25	06/28/2019 1910
Ethylbenzene	1.3	1.3		1	104	0.00	70-130	25	06/28/2019 1910
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	8.7	70-130	25	06/28/2019 1910
Naphthalene	1.3	1.1		1	88	8.7	70-130	25	06/28/2019 1910
Toluene	1.3	1.3		1	104	0.00	70-130	25	06/28/2019 1910
m+p - Xylenes	2.5	2.6		1	104	3.8	70-130	25	06/28/2019 1910
o - Xylenes	1.3	1.2		1	96	8.0	70-130	25	06/28/2019 1910

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21735-001
Batch: 21735
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	0.15	J	1	0.25	0.034	mg/kg	06/28/2019 1938
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/28/2019 1938
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/28/2019 1938
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/28/2019 1938
Naphthalene	ND		1	0.25	0.13	mg/kg	06/28/2019 1938
Toluene	ND		1	0.25	0.040	mg/kg	06/28/2019 1938
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/28/2019 1938
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/28/2019 1938

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21735-002
Batch: 21735
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.3		1	104	70-130	06/28/2019 2023
C9 - C10 Aromatics	1.3	1.4		1	112	70-130	06/28/2019 2023
Ethylbenzene	1.3	1.3		1	104	70-130	06/28/2019 2023
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	70-130	06/28/2019 2023
Naphthalene	1.3	1.2		1	96	70-130	06/28/2019 2023
Toluene	1.3	1.3		1	104	70-130	06/28/2019 2023
m+p - Xylenes	2.5	2.7		1	108	70-130	06/28/2019 2023
o - Xylenes	1.3	1.3		1	104	70-130	06/28/2019 2023

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21735-003
Batch: 21735
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	14	70-130	25	06/28/2019 1910
C9 - C10 Aromatics	1.3	1.3		1	104	21	70-130	25	06/28/2019 1910
Ethylbenzene	1.3	1.3		1	104	14	70-130	25	06/28/2019 1910
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	17	70-130	25	06/28/2019 1910
Naphthalene	1.3	1.1		1	88	24	70-130	25	06/28/2019 1910
Toluene	1.3	1.3		1	104	14	70-130	25	06/28/2019 1910
m+p - Xylenes	2.5	2.6		1	104	14	70-130	25	06/28/2019 1910
o - Xylenes	1.3	1.2		1	96	22	70-130	25	06/28/2019 1910

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20446-001
Batch: 20446
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/24/2019 1154

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	06/27/2019 1157
Arsenic	ND		1	0.50	0.20	mg/kg	06/27/2019 1157
Barium	ND		1	1.3	0.31	mg/kg	06/27/2019 1157
Beryllium	ND		1	0.10	0.034	mg/kg	06/27/2019 1157
Cadmium	ND		1	0.13	0.025	mg/kg	06/27/2019 1157
Chromium	ND		1	1.3	0.55	mg/kg	06/27/2019 1157
Cobalt	ND		1	1.3	0.30	mg/kg	06/27/2019 1157
Copper	ND		1	1.3	0.33	mg/kg	06/27/2019 1157
Lead	ND		1	0.25	0.068	mg/kg	06/27/2019 1157
Nickel	ND		1	1.3	0.30	mg/kg	06/27/2019 1157
Selenium	ND		1	1.3	0.47	mg/kg	06/27/2019 1157
Silver	ND		1	0.25	0.060	mg/kg	06/27/2019 1157
Vanadium	ND		1	1.3	0.25	mg/kg	06/27/2019 1157
Zinc	ND		1	2.5	0.50	mg/kg	06/27/2019 1157

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20446-002
Batch: 20446
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/24/2019 1154

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	52		1	104	80-120	06/27/2019 1203
Arsenic	50	53		1	106	80-120	06/27/2019 1203
Barium	50	52		1	104	80-120	06/27/2019 1203
Beryllium	50	56		1	112	80-120	06/27/2019 1203
Cadmium	50	51		1	101	80-120	06/27/2019 1203
Chromium	50	53		1	107	80-120	06/27/2019 1203
Cobalt	50	55		1	110	80-120	06/27/2019 1203
Copper	50	53		1	105	80-120	06/27/2019 1203
Lead	50	53		1	105	80-120	06/27/2019 1203
Nickel	50	52		1	104	80-120	06/27/2019 1203
Selenium	50	48		1	97	80-120	06/27/2019 1203
Silver	50	56		1	111	80-120	06/27/2019 1203
Vanadium	50	55		1	109	80-120	06/27/2019 1203
Zinc	50	49		1	98	80-120	06/27/2019 1203

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20452-001
Batch: 20452
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1843

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/25/2019 1547

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20452-002
Batch: 20452
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1843

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.87		1	104	80-120	06/25/2019 1550

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Chain of Custody

and

Miscellaneous Documents

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Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

SHEALY Chain of Custody Record

Number 91648

Client: RAMBOLL US CORP.
Address: 7500 COLLEGE BLVD #1905
City: OVERLAND PARK | State: KS | Zip Code: 66210
Project Name: CMR - RAEM - WEST RAIL
Project No.: 1690012344 - 003
P.O. No.:
Report to Contact: MICHAEL WILSON / DANIEL PRICE
Sampler's Signature: X
Printed Name: BROOKS BAILEY / ANDREW HARDWICK
Telephone No. / E-mail: dprice2@ramboll.com mwilson@ramboll.com
Quote No.:
Analysis (Attach list if more space is needed)
Page 1 of 1

UF21028
KMN2
Remarks / Cooler I.D.

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No of Containers by Preservative Type: Unpres	No of Containers by Preservative Type: H2SO4	No of Containers by Preservative Type: HNO3	No of Containers by Preservative Type: HCl	No of Containers by Preservative Type: NaOH	No of Containers by Preservative Type: Soda Ash	No of Containers by Preservative Type: MeOH	VOC	SVOC (EPH)	Metals	VPH	Remarks / Cooler I.D.
CMR-WB05-7.5-8.5-190619	6/19/19	1110		X		X					X	X	X	X	X	X	COOLER 001
CMR-WB04-8.0-9.0-190619	6/19/19	1505		X		X					X	X	X	X	X	X	COOLER 001
CMR-WB04-5.0-6.0-190619	6/19/19	1510		X		X					X	X	X	X	X	X	COOLER 001
TB-17	—	—	MA	X					X				X	X	X	X	TRIP BLANK / COOLER 001

BB 6/19/19

Turn Around Time Required (Prior lab approval required for expedited TAT.): X Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client X Disposal by Lab

Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison X Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by	6/19/19	1745	1. Received by		
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by: Fed EX	6-21-19	1020	4. Laboratory received by: L Hicks	6-21-19	1020

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle): (Yes) No Ice Pack
Receipt Temp. 2.9 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-139 Effective Date: 08-01-2014

SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.
Document Number: ME0018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL US CORP. Cooler Inspected by/date: LKH / 06-21-2019 Lot #: UF21028

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: _____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: NA Chlorine Strip ID: NA Tested by: NA

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

2.9 /2.9 °C NA /NA °C NA /NA °C NA /NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☐ Yes	☐ No	☑ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H2SO4, HNO3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: LKH Date: 06-21-2019

Comments:

MEMO

Date: **July 22, 2019**

To: **File**

From: **Rob Huening, Ramboll**

cc: **Daniel J Price, Ramboll**

Subject: **Calumet Montana Refining**
Data Usability Assessment
Methods 8260C, 8270, 6020A, MT EPH/VPH
SDG UF21029, 2 Soil Samples, 1 Groundwater Sample, 1 Water Sample

Data validation and usability assessment was conducted for data package UF21029 based on the National Functional Guidelines for Superfund Organic Methods Data Review OSWER 9355.0-132, EPA-540-R-014-002 (USEPA August 2014) and National Functional Guidelines for Superfund Inorganic Methods Data Review (USEPA August 2014). The following samples were reported in this data package:

Sample ID	Lab Sample ID
CMR-WB06-10.0-10.5-190620	UF21029-001
CMR-WB06-6.0-6.5-190620	UF21029-002
TB-19-20190620	UF21029-003
CMR-WB06S-190620	UF21029-004

Data validation included a review of the following QC parameters:

- Data Package Completeness
- Preservation and Holding Times
- Instrument Performance Check
- Blanks
- Deuterated Monitoring Compound or Surrogate Spikes
- Matrix Spike/Matrix Spike Duplicate
- Field Duplicate Samples
- Laboratory Control Sample
- Internal Standards
- Tentatively Identified Compounds
- System Performance
- Overall Assessment of Data

QC criteria were met for each parameter with the following exceptions:

LCS/LCSD Recoveries
During analysis LCS/LCSD samples were run and recoveries were reported. These recoveries were largely in criteria with the exception of aqueous methyl acetate. The out of criteria recoveries indicate a possible bias. Low recoveries indicate a possible low bias and high recoveries indicate a possible high bias. In general, high bias does not affect non-detect results. Based on the potential bias all aqueous methyl acetate results have been validated as estimated.

Overall Assessment of Data
Overall, data are acceptable and usable for project objectives. The laboratory flags (*, F1) to denote out of criteria results were removed. Several results were flagged J by the laboratory because the concentrations calculated were below the method reporting limit and above the laboratory detection limit. The J flag was retained. These results should be considered estimated as the calculated concentrations are below the instrument calibration range.

No additional validation actions were taken on project samples. Results are usable for project purposes as validated.

Attachments:
Attachment 1: Data Validation Summary Checklist

Inorganic Data Review Summary

SDG No. UF21029

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 2 Soil, 1 GW, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	Metals (Modified Skinner List)
Preservation and Holding Times	No issues
Blanks	Zinc detected below the RL in aqueous method blank sample. Project sample detections well above blank value. No action taken.
Matrix Spike/Matrix Spike Duplicate	No issues
Laboratory Control Sample	No issues
Duplicate Samples	No issues
Other Non-conformances	No other non-conformances noted during analysis.
Overall Assessment of Data	No validation action warranted.

SDG No. UF21029

Site Calumet Montana Refining

Laboratory Shealy Environmental

Number of Samples/Matrix 2 Soil, 1 GW, 1 Water

Reviewer Name R Huening

Completion Date July 15, 2019

Review Criteria	VOC 8260C, SVOC 8270	VPH/EPH
Preservation and Holding Times	No issues	No issues
Blanks	No issues	No issues
Deuterated Monitoring Compound or Surrogate Spikes	No issues	No issues
Matrix Spike/Matrix Spike Duplicate	No MS/MSD results reported with samples. No action taken.	No MS/MSD results reported with samples. No action taken.
Laboratory Control Sample	LCS out high for acetone with no detections. No action taken. Aqueous LCS out of criteria low for methyl acetate. All aqueous methyl acetate results validated as estimated (J, UJ).	No issues
Internal Standards	No issues	No issues
Tentatively Identified Compounds	No TICs identified by the lab.	N/a
Other Non-conformances	No other non-conformances noted.	No other non-conformances noted
Overall Assessment of Data	All aqueous methyl acetate results validated as estimated (J, UJ).	No validation action warranted.

SHEALY ENVIRONMENTAL SERVICES, INC.

Report of Analysis

Ramboll US Corporation
333 West Wacker Drive
Suite 2700
Chicago, IL 60606
Attention: Michael Wilson

Project Name: CMR RAIAIM - West Rail

Project Number: 1690012344-003

Lot Number:**UF21029**

Date Completed:07/11/2019

07/12/2019 10:17 AM
Approved and released by:
Project Manager: Kelly M. Nance

The electronic signature above is the equivalent of a handwritten signature.

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Case Narrative
Ramboll US Corporation
Lot Number: UF21029

This Report of Analysis contains the analytical result(s) for the sample(s) listed on the Sample Summary following this Case Narrative. The sample receiving date is documented in the header information associated with each sample.

All results listed in this report relate only to the samples that are contained within this report.

Sample receipt, sample analysis, and data review have been performed in accordance with the most current approved NELAC standards, the Shealy Environmental Services, Inc. ("Shealy") Quality Assurance Management Plan (QAMP), standard operating procedures (SOPs), and Shealy policies. Any exceptions to the NELAC standards, the QAMP, SOPs or policies are qualified on the results page or discussed below.

Where applicable, all soil sample analysis are reported on a dry weight basis unless flagged with a "W" qualifier

If you have any questions regarding this report please contact the Shealy Project Manager listed on the cover page.

Volatiles
The laboratory control sample (LCS) associated with batch 21545 had acetone recovered above the acceptance limits. This could potentially result in a high bias on analytical results. There were no detections for this compound in the samples associated with this batch; therefore, data quality is not impacted.

The LCS associated with batch 21545 had methyl acetate recovered marginally outside of the acceptance limits. Due to the large number of analytes in the LCS, there is a high statistical probability of a few analytes outside of control limits. Per SW-846 Update V 8000D- 23 Revision 4 July 2014, a number of analytes should be allowed to marginally fail the limits without requirement for corrective action. The laboratory's SOP allows for 10% of analytes to recover marginally outside criteria.

Semivolatiles
The method blank associated with batch 20650 had bis(2-ethylhexyl)phthalate detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for bis(2-ethylhexyl)phthalate have been flagged with a “B” qualifier.

Montana EPH
Sample -004 had the surrogate recovered outside of the acceptance limits due to confirmed matrix interference.

Montana VPH
The method blank associated with batch 21459 had benzene detected at a concentration that was below the LOQ. There were no detections for this compound in the samples associated with this method blank.

The closing continuing calibration verification (CCV) associated with sample -004 was recovered outside of the acceptance limits due to objective evidence of matrix interference.

Metals

The method blank associated with batch 20830 had zinc detected at a concentration that was below the LOQ. All samples associated with this method blank that have detections for zinc have been flagged with a “B” qualifier.

Sample Summary
Ramboll US Corporation
Lot Number: UF21029

Sample Number	Sample ID	Matrix	Date Sampled	Date Received
001	CMR-WB06-10.0-10.5-190620	Solid	06/20/2019 1125	06/21/2019
002	CMR-WB06-6.0-6.25-190620	Solid	06/20/2019 1130	06/21/2019
003	TB-19-20190620	Aqueous	06/20/2019	06/21/2019
004	CMR-WB06S-190620	Aqueous	06/20/2019 1545	06/21/2019

(4 samples)

Detection Summary
Ramboll US Corporation
Lot Number: UF21029

Sample	Sample ID	Matrix	Parameter	Method	Result	Q	Units	Page
001	CMR-WB06-10.0-10.5-190620	Solid	Acetone	8260B	34		ug/kg	6
001	CMR-WB06-10.0-10.5-190620	Solid	Pyrene	8270D	2.6	J	ug/kg	9
001	CMR-WB06-10.0-10.5-190620	Solid	Antimony	6020B	0.43	J	mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Arsenic	6020B	17		mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Barium	6020B	640		mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Beryllium	6020B	0.71		mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Cadmium	6020B	0.32		mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Chromium	6020B	17		mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Cobalt	6020B	11		mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Copper	6020B	15		mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Lead	6020B	12		mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Mercury	7471B	0.024	J	mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Nickel	6020B	18		mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Silver	6020B	0.10	J	mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Vanadium	6020B	70		mg/kg	15
001	CMR-WB06-10.0-10.5-190620	Solid	Zinc	6020B	66		mg/kg	15
002	CMR-WB06-6.0-6.25-190620	Solid	Acetone	8260B	140		ug/kg	16
002	CMR-WB06-6.0-6.25-190620	Solid	Benzo(g,h,i)perylene	8270D	3.8		ug/kg	18
002	CMR-WB06-6.0-6.25-190620	Solid	Arsenic	6020B	5.3		mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Barium	6020B	190		mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Beryllium	6020B	0.62		mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Cadmium	6020B	0.14		mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Chromium	6020B	13		mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Cobalt	6020B	5.0		mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Copper	6020B	7.6		mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Lead	6020B	7.8		mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Mercury	7471B	0.023	J	mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Nickel	6020B	11		mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Vanadium	6020B	26		mg/kg	25
002	CMR-WB06-6.0-6.25-190620	Solid	Zinc	6020B	33		mg/kg	25
004	CMR-WB06S-190620	Aqueous	Acetone	8260B	6.1	J	ug/L	28
004	CMR-WB06S-190620	Aqueous	bis(2-Ethylhexyl)phthalate	8270D	2.9	BJ	ug/L	30
004	CMR-WB06S-190620	Aqueous	Arsenic	6020B	2.9		ug/L	37
004	CMR-WB06S-190620	Aqueous	Barium	6020B	180		ug/L	37
004	CMR-WB06S-190620	Aqueous	Beryllium	6020B	0.33	J	ug/L	37
004	CMR-WB06S-190620	Aqueous	Cadmium	6020B	0.29	J	ug/L	37
004	CMR-WB06S-190620	Aqueous	Chromium	6020B	11		ug/L	37
004	CMR-WB06S-190620	Aqueous	Cobalt	6020B	16		ug/L	37
004	CMR-WB06S-190620	Aqueous	Copper	6020B	20		ug/L	37
004	CMR-WB06S-190620	Aqueous	Lead	6020B	3.5		ug/L	37
004	CMR-WB06S-190620	Aqueous	Nickel	6020B	39		ug/L	37
004	CMR-WB06S-190620	Aqueous	Vanadium	6020B	22		ug/L	37
004	CMR-WB06S-190620	Aqueous	Zinc	6020B	35	B	ug/L	37

(43 detections)

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-001
Description: CMR-WB06-10.0-10.5-190620
Matrix: Solid
Date Sampled: 06/20/2019 1125
% Solids: 83.2 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/28/2019 1619	JM1		21177	6.45

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	34		19	7.5	ug/kg	1
Benzene	71-43-2	8260B	ND		4.7	1.9	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.7	1.9	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.7	1.9	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.7	1.9	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.7	2.8	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		19	3.7	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.7	1.9	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.7	1.9	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.7	1.9	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.7	1.9	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.7	1.9	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.7	2.8	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.7	1.9	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.7	1.9	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.7	1.9	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.7	2.8	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.7	1.9	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.7	1.9	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.7	1.9	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.7	1.9	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.7	1.9	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.7	1.9	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.7	1.9	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		230	23	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.7	1.9	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		9.3	3.7	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.7	1.9	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.7	1.9	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.7	1.9	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		9.3	3.7	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.7	1.9	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.7	1.9	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.7	1.9	ug/kg	1
Styrene	100-42-5	8260B	ND		4.7	1.9	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.7	1.9	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.7	1.9	ug/kg	1
Toluene	108-88-3	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.7	1.9	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-001
Description: CMR-WB06-10.0-10.5-190620
Matrix: Solid
Date Sampled: 06/20/2019 1125
% Solids: 83.2 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/28/2019 1619	JM1		21177	6.45

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.7	1.9	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.7	1.9	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.7	1.9	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.7	1.9	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.7	1.9	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.7	1.9	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.7	2.8	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		9.3	3.7	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.7	1.9	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.7	1.9	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		91	53-142
Bromofluorobenzene		97	47-138
Toluene-d8		104	68-124

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-001
Description: CMR-WB06-10.0-10.5-190620
Matrix: Solid
Date Sampled: 06/20/2019 1125
% Solids: 83.2 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/03/2019 2040	SCD	07/02/2019 1820	20379

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		3.1	0.97	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		3.1	1.1	ug/kg	1
Anthracene	120-12-7	8270D	ND		3.1	0.59	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		3.1	0.69	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		3.1	0.77	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		3.1	0.58	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		3.1	0.76	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		3.1	0.56	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		15	5.8	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		15	5.8	ug/kg	1
Carbazole	86-74-8	8270D	ND		15	5.8	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		15	5.8	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		15	5.8	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		15	5.8	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		15	5.8	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		15	5.8	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		15	5.8	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		15	5.8	ug/kg	1
Chrysene	218-01-9	8270D	ND		3.1	0.52	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		3.1	0.59	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		15	5.8	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		78	29	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		78	29	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		78	29	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		15	5.8	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		15	5.8	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		15	5.8	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		15	8.6	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		15	5.8	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		15	5.8	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		78	29	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		78	29	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		31	12	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		31	12	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		15	5.8	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		78	29	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		3.1	0.49	ug/kg	1
Fluorene	86-73-7	8270D	ND		3.1	0.66	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		15	5.8	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		15	5.8	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		78	29	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		15	5.8	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		3.1	1.2	ug/kg	1
Isophorone	78-59-1	8270D	ND		15	5.8	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-001
Description: CMR-WB06-10.0-10.5-190620
Matrix: Solid
Date Sampled: 06/20/2019 1125
% Solids: 83.2 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/03/2019 2040	SCD	07/02/2019 1820	20379

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		3.1	1.2	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		15	5.8	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		31	12	ug/kg	1
Naphthalene	91-20-3	8270D	ND		3.1	1.1	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		31	12	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		31	12	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		31	12	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		15	5.8	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		31	12	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		78	29	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		15	5.8	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		15	5.8	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		78	29	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		3.1	0.84	ug/kg	1
Phenol	108-95-2	8270D	ND		15	5.8	ug/kg	1
Pyrene	129-00-0	8270D	2.6	J	3.1	0.58	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		38	12	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		78	12	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		78	29	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		15	5.8	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		15	5.8	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		64	33-102
2-Fluorophenol		61	35-115
Nitrobenzene-d5		61	22-109
Phenol-d5		62	33-122
Terphenyl-d14		79	41-120
2,4,6-Tribromophenol		68	30-117

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-001
Description: CMR-WB06-10.0-10.5-190620
Matrix: Solid
Date Sampled: 06/20/2019 1125
% Solids: 83.2 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 0226	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		12	12	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		69	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-001
Description: CMR-WB06-10.0-10.5-190620
Matrix: Solid
Date Sampled: 06/20/2019 1125
% Solids: 83.2 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1437	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		12	12	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		74	40-140
2-Fluorobiphenyl (fractionation 1)		101	40-140
o - Terphenyl (aromatic)		77	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-001
Description: CMR-WB06-10.0-10.5-190620
Matrix: Solid
Date Sampled: 06/20/2019 1125
% Solids: 83.2 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/28/2019 0105	STM		21144

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		4.4	0.89	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		4.4	0.89	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		97	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-001
Description: CMR-WB06-10.0-10.5-190620
Matrix: Solid
Date Sampled: 06/20/2019 1125
% Solids: 83.2 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/28/2019 2223	JJG		21459

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.30	0.040	mg/kg	2
C9 - C10 Aromatics		Montana VPH	ND		1.5	0.59	mg/kg	2
Ethylbenzene	100-41-4	Montana VPH	ND		0.30	0.037	mg/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.30	0.064	mg/kg	2
Naphthalene	91-20-3	Montana VPH	ND		0.30	0.15	mg/kg	2
Toluene	108-88-3	Montana VPH	ND		0.30	0.047	mg/kg	2
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.30	0.066	mg/kg	2
o - Xylenes	95-47-6	Montana VPH	ND		0.30	0.033	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF21029-001
Description: CMR-WB06-10.0-10.5-190620
Matrix: Solid
Date Sampled: 06/20/2019 1125
% Solids: 83.2 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/28/2019 0105	STM		21146

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		98	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-001
Description: CMR-WB06-10.0-10.5-190620
Matrix: Solid
Date Sampled: 06/20/2019 1125
% Solids: 83.2 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1337	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1623	TJW	06/24/2019 1843	20452

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	0.43	J	0.58	0.23	mg/kg	1
Arsenic	7440-38-2	6020B	17		0.58	0.23	mg/kg	1
Barium	7440-39-3	6020B	640		1.5	0.36	mg/kg	1
Beryllium	7440-41-7	6020B	0.71		0.12	0.040	mg/kg	1
Cadmium	7440-43-9	6020B	0.32		0.15	0.029	mg/kg	1
Chromium	7440-47-3	6020B	17		1.5	0.64	mg/kg	1
Cobalt	7440-48-4	6020B	11		1.5	0.35	mg/kg	1
Copper	7440-50-8	6020B	15		1.5	0.38	mg/kg	1
Lead	7439-92-1	6020B	12		0.29	0.079	mg/kg	1
Mercury	7439-97-6	7471B	0.024	J	0.093	0.022	mg/kg	1
Nickel	7440-02-0	6020B	18		1.5	0.35	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.5	0.55	mg/kg	1
Silver	7440-22-4	6020B	0.10	J	0.29	0.070	mg/kg	1
Vanadium	7440-62-2	6020B	70		1.5	0.29	mg/kg	1
Zinc	7440-66-6	6020B	66		2.9	0.58	mg/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-002
Description: CMR-WB06-6.0-6.25-190620
Matrix: Solid
Date Sampled: 06/20/2019 1130
% Solids: 87.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/28/2019 1642	JM1		21177	6.68

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	140		17	6.8	ug/kg	1
Benzene	71-43-2	8260B	ND		4.3	1.7	ug/kg	1
Bromochloromethane	74-97-5	8260B	ND		4.3	1.7	ug/kg	1
Bromodichloromethane	75-27-4	8260B	ND		4.3	1.7	ug/kg	1
Bromoform	75-25-2	8260B	ND		4.3	1.7	ug/kg	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		4.3	2.6	ug/kg	1
2-Butanone (MEK)	78-93-3	8260B	ND		17	3.4	ug/kg	1
Carbon disulfide	75-15-0	8260B	ND		4.3	1.7	ug/kg	1
Carbon tetrachloride	56-23-5	8260B	ND		4.3	1.7	ug/kg	1
Chlorobenzene	108-90-7	8260B	ND		4.3	1.7	ug/kg	1
Chloroethane	75-00-3	8260B	ND		4.3	1.7	ug/kg	1
Chloroform	67-66-3	8260B	ND		4.3	1.7	ug/kg	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		4.3	2.6	ug/kg	1
Cyclohexane	110-82-7	8260B	ND		4.3	1.7	ug/kg	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		4.3	1.7	ug/kg	1
Dibromochloromethane	124-48-1	8260B	ND		4.3	1.7	ug/kg	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		4.3	1.7	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		4.3	1.7	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		4.3	1.7	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		4.3	1.7	ug/kg	1
Dichlorodifluoromethane	75-71-8	8260B	ND		4.3	2.6	ug/kg	1
1,1-Dichloroethane	75-34-3	8260B	ND		4.3	1.7	ug/kg	1
1,2-Dichloroethane	107-06-2	8260B	ND		4.3	1.7	ug/kg	1
1,1-Dichloroethene	75-35-4	8260B	ND		4.3	1.7	ug/kg	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		4.3	1.7	ug/kg	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		4.3	1.7	ug/kg	1
1,2-Dichloropropane	78-87-5	8260B	ND		4.3	1.7	ug/kg	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		4.3	1.7	ug/kg	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		4.3	1.7	ug/kg	1
1,4-Dioxane	123-91-1	8260B	ND		210	21	ug/kg	1
Ethylbenzene	100-41-4	8260B	ND		4.3	1.7	ug/kg	1
2-Hexanone	591-78-6	8260B	ND		8.6	3.4	ug/kg	1
Isopropylbenzene	98-82-8	8260B	ND		4.3	1.7	ug/kg	1
Methyl acetate	79-20-9	8260B	ND		4.3	1.7	ug/kg	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		4.3	1.7	ug/kg	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		8.6	3.4	ug/kg	1
Methylcyclohexane	108-87-2	8260B	ND		4.3	1.7	ug/kg	1
Methylene chloride	75-09-2	8260B	ND		4.3	1.7	ug/kg	1
Naphthalene	91-20-3	8260B	ND		4.3	1.7	ug/kg	1
Styrene	100-42-5	8260B	ND		4.3	1.7	ug/kg	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		4.3	1.7	ug/kg	1
Tetrachloroethene	127-18-4	8260B	ND		4.3	1.7	ug/kg	1
Toluene	108-88-3	8260B	ND		4.3	1.7	ug/kg	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		4.3	1.7	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-002
Description: CMR-WB06-6.0-6.25-190620
Matrix: Solid
Date Sampled: 06/20/2019 1130
% Solids: 87.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch	Sample Wt.(g)
1	5035	8260B	1	06/28/2019 1642	JM1		21177	6.68

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		4.3	1.7	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		4.3	1.7	ug/kg	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		4.3	1.7	ug/kg	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		4.3	1.7	ug/kg	1
Trichloroethene	79-01-6	8260B	ND		4.3	1.7	ug/kg	1
Trichlorofluoromethane	75-69-4	8260B	ND		4.3	1.7	ug/kg	1
Vinyl chloride	75-01-4	8260B	ND		4.3	2.6	ug/kg	1
Xylenes (total)	1330-20-7	8260B	ND		8.6	3.4	ug/kg	1
m+p - Xylenes	179601-23-1	8260B	ND		4.3	1.7	ug/kg	1
o - Xylenes	95-47-6	8260B	ND		4.3	1.7	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		101	47-138
Toluene-d8		101	68-124

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-002
Description: CMR-WB06-6.0-6.25-190620
Matrix: Solid
Date Sampled: 06/20/2019 1130
% Solids: 87.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/03/2019 1542	SCD	07/02/2019 1820	20379

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		3.0	0.94	ug/kg	1
Acenaphthylene	208-96-8	8270D	ND		3.0	1.1	ug/kg	1
Anthracene	120-12-7	8270D	ND		3.0	0.58	ug/kg	1
Benzo(a)anthracene	56-55-3	8270D	ND		3.0	0.67	ug/kg	1
Benzo(a)pyrene	50-32-8	8270D	ND		3.0	0.74	ug/kg	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		3.0	0.56	ug/kg	1
Benzo(g,h,i)perylene	191-24-2	8270D	3.8		3.0	0.73	ug/kg	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		3.0	0.54	ug/kg	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		15	5.6	ug/kg	1
Butyl benzyl phthalate	85-68-7	8270D	ND		15	5.6	ug/kg	1
Carbazole	86-74-8	8270D	ND		15	5.6	ug/kg	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		15	5.6	ug/kg	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		15	5.6	ug/kg	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		15	5.6	ug/kg	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		15	5.6	ug/kg	1
2-Chloronaphthalene	91-58-7	8270D	ND		15	5.6	ug/kg	1
2-Chlorophenol	95-57-8	8270D	ND		15	5.6	ug/kg	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		15	5.6	ug/kg	1
Chrysene	218-01-9	8270D	ND		3.0	0.51	ug/kg	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		3.0	0.58	ug/kg	1
Dibenzofuran	132-64-9	8270D	ND		15	5.6	ug/kg	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		76	28	ug/kg	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		76	28	ug/kg	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		76	28	ug/kg	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		15	5.6	ug/kg	1
2,4-Dichlorophenol	120-83-2	8270D	ND		15	5.6	ug/kg	1
Diethylphthalate	84-66-2	8270D	ND		15	5.6	ug/kg	1
Dimethyl phthalate	131-11-3	8270D	ND		15	8.4	ug/kg	1
2,4-Dimethylphenol	105-67-9	8270D	ND		15	5.6	ug/kg	1
Di-n-butyl phthalate	84-74-2	8270D	ND		15	5.6	ug/kg	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		76	28	ug/kg	1
2,4-Dinitrophenol	51-28-5	8270D	ND		76	28	ug/kg	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		30	11	ug/kg	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		30	11	ug/kg	1
Di-n-octylphthalate	117-84-0	8270D	ND		15	5.6	ug/kg	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	ND		76	28	ug/kg	1
Fluoranthene	206-44-0	8270D	ND		3.0	0.47	ug/kg	1
Fluorene	86-73-7	8270D	ND		3.0	0.64	ug/kg	1
Hexachlorobenzene	118-74-1	8270D	ND		15	5.6	ug/kg	1
Hexachlorobutadiene	87-68-3	8270D	ND		15	5.6	ug/kg	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		76	28	ug/kg	1
Hexachloroethane	67-72-1	8270D	ND		15	5.6	ug/kg	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		3.0	1.1	ug/kg	1
Isophorone	78-59-1	8270D	ND		15	5.6	ug/kg	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-002
Description: CMR-WB06-6.0-6.25-190620
Matrix: Solid
Date Sampled: 06/20/2019 1130
% Solids: 87.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3546	8270D	1	07/03/2019 1542	SCD	07/02/2019 1820	20379

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		3.0	1.1	ug/kg	1
2-Methylphenol	95-48-7	8270D	ND		15	5.6	ug/kg	1
3+4-Methylphenol	106-44-5	8270D	ND		30	11	ug/kg	1
Naphthalene	91-20-3	8270D	ND		3.0	1.1	ug/kg	1
2-Nitroaniline	88-74-4	8270D	ND		30	11	ug/kg	1
3-Nitroaniline	99-09-2	8270D	ND		30	11	ug/kg	1
4-Nitroaniline	100-01-6	8270D	ND		30	11	ug/kg	1
Nitrobenzene	98-95-3	8270D	ND		15	5.6	ug/kg	1
2-Nitrophenol	88-75-5	8270D	ND		30	11	ug/kg	1
4-Nitrophenol	100-02-7	8270D	ND		76	28	ug/kg	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		15	5.6	ug/kg	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		15	5.6	ug/kg	1
Pentachlorophenol	87-86-5	8270D	ND		76	28	ug/kg	1
Phenanthrene	85-01-8	8270D	ND		3.0	0.81	ug/kg	1
Phenol	108-95-2	8270D	ND		15	5.6	ug/kg	1
Pyrene	129-00-0	8270D	ND		3.0	0.56	ug/kg	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		37	11	ug/kg	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		76	11	ug/kg	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		76	28	ug/kg	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		15	5.6	ug/kg	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		15	5.6	ug/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		67	33-102
2-Fluorophenol		59	35-115
Nitrobenzene-d5		61	22-109
Phenol-d5		62	33-122
Terphenyl-d14		83	41-120
2,4,6-Tribromophenol		75	30-117

LOQ = Limit of Quantitation
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J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-002
Description: CMR-WB06-6.0-6.25-190620
Matrix: Solid
Date Sampled: 06/20/2019 1130
% Solids: 87.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 0255	CHG	06/24/2019 1110	20483

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		11	11	mg/kg	1
C9 - C18 Aliphatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)		71	40-140

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-002
Description: CMR-WB06-6.0-6.25-190620
Matrix: Solid
Date Sampled: 06/20/2019 1130
% Solids: 87.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	MADEP-EPH-	Montana EPH	1	06/27/2019 1507	CHG	06/24/2019 1110	20484

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		11	11	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		97	40-140
2-Fluorobiphenyl (fractionation 1)		103	40-140
o - Terphenyl (aromatic)		87	40-140

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-002
Description: CMR-WB06-6.0-6.25-190620
Matrix: Solid
Date Sampled: 06/20/2019 1130
% Solids: 87.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/28/2019 0133	STM		21144

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		3.8	0.76	mg/kg	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		3.8	0.76	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		95	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-002
Description: CMR-WB06-6.0-6.25-190620
Matrix: Solid
Date Sampled: 06/20/2019 1130
% Solids: 87.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
2	VPH	Montana VPH	1	06/29/2019 0010	JJG		21459

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		0.25	0.035	mg/kg	2
C9 - C10 Aromatics		Montana VPH	ND		1.3	0.51	mg/kg	2
Ethylbenzene	100-41-4	Montana VPH	ND		0.25	0.032	mg/kg	2
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		0.25	0.055	mg/kg	2
Naphthalene	91-20-3	Montana VPH	ND		0.25	0.13	mg/kg	2
Toluene	108-88-3	Montana VPH	ND		0.25	0.041	mg/kg	2
m+p - Xylenes	179601-23-1	Montana VPH	ND		0.25	0.057	mg/kg	2
o - Xylenes	95-47-6	Montana VPH	ND		0.25	0.029	mg/kg	2

Surrogate	Q	Run 2 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		75	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
N = Recovery is out of criteria
W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF21029-002
Description: CMR-WB06-6.0-6.25-190620
Matrix: Solid
Date Sampled: 06/20/2019 1130
% Solids: 87.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/28/2019 0133	STM		21146

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		8.9	1.8	mg/kg	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		94	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-002
Description: CMR-WB06-6.0-6.25-190620
Matrix: Solid
Date Sampled: 06/20/2019 1130
% Solids: 87.4 06/22/2019 0135
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3050B	6020B	1	06/27/2019 1343	BNW	06/24/2019 1154	20446
1	7471B	7471B	1	06/25/2019 1630	TJW	06/24/2019 1843	20452

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		0.54	0.22	mg/kg	1
Arsenic	7440-38-2	6020B	5.3		0.54	0.22	mg/kg	1
Barium	7440-39-3	6020B	190		1.4	0.33	mg/kg	1
Beryllium	7440-41-7	6020B	0.62		0.11	0.037	mg/kg	1
Cadmium	7440-43-9	6020B	0.14		0.14	0.027	mg/kg	1
Chromium	7440-47-3	6020B	13		1.4	0.60	mg/kg	1
Cobalt	7440-48-4	6020B	5.0		1.4	0.32	mg/kg	1
Copper	7440-50-8	6020B	7.6		1.4	0.35	mg/kg	1
Lead	7439-92-1	6020B	7.8		0.27	0.073	mg/kg	1
Mercury	7439-97-6	7471B	0.023	J	0.087	0.021	mg/kg	1
Nickel	7440-02-0	6020B	11		1.4	0.32	mg/kg	1
Selenium	7782-49-2	6020B	ND		1.4	0.51	mg/kg	1
Silver	7440-22-4	6020B	ND		0.27	0.065	mg/kg	1
Vanadium	7440-62-2	6020B	26		1.4	0.27	mg/kg	1
Zinc	7440-66-6	6020B	33		2.7	0.54	mg/kg	1

LOQ = Limit of Quantitation
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DL = Detection Limit
ND = Not detected at or above the DL
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P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-003
Description: TB-19-20190620
Matrix: Aqueous
Date Sampled: 06/20/2019
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1320	BWS		21545

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	ND		10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-003
Description: TB-19-20190620
Matrix: Aqueous
Date Sampled: 06/20/2019
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 1320	BWS		21545

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		102	70-130
Toluene-d8		100	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
B = Detected in the method blank
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W = Reported on wet weight basis
E = Quantitation of compound exceeded the calibration range
P = The RPD between two GC columns exceeds 40%
DL = Detection Limit
J = Estimated result < LOQ and ≥ DL

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-004
Description: CMR-WB06S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1545
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 0227	STM		21480

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acetone	67-64-1	8260B	6.1	J	10	2.0	ug/L	1
Benzene	71-43-2	8260B	ND		0.50	0.40	ug/L	1
Bromochloromethane	74-97-5	8260B	ND		0.50	0.40	ug/L	1
Bromodichloromethane	75-27-4	8260B	ND		0.50	0.40	ug/L	1
Bromoform	75-25-2	8260B	ND		0.50	0.40	ug/L	1
Bromomethane (Methyl bromide)	74-83-9	8260B	ND		0.50	0.40	ug/L	1
2-Butanone (MEK)	78-93-3	8260B	ND		10	2.0	ug/L	1
Carbon disulfide	75-15-0	8260B	ND		0.50	0.40	ug/L	1
Carbon tetrachloride	56-23-5	8260B	ND		0.50	0.40	ug/L	1
Chlorobenzene	108-90-7	8260B	ND		0.50	0.40	ug/L	1
Chloroethane	75-00-3	8260B	ND		0.50	0.40	ug/L	1
Chloroform	67-66-3	8260B	ND		0.50	0.40	ug/L	1
Chloromethane (Methyl chloride)	74-87-3	8260B	ND		0.50	0.40	ug/L	1
Cyclohexane	110-82-7	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromo-3-chloropropane (DBCP)	96-12-8	8260B	ND		0.50	0.40	ug/L	1
Dibromochloromethane	124-48-1	8260B	ND		0.50	0.40	ug/L	1
1,2-Dibromoethane (EDB)	106-93-4	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichlorobenzene	95-50-1	8260B	ND		0.50	0.40	ug/L	1
1,3-Dichlorobenzene	541-73-1	8260B	ND		0.50	0.40	ug/L	1
1,4-Dichlorobenzene	106-46-7	8260B	ND		0.50	0.40	ug/L	1
Dichlorodifluoromethane	75-71-8	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethane	75-34-3	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloroethane	107-06-2	8260B	ND		0.50	0.40	ug/L	1
1,1-Dichloroethene	75-35-4	8260B	ND		0.50	0.40	ug/L	1
cis-1,2-Dichloroethene	156-59-2	8260B	ND		0.50	0.40	ug/L	1
trans-1,2-Dichloroethene	156-60-5	8260B	ND		0.50	0.40	ug/L	1
1,2-Dichloropropane	78-87-5	8260B	ND		0.50	0.40	ug/L	1
cis-1,3-Dichloropropene	10061-01-5	8260B	ND		0.50	0.40	ug/L	1
trans-1,3-Dichloropropene	10061-02-6	8260B	ND		0.50	0.11	ug/L	1
1,4-Dioxane	123-91-1	8260B	ND		20	13	ug/L	1
Ethylbenzene	100-41-4	8260B	ND		0.50	0.40	ug/L	1
2-Hexanone	591-78-6	8260B	ND		10	2.0	ug/L	1
Isopropylbenzene	98-82-8	8260B	ND		0.50	0.40	ug/L	1
Methyl acetate	79-20-9	8260B	ND		1.0	0.40	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	8260B	ND		0.50	0.40	ug/L	1
4-Methyl-2-pentanone	108-10-1	8260B	ND		10	2.0	ug/L	1
Methylcyclohexane	108-87-2	8260B	ND		5.0	0.40	ug/L	1
Methylene chloride	75-09-2	8260B	ND		0.50	0.40	ug/L	1
Naphthalene	91-20-3	8260B	ND		0.50	0.40	ug/L	1
Styrene	100-42-5	8260B	ND		0.50	0.41	ug/L	1
1,1,2,2-Tetrachloroethane	79-34-5	8260B	ND		0.50	0.40	ug/L	1
Tetrachloroethene	127-18-4	8260B	ND		0.50	0.40	ug/L	1
Toluene	108-88-3	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloro-1,2,2-Trifluoroethane	76-13-1	8260B	ND		1.0	0.42	ug/L	1

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Volatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-004
Description: CMR-WB06S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1545
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	5030B	8260B	1	07/03/2019 0227	STM		21480

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
1,2,3-Trichlorobenzene	87-61-6	8260B	ND		0.50	0.40	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8260B	ND		0.50	0.40	ug/L	1
1,1,1-Trichloroethane	71-55-6	8260B	ND		0.50	0.40	ug/L	1
1,1,2-Trichloroethane	79-00-5	8260B	ND		0.50	0.40	ug/L	1
Trichloroethene	79-01-6	8260B	ND		0.50	0.40	ug/L	1
Trichlorofluoromethane	75-69-4	8260B	ND		0.50	0.40	ug/L	1
Vinyl chloride	75-01-4	8260B	ND		0.50	0.40	ug/L	1
Xylenes (total)	1330-20-7	8260B	ND		1.0	0.40	ug/L	1
m+p - Xylenes	179601-23-1	8260B	ND		0.50	0.40	ug/L	1
o - Xylenes	95-47-6	8260B	ND		0.50	0.40	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1,2-Dichloroethane-d4		98	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		103	70-130

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-004
Description: CMR-WB06S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1545
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 1804	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Acenaphthene	83-32-9	8270D	ND		0.16	0.040	ug/L	1
Acenaphthylene	208-96-8	8270D	ND		0.16	0.040	ug/L	1
Anthracene	120-12-7	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)anthracene	56-55-3	8270D	ND		0.16	0.040	ug/L	1
Benzo(a)pyrene	50-32-8	8270D	ND		0.16	0.040	ug/L	1
Benzo(b)fluoranthene	205-99-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(g,h,i)perylene	191-24-2	8270D	ND		0.16	0.040	ug/L	1
Benzo(k)fluoranthene	207-08-9	8270D	ND		0.16	0.040	ug/L	1
4-Bromophenyl phenyl ether	101-55-3	8270D	ND		0.80	0.15	ug/L	1
Butyl benzyl phthalate	85-68-7	8270D	ND		4.0	0.21	ug/L	1
Carbazole	86-74-8	8270D	ND		0.80	0.040	ug/L	1
bis (2-Chloro-1-methylethyl) ether	108-60-1	8270D	ND		0.80	0.17	ug/L	1
4-Chloro-3-methyl phenol	59-50-7	8270D	ND		0.80	0.26	ug/L	1
bis(2-Chloroethoxy)methane	111-91-1	8270D	ND		0.80	0.060	ug/L	1
bis(2-Chloroethyl)ether	111-44-4	8270D	ND		0.80	0.16	ug/L	1
2-Chloronaphthalene	91-58-7	8270D	ND		0.80	0.15	ug/L	1
2-Chlorophenol	95-57-8	8270D	ND		0.80	0.15	ug/L	1
4-Chlorophenyl phenyl ether	7005-72-3	8270D	ND		0.80	0.16	ug/L	1
Chrysene	218-01-9	8270D	ND		0.16	0.040	ug/L	1
Dibenzo(a,h)anthracene	53-70-3	8270D	ND		0.16	0.040	ug/L	1
Dibenzofuran	132-64-9	8270D	ND		0.80	0.16	ug/L	1
1,2-Dichlorobenzene	95-50-1	8270D	ND		0.80	0.17	ug/L	1
1,3-Dichlorobenzene	541-73-1	8270D	ND		0.80	0.18	ug/L	1
1,4-Dichlorobenzene	106-46-7	8270D	ND		0.80	0.16	ug/L	1
3,3'-Dichlorobenzidine	91-94-1	8270D	ND		4.0	0.81	ug/L	1
2,4-Dichlorophenol	120-83-2	8270D	ND		0.80	0.19	ug/L	1
Diethylphthalate	84-66-2	8270D	ND		4.0	0.19	ug/L	1
Dimethyl phthalate	131-11-3	8270D	ND		4.0	0.18	ug/L	1
2,4-Dimethylphenol	105-67-9	8270D	ND		0.80	0.15	ug/L	1
Di-n-butyl phthalate	84-74-2	8270D	ND		4.0	0.42	ug/L	1
4,6-Dinitro-2-methylphenol	534-52-1	8270D	ND		4.0	0.89	ug/L	1
2,4-Dinitrophenol	51-28-5	8270D	ND		4.0	1.3	ug/L	1
2,4-Dinitrotoluene	121-14-2	8270D	ND		1.6	0.36	ug/L	1
2,6-Dinitrotoluene	606-20-2	8270D	ND		1.6	0.34	ug/L	1
Di-n-octylphthalate	117-84-0	8270D	ND		4.0	0.48	ug/L	1
bis(2-Ethylhexyl)phthalate	117-81-7	8270D	2.9	BJ	4.0	0.38	ug/L	1
Fluoranthene	206-44-0	8270D	ND		0.16	0.040	ug/L	1
Fluorene	86-73-7	8270D	ND		0.16	0.040	ug/L	1
Hexachlorobenzene	118-74-1	8270D	ND		0.80	0.15	ug/L	1
Hexachlorobutadiene	87-68-3	8270D	ND		0.80	0.17	ug/L	1
Hexachlorocyclopentadiene	77-47-4	8270D	ND		4.0	1.1	ug/L	1
Hexachloroethane	67-72-1	8270D	ND		0.80	0.17	ug/L	1
Indeno(1,2,3-c,d)pyrene	193-39-5	8270D	ND		0.16	0.040	ug/L	1
Isophorone	78-59-1	8270D	ND		0.80	0.22	ug/L	1

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Semivolatile Organic Compounds by GC/MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-004
Description: CMR-WB06S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1545
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	3520C	8270D	1	06/28/2019 1804	SCD	06/25/2019 1318	20650

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
2-Methylnaphthalene	91-57-6	8270D	ND		0.16	0.040	ug/L	1
2-Methylphenol	95-48-7	8270D	ND		0.80	0.21	ug/L	1
3+4-Methylphenol	106-44-5	8270D	ND		1.6	0.46	ug/L	1
Naphthalene	91-20-3	8270D	ND		0.16	0.040	ug/L	1
2-Nitroaniline	88-74-4	8270D	ND		1.6	0.66	ug/L	1
3-Nitroaniline	99-09-2	8270D	ND		1.6	0.15	ug/L	1
4-Nitroaniline	100-01-6	8270D	ND		1.6	1.3	ug/L	1
Nitrobenzene	98-95-3	8270D	ND		0.80	0.17	ug/L	1
2-Nitrophenol	88-75-5	8270D	ND		1.6	0.44	ug/L	1
4-Nitrophenol	100-02-7	8270D	ND		4.0	2.1	ug/L	1
N-Nitrosodi-n-propylamine	621-64-7	8270D	ND		0.80	0.28	ug/L	1
N-Nitrosodiphenylamine (Diphenylamine)	86-30-6	8270D	ND		0.80	0.50	ug/L	1
Pentachlorophenol	87-86-5	8270D	ND		4.0	1.3	ug/L	1
Phenanthrene	85-01-8	8270D	ND		0.16	0.040	ug/L	1
Phenol	108-95-2	8270D	ND		0.80	0.19	ug/L	1
Pyrene	129-00-0	8270D	ND		0.16	0.040	ug/L	1
1,2,4,5-Tetrachlorobenzene	95-94-3	8270D	ND		0.80	0.25	ug/L	1
2,3,4,6-Tetrachlorophenol	58-90-2	8270D	ND		0.80	0.55	ug/L	1
1,2,4-Trichlorobenzene	120-82-1	8270D	ND		0.80	0.37	ug/L	1
2,4,5-Trichlorophenol	95-95-4	8270D	ND		0.80	0.19	ug/L	1
2,4,6-Trichlorophenol	88-06-2	8270D	ND		0.80	0.22	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Fluorobiphenyl		44	37-129
2-Fluorophenol		25	24-127
Nitrobenzene-d5		46	38-127
Phenol-d5		29	28-128
Terphenyl-d14		58	10-148
2,4,6-Tribromophenol		55	35-144

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Montana EPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-004
Description: CMR-WB06S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1545
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/08/2019 1543	CHG	06/26/2019 0946	20744

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C19 - C36 Aliphatics		Montana EPH	ND		100	100	ug/L	1
C9 - C18 Aliphatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
1-Chloro-octadecane (aliphatic)	N	27	40-140

LOQ = Limit of Quantitation
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Montana EPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-004
Description: CMR-WB06S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1545
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	Montana EPH	Montana EPH	1	07/09/2019 0410	CHG	06/26/2019 0946	20745

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C11 - C22 Aromatics		Montana EPH	ND		100	100	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2-Bromonaphthalene (fractionation 2)		56	40-140
2-Fluorobiphenyl (fractionation 1)		62	40-140
o - Terphenyl (aromatic)		51	40-140

LOQ = Limit of Quantitation
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Montana VPH (aliphatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-004
Description: CMR-WB06S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1545
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 1930	STM		21206

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
C5 - C8 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1
C9 - C12 Aliphatics, Adjusted		Montana VPH	ND		75	15	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
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Montana VPH (aromatics)

Client: Ramboll US Corporation
Laboratory ID: UF21029-004
Description: CMR-WB06S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1545
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 1930	STM		21207

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Benzene	71-43-2	Montana VPH	ND		5.0	0.51	ug/L	1
C9 - C10 Aromatics		Montana VPH	ND		25	5.0	ug/L	1
Ethylbenzene	100-41-4	Montana VPH	ND		5.0	0.62	ug/L	1
Methyl tertiary butyl ether (MTBE)	1634-04-4	Montana VPH	ND		5.0	1.2	ug/L	1
Naphthalene	91-20-3	Montana VPH	ND		5.0	0.70	ug/L	1
Toluene	108-88-3	Montana VPH	ND		5.0	0.53	ug/L	1
m+p - Xylenes	179601-23-1	Montana VPH	ND		5.0	1.2	ug/L	1
o - Xylenes	95-47-6	Montana VPH	ND		5.0	0.58	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (PID)		88	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
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Montana VPH (TPH)

Client: Ramboll US Corporation
Laboratory ID: UF21029-004
Description: CMR-WB06S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1545
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1	VPH	Montana VPH	1	06/29/2019 1930	STM		21208

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
TPH		Montana VPH	ND		180	35	ug/L	1

Surrogate	Q	Run 1 % Recovery	Acceptance Limits
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
ND = Not detected at or above the DL
H = Out of holding time
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ICP-MS

Client: Ramboll US Corporation
Laboratory ID: UF21029-004
Description: CMR-WB06S-190620
Matrix: Aqueous
Date Sampled: 06/20/2019 1545
Date Received: 06/21/2019

Run	Prep Method	Analytical Method	Dilution	Analysis Date	Analyst	Prep Date	Batch
1		7470A	1	06/27/2019 1400	TJW	06/26/2019 1259	20714
1	3005A	6020B	1	06/27/2019 1728	BNW	06/26/2019 1925	20830

Parameter	CAS Number	Analytical Method	Result	Q	LOQ	DL	Units	Run
Antimony	7440-36-0	6020B	ND		2.0	0.50	ug/L	1
Arsenic	7440-38-2	6020B	2.9		2.0	1.3	ug/L	1
Barium	7440-39-3	6020B	180		5.0	1.3	ug/L	1
Beryllium	7440-41-7	6020B	0.33	J	0.40	0.15	ug/L	1
Cadmium	7440-43-9	6020B	0.29	J	0.50	0.13	ug/L	1
Chromium	7440-47-3	6020B	11		5.0	1.3	ug/L	1
Cobalt	7440-48-4	6020B	16		5.0	1.3	ug/L	1
Copper	7440-50-8	6020B	20		5.0	1.3	ug/L	1
Lead	7439-92-1	6020B	3.5		1.0	0.25	ug/L	1
Mercury	7439-97-6	7470A	ND		0.00020	0.000091	mg/L	1
Nickel	7440-02-0	6020B	39		5.0	1.3	ug/L	1
Selenium	7782-49-2	6020B	ND		5.0	1.3	ug/L	1
Silver	7440-22-4	6020B	ND		1.0	0.25	ug/L	1
Vanadium	7440-62-2	6020B	22		5.0	2.5	ug/L	1
Zinc	7440-66-6	6020B	35	B	10	2.5	ug/L	1

LOQ = Limit of Quantitation
B = Detected in the method blank
E = Quantitation of compound exceeded the calibration range
DL = Detection Limit
ND = Not detected at or above the DL
N = Recovery is out of criteria
P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
H = Out of holding time
W = Reported on wet weight basis

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QC Summary

Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21177-001
Batch: 21177
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	20	8.0	ug/kg	06/28/2019 1501
Benzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Bromochloromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Bromodichloromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Bromoform	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Bromomethane (Methyl bromide)	ND		1	5.0	3.0	ug/kg	06/28/2019 1501
2-Butanone (MEK)	ND		1	20	4.0	ug/kg	06/28/2019 1501
Carbon disulfide	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Carbon tetrachloride	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Chlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Chloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Chloroform	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Chloromethane (Methyl chloride)	ND		1	5.0	3.0	ug/kg	06/28/2019 1501
Cyclohexane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Dibromochloromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,2-Dibromoethane (EDB)	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,2-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,3-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,4-Dichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Dichlorodifluoromethane	ND		1	5.0	3.0	ug/kg	06/28/2019 1501
1,1-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,2-Dichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,1-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
cis-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
trans-1,2-Dichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,2-Dichloropropane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
cis-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
trans-1,3-Dichloropropene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,4-Dioxane	ND		1	250	25	ug/kg	06/28/2019 1501
Ethylbenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
2-Hexanone	ND		1	10	4.0	ug/kg	06/28/2019 1501
Isopropylbenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Methyl acetate	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
4-Methyl-2-pentanone	ND		1	10	4.0	ug/kg	06/28/2019 1501
Methylcyclohexane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Methylene chloride	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Naphthalene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Styrene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,1,2,2-Tetrachloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Tetrachloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Toluene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21177-001
Batch: 21177
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,2,4-Trichlorobenzene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,1,1-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
1,1,2-Trichloroethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Trichloroethene	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Trichlorofluoromethane	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
Vinyl chloride	ND		1	5.0	3.0	ug/kg	06/28/2019 1501
Xylenes (total)	ND		1	10	4.0	ug/kg	06/28/2019 1501
m+p - Xylenes	ND		1	5.0	2.0	ug/kg	06/28/2019 1501
o - Xylenes	ND		1	5.0	2.0	ug/kg	06/28/2019 1501

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		103	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21177-002
Batch: 21177
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	96		1	96	60-140	06/28/2019 1342
Benzene	50	49		1	97	70-130	06/28/2019 1342
Bromochloromethane	50	50		1	101	70-130	06/28/2019 1342
Bromodichloromethane	50	50		1	100	70-130	06/28/2019 1342
Bromoform	50	50		1	100	70-130	06/28/2019 1342
Bromomethane (Methyl bromide)	50	47		1	95	70-130	06/28/2019 1342
2-Butanone (MEK)	100	100		1	100	60-140	06/28/2019 1342
Carbon disulfide	50	49		1	98	70-130	06/28/2019 1342
Carbon tetrachloride	50	48		1	96	70-130	06/28/2019 1342
Chlorobenzene	50	49		1	99	70-130	06/28/2019 1342
Chloroethane	50	52		1	104	70-130	06/28/2019 1342
Chloroform	50	49		1	99	70-130	06/28/2019 1342
Chloromethane (Methyl chloride)	50	46		1	91	60-140	06/28/2019 1342
Cyclohexane	50	42		1	85	70-130	06/28/2019 1342
1,2-Dibromo-3-chloropropane (DBCP)	50	48		1	96	70-130	06/28/2019 1342
Dibromochloromethane	50	49		1	98	70-130	06/28/2019 1342
1,2-Dibromoethane (EDB)	50	52		1	103	70-130	06/28/2019 1342
1,2-Dichlorobenzene	50	49		1	99	70-130	06/28/2019 1342
1,3-Dichlorobenzene	50	48		1	97	70-130	06/28/2019 1342
1,4-Dichlorobenzene	50	49		1	98	70-130	06/28/2019 1342
Dichlorodifluoromethane	50	39		1	79	60-140	06/28/2019 1342
1,1-Dichloroethane	50	51		1	102	70-130	06/28/2019 1342
1,2-Dichloroethane	50	50		1	99	70-130	06/28/2019 1342
1,1-Dichloroethene	50	47		1	94	70-130	06/28/2019 1342
cis-1,2-Dichloroethene	50	48		1	97	70-130	06/28/2019 1342
trans-1,2-Dichloroethene	50	49		1	98	70-130	06/28/2019 1342
1,2-Dichloropropane	50	49		1	99	70-130	06/28/2019 1342
cis-1,3-Dichloropropene	50	52		1	103	70-130	06/28/2019 1342
trans-1,3-Dichloropropene	50	52		1	103	70-130	06/28/2019 1342
1,4-Dioxane	500	500		1	101	60-140	06/28/2019 1342
Ethylbenzene	50	49		1	98	70-130	06/28/2019 1342
2-Hexanone	100	99		1	99	70-130	06/28/2019 1342
Isopropylbenzene	50	49		1	97	70-130	06/28/2019 1342
Methyl acetate	50	38		1	77	70-130	06/28/2019 1342
Methyl tertiary butyl ether (MTBE)	50	52		1	103	70-130	06/28/2019 1342
4-Methyl-2-pentanone	100	99		1	99	70-130	06/28/2019 1342
Methylcyclohexane	50	42		1	83	70-130	06/28/2019 1342
Methylene chloride	50	47		1	94	70-130	06/28/2019 1342
Naphthalene	50	51		1	101	70-130	06/28/2019 1342
Styrene	50	50		1	99	70-130	06/28/2019 1342
1,1,2,2-Tetrachloroethane	50	49		1	99	70-130	06/28/2019 1342
Tetrachloroethene	50	48		1	97	70-130	06/28/2019 1342
Toluene	50	48		1	96	70-130	06/28/2019 1342
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	44		1	89	70-130	06/28/2019 1342

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21177-002
Batch: 21177
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	51		1	102	70-130	06/28/2019 1342
1,2,4-Trichlorobenzene	50	50		1	99	70-130	06/28/2019 1342
1,1,1-Trichloroethane	50	49		1	98	70-130	06/28/2019 1342
1,1,2-Trichloroethane	50	50		1	100	70-130	06/28/2019 1342
Trichloroethene	50	48		1	97	70-130	06/28/2019 1342
Trichlorofluoromethane	50	44		1	88	70-130	06/28/2019 1342
Vinyl chloride	50	44		1	88	70-130	06/28/2019 1342
Xylenes (total)	100	98		1	98	70-130	06/28/2019 1342
m+p - Xylenes	50	49		1	98	70-130	06/28/2019 1342
o - Xylenes	50	49		1	98	70-130	06/28/2019 1342

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		91	53-142
Bromofluorobenzene		103	47-138
Toluene-d8		100	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ21177-003
Batch: 21177
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Acetone	100	99		1	99	2.3	60-140	20	06/28/2019 1438
Benzene	50	48		1	95	2.0	70-130	20	06/28/2019 1438
Bromochloromethane	50	48		1	97	3.9	70-130	20	06/28/2019 1438
Bromodichloromethane	50	48		1	96	3.5	70-130	20	06/28/2019 1438
Bromoform	50	48		1	96	4.2	70-130	20	06/28/2019 1438
Bromomethane (Methyl bromide)	50	50		1	100	5.2	70-130	20	06/28/2019 1438
2-Butanone (MEK)	100	94		1	94	5.6	60-140	20	06/28/2019 1438
Carbon disulfide	50	50		1	100	2.6	70-130	20	06/28/2019 1438
Carbon tetrachloride	50	48		1	96	0.71	70-130	20	06/28/2019 1438
Chlorobenzene	50	49		1	97	1.5	70-130	20	06/28/2019 1438
Chloroethane	50	51		1	102	2.2	70-130	20	06/28/2019 1438
Chloroform	50	48		1	96	2.6	70-130	20	06/28/2019 1438
Chloromethane (Methyl chloride)	50	44		1	88	3.7	60-140	20	06/28/2019 1438
Cyclohexane	50	43		1	87	2.5	70-130	20	06/28/2019 1438
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	93	3.0	70-130	20	06/28/2019 1438
Dibromochloromethane	50	48		1	97	0.93	70-130	20	06/28/2019 1438
1,2-Dibromoethane (EDB)	50	49		1	98	4.6	70-130	20	06/28/2019 1438
1,2-Dichlorobenzene	50	50		1	100	1.5	70-130	20	06/28/2019 1438
1,3-Dichlorobenzene	50	51		1	101	4.7	70-130	20	06/28/2019 1438
1,4-Dichlorobenzene	50	50		1	100	2.2	70-130	20	06/28/2019 1438
Dichlorodifluoromethane	50	41		1	82	3.8	60-140	20	06/28/2019 1438
1,1-Dichloroethane	50	50		1	101	1.4	70-130	20	06/28/2019 1438
1,2-Dichloroethane	50	48		1	95	4.0	70-130	20	06/28/2019 1438
1,1-Dichloroethene	50	49		1	97	3.3	70-130	20	06/28/2019 1438
cis-1,2-Dichloroethene	50	48		1	96	1.3	70-130	20	06/28/2019 1438
trans-1,2-Dichloroethene	50	49		1	98	0.32	70-130	20	06/28/2019 1438
1,2-Dichloropropane	50	48		1	96	2.5	70-130	20	06/28/2019 1438
cis-1,3-Dichloropropene	50	50		1	101	2.2	70-130	20	06/28/2019 1438
trans-1,3-Dichloropropene	50	50		1	101	2.2	70-130	20	06/28/2019 1438
1,4-Dioxane	500	500		1	100	0.44	60-140	20	06/28/2019 1438
Ethylbenzene	50	49		1	98	0.64	70-130	20	06/28/2019 1438
2-Hexanone	100	95		1	95	3.6	70-130	20	06/28/2019 1438
Isopropylbenzene	50	49		1	98	0.69	70-130	20	06/28/2019 1438
Methyl acetate	50	35		1	71	8.2	70-130	20	06/28/2019 1438
Methyl tertiary butyl ether (MTBE)	50	50		1	99	4.4	70-130	20	06/28/2019 1438
4-Methyl-2-pentanone	100	91		1	91	9.0	70-130	20	06/28/2019 1438
Methylcyclohexane	50	43		1	86	3.6	70-130	20	06/28/2019 1438
Methylene chloride	50	46		1	93	1.4	70-130	20	06/28/2019 1438
Naphthalene	50	50		1	99	2.4	70-130	20	06/28/2019 1438
Styrene	50	49		1	98	0.71	70-130	20	06/28/2019 1438
1,1,2,2-Tetrachloroethane	50	48		1	95	3.6	70-130	20	06/28/2019 1438
Tetrachloroethene	50	50		1	99	2.8	70-130	20	06/28/2019 1438
Toluene	50	48		1	96	0.34	70-130	20	06/28/2019 1438
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	47		1	94	5.5	70-130	20	06/28/2019 1438

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCSD

Sample ID: UQ21177-003
Batch: 21177
Analytical Method: 8260B

Matrix: Solid
Prep Method: 5035

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
1,2,3-Trichlorobenzene	50	52		1	104	1.6	70-130	20	06/28/2019 1438
1,2,4-Trichlorobenzene	50	52		1	104	5.0	70-130	20	06/28/2019 1438
1,1,1-Trichloroethane	50	48		1	96	1.9	70-130	20	06/28/2019 1438
1,1,2-Trichloroethane	50	48		1	97	3.4	70-130	20	06/28/2019 1438
Trichloroethene	50	48		1	96	0.90	70-130	20	06/28/2019 1438
Trichlorofluoromethane	50	45		1	91	2.4	70-130	20	06/28/2019 1438
Vinyl chloride	50	44		1	87	0.35	70-130	20	06/28/2019 1438
Xylenes (total)	100	99		1	99	0.86	70-130	20	06/28/2019 1438
m+p - Xylenes	50	50		1	100	2.1	70-130	20	06/28/2019 1438
o - Xylenes	50	49		1	98	0.44	70-130	20	06/28/2019 1438

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		90	53-142
Bromofluorobenzene		104	47-138
Toluene-d8		102	68-124

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21480-001
Batch: 21480
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/02/2019 2011
Benzene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Bromoform	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/02/2019 2011
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/02/2019 2011
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Chloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Chloroform	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Cyclohexane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/02/2019 2011
1,4-Dioxane	ND		1	20	13	ug/L	07/02/2019 2011
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
2-Hexanone	ND		1	10	2.0	ug/L	07/02/2019 2011
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Methyl acetate	ND		1	1.0	0.40	ug/L	07/02/2019 2011
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/02/2019 2011
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/02/2019 2011
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/02/2019 2011
Methylene chloride	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Naphthalene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Styrene	ND		1	0.50	0.41	ug/L	07/02/2019 2011
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Toluene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/02/2019 2011

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21480-001
Batch: 21480
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Trichloroethene	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/02/2019 2011
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/02/2019 2011
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/02/2019 2011
o - Xylenes	ND		1	0.50	0.40	ug/L	07/02/2019 2011

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		97	70-130
Bromofluorobenzene		104	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21480-002
Batch: 21480
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	100		1	102	60-140	07/02/2019 1906
Benzene	50	50		1	99	70-130	07/02/2019 1906
Bromochloromethane	50	48		1	97	70-130	07/02/2019 1906
Bromodichloromethane	50	50		1	99	70-130	07/02/2019 1906
Bromoform	50	55		1	110	70-130	07/02/2019 1906
Bromomethane (Methyl bromide)	50	50		1	100	70-130	07/02/2019 1906
2-Butanone (MEK)	100	98		1	98	70-130	07/02/2019 1906
Carbon disulfide	50	49		1	98	70-130	07/02/2019 1906
Carbon tetrachloride	50	49		1	98	70-130	07/02/2019 1906
Chlorobenzene	50	49		1	98	70-130	07/02/2019 1906
Chloroethane	50	52		1	103	70-130	07/02/2019 1906
Chloroform	50	49		1	98	70-130	07/02/2019 1906
Chloromethane (Methyl chloride)	50	47		1	94	60-140	07/02/2019 1906
Cyclohexane	50	48		1	96	70-130	07/02/2019 1906
1,2-Dibromo-3-chloropropane (DBCP)	50	49		1	98	70-130	07/02/2019 1906
Dibromochloromethane	50	51		1	102	70-130	07/02/2019 1906
1,2-Dibromoethane (EDB)	50	51		1	101	70-130	07/02/2019 1906
1,2-Dichlorobenzene	50	48		1	96	70-130	07/02/2019 1906
1,3-Dichlorobenzene	50	47		1	95	70-130	07/02/2019 1906
1,4-Dichlorobenzene	50	48		1	95	70-130	07/02/2019 1906
Dichlorodifluoromethane	50	51		1	102	60-140	07/02/2019 1906
1,1-Dichloroethane	50	50		1	100	70-130	07/02/2019 1906
1,2-Dichloroethane	50	49		1	98	70-130	07/02/2019 1906
1,1-Dichloroethene	50	47		1	93	70-130	07/02/2019 1906
cis-1,2-Dichloroethene	50	48		1	96	70-130	07/02/2019 1906
trans-1,2-Dichloroethene	50	48		1	96	70-130	07/02/2019 1906
1,2-Dichloropropane	50	49		1	98	70-130	07/02/2019 1906
cis-1,3-Dichloropropene	50	50		1	101	70-130	07/02/2019 1906
trans-1,3-Dichloropropene	50	48		1	96	70-130	07/02/2019 1906
1,4-Dioxane	500	430		1	87	60-140	07/02/2019 1906
Ethylbenzene	50	49		1	99	70-130	07/02/2019 1906
2-Hexanone	100	92		1	92	70-130	07/02/2019 1906
Isopropylbenzene	50	50		1	99	70-130	07/02/2019 1906
Methyl acetate	50	40		1	81	70-130	07/02/2019 1906
Methyl tertiary butyl ether (MTBE)	50	52		1	104	70-130	07/02/2019 1906
4-Methyl-2-pentanone	100	97		1	97	70-130	07/02/2019 1906
Methylcyclohexane	50	49		1	97	70-130	07/02/2019 1906
Methylene chloride	50	45		1	90	70-130	07/02/2019 1906
Naphthalene	50	49		1	97	70-130	07/02/2019 1906
Styrene	50	51		1	101	70-130	07/02/2019 1906
1,1,2,2-Tetrachloroethane	50	41		1	81	70-130	07/02/2019 1906
Tetrachloroethene	50	49		1	98	70-130	07/02/2019 1906
Toluene	50	48		1	95	70-130	07/02/2019 1906
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	98	70-130	07/02/2019 1906

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21480-002
Batch: 21480
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	49		1	99	70-130	07/02/2019 1906
1,2,4-Trichlorobenzene	50	49		1	98	70-130	07/02/2019 1906
1,1,1-Trichloroethane	50	48		1	95	70-130	07/02/2019 1906
1,1,2-Trichloroethane	50	49		1	98	70-130	07/02/2019 1906
Trichloroethene	50	54		1	108	70-130	07/02/2019 1906
Trichlorofluoromethane	50	49		1	98	70-130	07/02/2019 1906
Vinyl chloride	50	46		1	92	70-130	07/02/2019 1906
Xylenes (total)	100	98		1	98	70-130	07/02/2019 1906
m+p - Xylenes	50	48		1	96	70-130	07/02/2019 1906
o - Xylenes	50	50		1	99	70-130	07/02/2019 1906

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		94	70-130
Bromofluorobenzene		100	70-130
Toluene-d8		99	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21545-001
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acetone	ND		1	10	2.0	ug/L	07/03/2019 1243
Benzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromochloromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromodichloromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromoform	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Bromomethane (Methyl bromide)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
2-Butanone (MEK)	ND		1	10	2.0	ug/L	07/03/2019 1243
Carbon disulfide	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Carbon tetrachloride	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chloroform	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Chloromethane (Methyl chloride)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Cyclohexane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dibromo-3-chloropropane (DBCP)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Dibromochloromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dibromoethane (EDB)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,3-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,4-Dichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Dichlorodifluoromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1-Dichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1-Dichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
cis-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
trans-1,2-Dichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2-Dichloropropane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
cis-1,3-Dichloropropene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
trans-1,3-Dichloropropene	ND		1	0.50	0.11	ug/L	07/03/2019 1243
1,4-Dioxane	ND		1	20	13	ug/L	07/03/2019 1243
Ethylbenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
2-Hexanone	ND		1	10	2.0	ug/L	07/03/2019 1243
Isopropylbenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Methyl acetate	ND		1	1.0	0.40	ug/L	07/03/2019 1243
Methyl tertiary butyl ether (MTBE)	ND		1	0.50	0.40	ug/L	07/03/2019 1243
4-Methyl-2-pentanone	ND		1	10	2.0	ug/L	07/03/2019 1243
Methylcyclohexane	ND		1	5.0	0.40	ug/L	07/03/2019 1243
Methylene chloride	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Naphthalene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Styrene	ND		1	0.50	0.41	ug/L	07/03/2019 1243
1,1,2,2-Tetrachloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Tetrachloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Toluene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1,2-Trichloro-1,2,2-Trifluoroethane	ND		1	1.0	0.42	ug/L	07/03/2019 1243

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - MB

Sample ID: UQ21545-001
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
1,2,3-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,2,4-Trichlorobenzene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1,1-Trichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
1,1,2-Trichloroethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Trichloroethene	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Trichlorofluoromethane	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Vinyl chloride	ND		1	0.50	0.40	ug/L	07/03/2019 1243
Xylenes (total)	ND		1	1.0	0.40	ug/L	07/03/2019 1243
m+p - Xylenes	ND		1	0.50	0.40	ug/L	07/03/2019 1243
o - Xylenes	ND		1	0.50	0.40	ug/L	07/03/2019 1243

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		92	70-130
Bromofluorobenzene		101	70-130
Toluene-d8		97	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21545-002
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acetone	100	170	N	1	167	60-140	07/03/2019 1141
Benzene	50	47		1	93	70-130	07/03/2019 1141
Bromochloromethane	50	43		1	86	70-130	07/03/2019 1141
Bromodichloromethane	50	46		1	92	70-130	07/03/2019 1141
Bromoform	50	52		1	104	70-130	07/03/2019 1141
Bromomethane (Methyl bromide)	50	46		1	92	70-130	07/03/2019 1141
2-Butanone (MEK)	100	130		1	127	70-130	07/03/2019 1141
Carbon disulfide	50	47		1	95	70-130	07/03/2019 1141
Carbon tetrachloride	50	43		1	86	70-130	07/03/2019 1141
Chlorobenzene	50	48		1	96	70-130	07/03/2019 1141
Chloroethane	50	48		1	95	70-130	07/03/2019 1141
Chloroform	50	42		1	84	70-130	07/03/2019 1141
Chloromethane (Methyl chloride)	50	42		1	84	60-140	07/03/2019 1141
Cyclohexane	50	39		1	78	70-130	07/03/2019 1141
1,2-Dibromo-3-chloropropane (DBCP)	50	47		1	94	70-130	07/03/2019 1141
Dibromochloromethane	50	49		1	98	70-130	07/03/2019 1141
1,2-Dibromoethane (EDB)	50	48		1	96	70-130	07/03/2019 1141
1,2-Dichlorobenzene	50	48		1	96	70-130	07/03/2019 1141
1,3-Dichlorobenzene	50	48		1	95	70-130	07/03/2019 1141
1,4-Dichlorobenzene	50	47		1	95	70-130	07/03/2019 1141
Dichlorodifluoromethane	50	44		1	89	60-140	07/03/2019 1141
1,1-Dichloroethane	50	44		1	88	70-130	07/03/2019 1141
1,2-Dichloroethane	50	45		1	89	70-130	07/03/2019 1141
1,1-Dichloroethene	50	44		1	88	70-130	07/03/2019 1141
cis-1,2-Dichloroethene	50	43		1	85	70-130	07/03/2019 1141
trans-1,2-Dichloroethene	50	43		1	87	70-130	07/03/2019 1141
1,2-Dichloropropane	50	46		1	92	70-130	07/03/2019 1141
cis-1,3-Dichloropropene	50	49		1	98	70-130	07/03/2019 1141
trans-1,3-Dichloropropene	50	48		1	96	70-130	07/03/2019 1141
1,4-Dioxane	500	410		1	81	60-140	07/03/2019 1141
Ethylbenzene	50	49		1	97	70-130	07/03/2019 1141
2-Hexanone	100	110		1	106	70-130	07/03/2019 1141
Isopropylbenzene	50	49		1	98	70-130	07/03/2019 1141
Methyl acetate	50	33	N	1	66	70-130	07/03/2019 1141
Methyl tertiary butyl ether (MTBE)	50	45		1	91	70-130	07/03/2019 1141
4-Methyl-2-pentanone	100	90		1	90	70-130	07/03/2019 1141
Methylcyclohexane	50	47		1	94	70-130	07/03/2019 1141
Methylene chloride	50	44		1	88	70-130	07/03/2019 1141
Naphthalene	50	47		1	94	70-130	07/03/2019 1141
Styrene	50	49		1	99	70-130	07/03/2019 1141
1,1,2,2-Tetrachloroethane	50	46		1	93	70-130	07/03/2019 1141
Tetrachloroethene	50	50		1	100	70-130	07/03/2019 1141
Toluene	50	46		1	92	70-130	07/03/2019 1141
1,1,2-Trichloro-1,2,2-Trifluoroethane	50	49		1	97	70-130	07/03/2019 1141

LOQ = Limit of Quantitation
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LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Volatile Organic Compounds by GC/MS - LCS

Sample ID: UQ21545-002
Batch: 21545
Analytical Method: 8260B

Matrix: Aqueous
Prep Method: 5030B

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
1,2,3-Trichlorobenzene	50	48		1	96	70-130	07/03/2019 1141
1,2,4-Trichlorobenzene	50	49		1	98	70-130	07/03/2019 1141
1,1,1-Trichloroethane	50	43		1	87	70-130	07/03/2019 1141
1,1,2-Trichloroethane	50	46		1	93	70-130	07/03/2019 1141
Trichloroethene	50	47		1	94	70-130	07/03/2019 1141
Trichlorofluoromethane	50	44		1	89	70-130	07/03/2019 1141
Vinyl chloride	50	41		1	81	70-130	07/03/2019 1141
Xylenes (total)	100	95		1	95	70-130	07/03/2019 1141
m+p - Xylenes	50	47		1	95	70-130	07/03/2019 1141
o - Xylenes	50	48		1	96	70-130	07/03/2019 1141

Surrogate	Q	% Rec	Acceptance Limit
1,2-Dichloroethane-d4		89	70-130
Bromofluorobenzene		99	70-130
Toluene-d8		98	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20379-001
Batch: 20379
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 07/02/2019 1820

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	2.7	0.83	ug/kg	07/03/2019 1046
Acenaphthylene	ND		1	2.7	0.95	ug/kg	07/03/2019 1046
Anthracene	ND		1	2.7	0.51	ug/kg	07/03/2019 1046
Benzo(a)anthracene	ND		1	2.7	0.59	ug/kg	07/03/2019 1046
Benzo(a)pyrene	ND		1	2.7	0.66	ug/kg	07/03/2019 1046
Benzo(b)fluoranthene	ND		1	2.7	0.50	ug/kg	07/03/2019 1046
Benzo(g,h,i)perylene	ND		1	2.7	0.65	ug/kg	07/03/2019 1046
Benzo(k)fluoranthene	ND		1	2.7	0.48	ug/kg	07/03/2019 1046
4-Bromophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/03/2019 1046
Butyl benzyl phthalate	ND		1	13	5.0	ug/kg	07/03/2019 1046
Carbazole	ND		1	13	5.0	ug/kg	07/03/2019 1046
bis (2-Chloro-1-methylethyl) ether	ND		1	13	5.0	ug/kg	07/03/2019 1046
4-Chloro-3-methyl phenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
bis(2-Chloroethoxy)methane	ND		1	13	5.0	ug/kg	07/03/2019 1046
bis(2-Chloroethyl)ether	ND		1	13	5.0	ug/kg	07/03/2019 1046
2-Chloronaphthalene	ND		1	13	5.0	ug/kg	07/03/2019 1046
2-Chlorophenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
4-Chlorophenyl phenyl ether	ND		1	13	5.0	ug/kg	07/03/2019 1046
Chrysene	ND		1	2.7	0.45	ug/kg	07/03/2019 1046
Dibenzo(a,h)anthracene	ND		1	2.7	0.51	ug/kg	07/03/2019 1046
Dibenzofuran	ND		1	13	5.0	ug/kg	07/03/2019 1046
1,2-Dichlorobenzene	ND		1	67	25	ug/kg	07/03/2019 1046
1,3-Dichlorobenzene	ND		1	67	25	ug/kg	07/03/2019 1046
1,4-Dichlorobenzene	ND		1	67	25	ug/kg	07/03/2019 1046
3,3'-Dichlorobenzidine	ND		1	13	5.0	ug/kg	07/03/2019 1046
2,4-Dichlorophenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
Diethylphthalate	ND		1	13	5.0	ug/kg	07/03/2019 1046
Dimethyl phthalate	ND		1	13	7.4	ug/kg	07/03/2019 1046
2,4-Dimethylphenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
Di-n-butyl phthalate	ND		1	13	5.0	ug/kg	07/03/2019 1046
4,6-Dinitro-2-methylphenol	ND		1	67	25	ug/kg	07/03/2019 1046
2,4-Dinitrophenol	ND		1	67	25	ug/kg	07/03/2019 1046
2,4-Dinitrotoluene	ND		1	27	10	ug/kg	07/03/2019 1046
2,6-Dinitrotoluene	ND		1	27	10	ug/kg	07/03/2019 1046
Di-n-octylphthalate	ND		1	13	5.0	ug/kg	07/03/2019 1046
bis(2-Ethylhexyl)phthalate	ND		1	67	25	ug/kg	07/03/2019 1046
Fluoranthene	ND		1	2.7	0.42	ug/kg	07/03/2019 1046
Fluorene	ND		1	2.7	0.57	ug/kg	07/03/2019 1046
Hexachlorobenzene	ND		1	13	5.0	ug/kg	07/03/2019 1046
Hexachlorobutadiene	ND		1	13	5.0	ug/kg	07/03/2019 1046
Hexachlorocyclopentadiene	ND		1	67	25	ug/kg	07/03/2019 1046
Hexachloroethane	ND		1	13	5.0	ug/kg	07/03/2019 1046
Indeno(1,2,3-c,d)pyrene	ND		1	2.7	1.0	ug/kg	07/03/2019 1046
Isophorone	ND		1	13	5.0	ug/kg	07/03/2019 1046

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20379-001
Batch: 20379
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 07/02/2019 1820

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	2.7	0.99	ug/kg	07/03/2019 1046
2-Methylphenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
3+4-Methylphenol	ND		1	27	10	ug/kg	07/03/2019 1046
Naphthalene	ND		1	2.7	0.97	ug/kg	07/03/2019 1046
2-Nitroaniline	ND		1	27	10	ug/kg	07/03/2019 1046
3-Nitroaniline	ND		1	27	10	ug/kg	07/03/2019 1046
4-Nitroaniline	ND		1	27	10	ug/kg	07/03/2019 1046
Nitrobenzene	ND		1	13	5.0	ug/kg	07/03/2019 1046
2-Nitrophenol	ND		1	27	10	ug/kg	07/03/2019 1046
4-Nitrophenol	ND		1	67	25	ug/kg	07/03/2019 1046
N-Nitrosodi-n-propylamine	ND		1	13	5.0	ug/kg	07/03/2019 1046
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	13	5.0	ug/kg	07/03/2019 1046
Pentachlorophenol	ND		1	67	25	ug/kg	07/03/2019 1046
Phenanthrene	ND		1	2.7	0.72	ug/kg	07/03/2019 1046
Phenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
Pyrene	ND		1	2.7	0.50	ug/kg	07/03/2019 1046
1,2,4,5-Tetrachlorobenzene	ND		1	33	10	ug/kg	07/03/2019 1046
2,3,4,6-Tetrachlorophenol	ND		1	67	10	ug/kg	07/03/2019 1046
1,2,4-Trichlorobenzene	ND		1	67	25	ug/kg	07/03/2019 1046
2,4,5-Trichlorophenol	ND		1	13	5.0	ug/kg	07/03/2019 1046
2,4,6-Trichlorophenol	ND		1	13	5.0	ug/kg	07/03/2019 1046

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		70	33-102
2-Fluorophenol		64	35-115
Nitrobenzene-d5		64	22-109
Phenol-d5		66	33-122
Terphenyl-d14		78	41-120
2,4,6-Tribromophenol		69	30-117

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20379-002
Batch: 20379
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 07/02/2019 1820

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	130	95		1	71	12-111	07/03/2019 1111
Acenaphthylene	130	100		1	78	44-122	07/03/2019 1111
Anthracene	130	100		1	77	16-122	07/03/2019 1111
Benzo(a)anthracene	130	110		1	85	40-121	07/03/2019 1111
Benzo(a)pyrene	130	110		1	81	36-114	07/03/2019 1111
Benzo(b)fluoranthene	130	110		1	80	38-123	07/03/2019 1111
Benzo(g,h,i)perylene	130	130		1	97	43-120	07/03/2019 1111
Benzo(k)fluoranthene	130	110		1	81	40-126	07/03/2019 1111
4-Bromophenyl phenyl ether	130	99		1	74	30-130	07/03/2019 1111
Butyl benzyl phthalate	130	140		1	106	48-124	07/03/2019 1111
Carbazole	130	110		1	81	47-125	07/03/2019 1111
bis (2-Chloro-1-methylethyl) ether	130	110		1	79	41-113	07/03/2019 1111
4-Chloro-3-methyl phenol	130	110		1	79	48-120	07/03/2019 1111
bis(2-Chloroethoxy)methane	130	95		1	71	38-115	07/03/2019 1111
bis(2-Chloroethyl)ether	130	100		1	76	46-122	07/03/2019 1111
2-Chloronaphthalene	130	97		1	73	37-106	07/03/2019 1111
2-Chlorophenol	130	96		1	72	44-122	07/03/2019 1111
4-Chlorophenyl phenyl ether	130	100		1	76	32-107	07/03/2019 1111
Chrysene	130	110		1	80	41-124	07/03/2019 1111
Dibenzo(a,h)anthracene	130	120		1	92	38-125	07/03/2019 1111
Dibenzofuran	130	100		1	76	45-128	07/03/2019 1111
1,2-Dichlorobenzene	130	94		1	71	39-94	07/03/2019 1111
1,3-Dichlorobenzene	130	89		1	67	30-130	07/03/2019 1111
1,4-Dichlorobenzene	130	88		1	66	39-92	07/03/2019 1111
3,3'-Dichlorobenzidine	130	100		1	77	10-119	07/03/2019 1111
2,4-Dichlorophenol	130	99		1	74	30-96	07/03/2019 1111
Diethylphthalate	130	100		1	77	30-130	07/03/2019 1111
Dimethyl phthalate	130	110		1	80	24-127	07/03/2019 1111
2,4-Dimethylphenol	130	160		1	120	30-130	07/03/2019 1111
Di-n-butyl phthalate	130	110		1	82	35-108	07/03/2019 1111
4,6-Dinitro-2-methylphenol	130	96		1	72	53-150	07/03/2019 1111
2,4-Dinitrophenol	270	180		1	69	32-115	07/03/2019 1111
2,4-Dinitrotoluene	130	110		1	82	40-130	07/03/2019 1111
2,6-Dinitrotoluene	130	100		1	78	46-118	07/03/2019 1111
Di-n-octylphthalate	130	120		1	90	49-118	07/03/2019 1111
bis(2-Ethylhexyl)phthalate	130	120		1	89	33-123	07/03/2019 1111
Fluoranthene	130	110		1	82	26-133	07/03/2019 1111
Fluorene	130	97		1	73	19-108	07/03/2019 1111
Hexachlorobenzene	130	100		1	75	10-125	07/03/2019 1111
Hexachlorobutadiene	130	99		1	75	47-116	07/03/2019 1111
Hexachlorocyclopentadiene	670	530		1	79	48-127	07/03/2019 1111
Hexachloroethane	130	95		1	71	18-154	07/03/2019 1111
Indeno(1,2,3-c,d)pyrene	130	130		1	94	42-123	07/03/2019 1111
Isophorone	130	110		1	79	30-130	07/03/2019 1111

LOQ = Limit of Quantitation
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20379-002
Batch: 20379
Analytical Method: 8270D

Matrix: Solid
Prep Method: 3546
Prep Date: 07/02/2019 1820

Parameter	Spike Amount (ug/kg)	Result (ug/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	130	98		1	74	10-107	07/03/2019 1111
2-Methylphenol	130	110		1	83	33-103	07/03/2019 1111
3+4-Methylphenol	130	130		1	98	18-121	07/03/2019 1111
Naphthalene	130	97		1	73	10-112	07/03/2019 1111
2-Nitroaniline	130	110		1	80	46-128	07/03/2019 1111
3-Nitroaniline	130	75		1	57	30-130	07/03/2019 1111
4-Nitroaniline	130	100		1	76	51-129	07/03/2019 1111
Nitrobenzene	130	99		1	74	49-142	07/03/2019 1111
2-Nitrophenol	130	94		1	71	33-114	07/03/2019 1111
4-Nitrophenol	270	180		1	68	27-138	07/03/2019 1111
N-Nitrosodi-n-propylamine	130	110		1	83	45-112	07/03/2019 1111
N-Nitrosodiphenylamine (Diphenylamine)	130	100		1	78	49-123	07/03/2019 1111
Pentachlorophenol	270	190		1	73	36-108	07/03/2019 1111
Phenanthrene	130	96		1	72	16-123	07/03/2019 1111
Phenol	130	99		1	74	39-108	07/03/2019 1111
Pyrene	130	120		1	87	34-121	07/03/2019 1111
1,2,4,5-Tetrachlorobenzene	130	88		1	67	30-130	07/03/2019 1111
2,3,4,6-Tetrachlorophenol	130	100		1	79	53-125	07/03/2019 1111
1,2,4-Trichlorobenzene	130	95		1	71	30-130	07/03/2019 1111
2,4,5-Trichlorophenol	130	110		1	80	32-105	07/03/2019 1111
2,4,6-Trichlorophenol	130	93		1	70	31-102	07/03/2019 1111

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		75	33-102
2-Fluorophenol		73	35-115
Nitrobenzene-d5		73	22-109
Phenol-d5		73	33-122
Terphenyl-d14		92	41-120
2,4,6-Tribromophenol		78	30-117

LOQ = Limit of Quantitation
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P = The RPD between two GC columns exceeds 40%
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N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20650-001
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Acenaphthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Acenaphthylene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(a)anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(a)pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(b)fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(g,h,i)perylene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Benzo(k)fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
4-Bromophenyl phenyl ether	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Butyl benzyl phthalate	ND		1	4.0	0.21	ug/L	06/28/2019 1218
Carbazole	ND		1	0.80	0.040	ug/L	06/28/2019 1218
bis (2-Chloro-1-methylethyl) ether	ND		1	0.80	0.17	ug/L	06/28/2019 1218
4-Chloro-3-methyl phenol	ND		1	0.80	0.26	ug/L	06/28/2019 1218
bis(2-Chloroethoxy)methane	ND		1	0.80	0.060	ug/L	06/28/2019 1218
bis(2-Chloroethyl)ether	ND		1	0.80	0.16	ug/L	06/28/2019 1218
2-Chloronaphthalene	ND		1	0.80	0.15	ug/L	06/28/2019 1218
2-Chlorophenol	ND		1	0.80	0.15	ug/L	06/28/2019 1218
4-Chlorophenyl phenyl ether	ND		1	0.80	0.16	ug/L	06/28/2019 1218
Chrysene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Dibenzo(a,h)anthracene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Dibenzofuran	ND		1	0.80	0.16	ug/L	06/28/2019 1218
1,2-Dichlorobenzene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
1,3-Dichlorobenzene	ND		1	0.80	0.18	ug/L	06/28/2019 1218
1,4-Dichlorobenzene	ND		1	0.80	0.16	ug/L	06/28/2019 1218
3,3'-Dichlorobenzidine	ND		1	4.0	0.81	ug/L	06/28/2019 1218
2,4-Dichlorophenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
Diethylphthalate	ND		1	4.0	0.19	ug/L	06/28/2019 1218
Dimethyl phthalate	ND		1	4.0	0.18	ug/L	06/28/2019 1218
2,4-Dimethylphenol	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Di-n-butyl phthalate	ND		1	4.0	0.42	ug/L	06/28/2019 1218
4,6-Dinitro-2-methylphenol	ND		1	4.0	0.89	ug/L	06/28/2019 1218
2,4-Dinitrophenol	ND		1	4.0	1.3	ug/L	06/28/2019 1218
2,4-Dinitrotoluene	ND		1	1.6	0.36	ug/L	06/28/2019 1218
2,6-Dinitrotoluene	ND		1	1.6	0.34	ug/L	06/28/2019 1218
Di-n-octylphthalate	ND		1	4.0	0.48	ug/L	06/28/2019 1218
bis(2-Ethylhexyl)phthalate	0.68	J	1	4.0	0.38	ug/L	06/28/2019 1218
Fluoranthene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Fluorene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Hexachlorobenzene	ND		1	0.80	0.15	ug/L	06/28/2019 1218
Hexachlorobutadiene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
Hexachlorocyclopentadiene	ND		1	4.0	1.1	ug/L	06/28/2019 1218
Hexachloroethane	ND		1	0.80	0.17	ug/L	06/28/2019 1218
Indeno(1,2,3-c,d)pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Isophorone	ND		1	0.80	0.22	ug/L	06/28/2019 1218

LOQ = Limit of Quantitation
DL = Detection Limit
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P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - MB

Sample ID: UQ20650-001
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
2-Methylnaphthalene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
2-Methylphenol	ND		1	0.80	0.21	ug/L	06/28/2019 1218
3+4-Methylphenol	ND		1	1.6	0.46	ug/L	06/28/2019 1218
Naphthalene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
2-Nitroaniline	ND		1	1.6	0.66	ug/L	06/28/2019 1218
3-Nitroaniline	ND		1	1.6	0.15	ug/L	06/28/2019 1218
4-Nitroaniline	ND		1	1.6	1.3	ug/L	06/28/2019 1218
Nitrobenzene	ND		1	0.80	0.17	ug/L	06/28/2019 1218
2-Nitrophenol	ND		1	1.6	0.44	ug/L	06/28/2019 1218
4-Nitrophenol	ND		1	4.0	2.1	ug/L	06/28/2019 1218
N-Nitrosodi-n-propylamine	ND		1	0.80	0.28	ug/L	06/28/2019 1218
N-Nitrosodiphenylamine (Diphenylamine)	ND		1	0.80	0.50	ug/L	06/28/2019 1218
Pentachlorophenol	ND		1	4.0	1.3	ug/L	06/28/2019 1218
Phenanthrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
Phenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
Pyrene	ND		1	0.16	0.040	ug/L	06/28/2019 1218
1,2,4,5-Tetrachlorobenzene	ND		1	0.80	0.25	ug/L	06/28/2019 1218
2,3,4,6-Tetrachlorophenol	ND		1	0.80	0.55	ug/L	06/28/2019 1218
1,2,4-Trichlorobenzene	ND		1	0.80	0.37	ug/L	06/28/2019 1218
2,4,5-Trichlorophenol	ND		1	0.80	0.19	ug/L	06/28/2019 1218
2,4,6-Trichlorophenol	ND		1	0.80	0.22	ug/L	06/28/2019 1218

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		38	37-129
2-Fluorophenol		30	24-127
Nitrobenzene-d5		39	38-127
Phenol-d5		33	28-128
Terphenyl-d14		63	10-148
2,4,6-Tribromophenol		43	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20650-002
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Acenaphthene	8.0	4.7		1	58	30-122	06/28/2019 1243
Acenaphthylene	8.0	5.2		1	65	30-130	06/28/2019 1243
Anthracene	8.0	5.4		1	67	30-123	06/28/2019 1243
Benzo(a)anthracene	8.0	5.9		1	74	40-125	06/28/2019 1243
Benzo(a)pyrene	8.0	5.5		1	69	40-128	06/28/2019 1243
Benzo(b)fluoranthene	8.0	5.4		1	67	30-130	06/28/2019 1243
Benzo(g,h,i)perylene	8.0	6.5		1	81	30-130	06/28/2019 1243
Benzo(k)fluoranthene	8.0	5.8		1	73	30-130	06/28/2019 1243
4-Bromophenyl phenyl ether	8.0	5.2		1	65	30-124	06/28/2019 1243
Butyl benzyl phthalate	8.0	6.4		1	80	54-135	06/28/2019 1243
Carbazole	8.0	5.5		1	68	45-101	06/28/2019 1243
bis (2-Chloro-1-methylethyl) ether	8.0	5.9		1	73	42-124	06/28/2019 1243
4-Chloro-3-methyl phenol	8.0	5.2		1	66	30-123	06/28/2019 1243
bis(2-Chloroethoxy)methane	8.0	5.0		1	63	44-127	06/28/2019 1243
bis(2-Chloroethyl)ether	8.0	5.5		1	69	46-120	06/28/2019 1243
2-Chloronaphthalene	8.0	4.6		1	57	46-100	06/28/2019 1243
2-Chlorophenol	8.0	4.6		1	57	50-117	06/28/2019 1243
4-Chlorophenyl phenyl ether	8.0	5.1		1	63	30-121	06/28/2019 1243
Chrysene	8.0	5.7		1	71	30-130	06/28/2019 1243
Dibenzo(a,h)anthracene	8.0	6.2		1	78	30-130	06/28/2019 1243
Dibenzofuran	8.0	5.0		1	63	30-118	06/28/2019 1243
1,2-Dichlorobenzene	8.0	4.2		1	53	32-111	06/28/2019 1243
1,3-Dichlorobenzene	8.0	4.0		1	50	28-110	06/28/2019 1243
1,4-Dichlorobenzene	8.0	4.0		1	51	29-112	06/28/2019 1243
3,3'-Dichlorobenzidine	8.0	4.4		1	55	10-126	06/28/2019 1243
2,4-Dichlorophenol	8.0	4.6		1	58	30-121	06/28/2019 1243
Diethylphthalate	8.0	5.3		1	67	40-125	06/28/2019 1243
Dimethyl phthalate	8.0	5.2		1	65	40-127	06/28/2019 1243
2,4-Dimethylphenol	8.0	5.9		1	74	20-125	06/28/2019 1243
Di-n-butyl phthalate	8.0	5.8		1	73	40-127	06/28/2019 1243
4,6-Dinitro-2-methylphenol	8.0	5.0		1	63	56-128	06/28/2019 1243
2,4-Dinitrophenol	16	6.7		1	42	11-126	06/28/2019 1243
2,4-Dinitrotoluene	8.0	5.6		1	70	59-127	06/28/2019 1243
2,6-Dinitrotoluene	8.0	5.4		1	67	59-126	06/28/2019 1243
Di-n-octylphthalate	8.0	5.3		1	66	50-136	06/28/2019 1243
bis(2-Ethylhexyl)phthalate	8.0	6.3		1	79	56-128	06/28/2019 1243
Fluoranthene	8.0	5.7		1	72	40-128	06/28/2019 1243
Fluorene	8.0	5.0		1	62	30-124	06/28/2019 1243
Hexachlorobenzene	8.0	5.2		1	65	30-125	06/28/2019 1243
Hexachlorobutadiene	8.0	3.8		1	48	24-110	06/28/2019 1243
Hexachlorocyclopentadiene	40	16		1	39	16-96	06/28/2019 1243
Hexachloroethane	8.0	3.8		1	47	31-110	06/28/2019 1243
Indeno(1,2,3-c,d)pyrene	8.0	6.3		1	79	30-130	06/28/2019 1243
Isophorone	8.0	5.4		1	67	57-123	06/28/2019 1243

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
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Semivolatile Organic Compounds by GC/MS - LCS

Sample ID: UQ20650-002
Batch: 20650
Analytical Method: 8270D

Matrix: Aqueous
Prep Method: 3520C
Prep Date: 06/25/2019 1318

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
2-Methylnaphthalene	8.0	4.6		1	58	40-132	06/28/2019 1243
2-Methylphenol	8.0	7.1		1	89	56-119	06/28/2019 1243
3+4-Methylphenol	8.0	5.3		1	66	53-119	06/28/2019 1243
Naphthalene	8.0	4.8		1	60	30-130	06/28/2019 1243
2-Nitroaniline	8.0	5.3		1	67	60-124	06/28/2019 1243
3-Nitroaniline	8.0	4.1		1	51	43-123	06/28/2019 1243
4-Nitroaniline	8.0	5.2		1	65	30-135	06/28/2019 1243
Nitrobenzene	8.0	5.1		1	64	51-122	06/28/2019 1243
2-Nitrophenol	8.0	4.8		1	60	51-118	06/28/2019 1243
4-Nitrophenol	16	9.3		1	58	53-130	06/28/2019 1243
N-Nitrosodi-n-propylamine	8.0	5.7		1	71	54-127	06/28/2019 1243
N-Nitrosodiphenylamine (Diphenylamine)	8.0	5.4		1	68	30-123	06/28/2019 1243
Pentachlorophenol	16	9.4		1	59	42-131	06/28/2019 1243
Phenanthrene	8.0	5.2		1	65	40-123	06/28/2019 1243
Phenol	8.0	5.0		1	63	49-117	06/28/2019 1243
Pyrene	8.0	6.2		1	77	40-126	06/28/2019 1243
1,2,4,5-Tetrachlorobenzene	8.0	3.8		1	48	30-130	06/28/2019 1243
2,3,4,6-Tetrachlorophenol	8.0	5.1		1	64	30-130	06/28/2019 1243
1,2,4-Trichlorobenzene	8.0	4.1		1	51	20-90	06/28/2019 1243
2,4,5-Trichlorophenol	8.0	5.0		1	62	30-123	06/28/2019 1243
2,4,6-Trichlorophenol	8.0	4.9		1	62	30-125	06/28/2019 1243

Surrogate	Q	% Rec	Acceptance Limit
2-Fluorobiphenyl		60	37-129
2-Fluorophenol		48	24-127
Nitrobenzene-d5		64	38-127
Phenol-d5		62	28-128
Terphenyl-d14		86	10-148
2,4,6-Tribromophenol		71	35-144

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
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ND = Not detected at or above the DL

N = Recovery is out of criteria
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Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - MB

Sample ID: UQ20483-001
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	10	10	mg/kg	06/26/2019 1830
C9 - C18 Aliphatics	ND		1	10	10	mg/kg	06/26/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		82	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20483-002
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	40	34		1	86	40-140	06/26/2019 1900
C9 - C18 Aliphatics	30	20		1	68	40-140	06/26/2019 1900

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		78	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20483-003
Batch: 20483
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	40	37		1	92	6.2	40-140	25	06/26/2019 1930
C9 - C18 Aliphatics	30	23		1	76	10	40-140	25	06/26/2019 1930

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		79	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20484-001
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	10	10	mg/kg	06/27/2019 0424

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		83	40-140
2-Fluorobiphenyl (fractionation 1)		83	40-140
o - Terphenyl (aromatic)		74	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20484-002
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	85	64		1	75	40-140	06/27/2019 0453

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		88	40-140
2-Fluorobiphenyl (fractionation 1)		88	40-140
o - Terphenyl (aromatic)		83	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20484-003
Batch: 20484
Analytical Method: Montana EPH

Matrix: Solid
Prep Method: MADEP-EPH-04
Prep Date: 06/24/2019 1110

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	85	63		1	74	0.98	40-140	25	06/27/2019 0523

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		84	40-140
2-Fluorobiphenyl (fractionation 1)		87	40-140
o - Terphenyl (aromatic)		80	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana EPH (aliphatics) - MB

Sample ID: UQ20744-001
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C19 - C36 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012
C9 - C18 Aliphatics	ND		1	100	100	ug/L	07/08/2019 1012

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCS

Sample ID: UQ20744-002
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C19 - C36 Aliphatics	400	260		1	65	40-140	07/08/2019 1042
C9 - C18 Aliphatics	300	140		1	48	40-140	07/08/2019 1042

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		57	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aliphatics) - LCSD

Sample ID: UQ20744-003
Batch: 20744
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C19 - C36 Aliphatics	400	280		1	69	5.9	40-140	25	07/08/2019 1112
C9 - C18 Aliphatics	300	150		1	51	6.4	40-140	25	07/08/2019 1112

Surrogate	Q	% Rec	Acceptance Limit
1-Chloro-octadecane (aliphatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - MB

Sample ID: UQ20745-001
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C11 - C22 Aromatics	ND		1	100	100	ug/L	07/08/2019 2143

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		45	40-140
2-Fluorobiphenyl (fractionation 1)		60	40-140
o - Terphenyl (aromatic)		52	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCS

Sample ID: UQ20745-002
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C11 - C22 Aromatics	850	460		1	54	40-140	07/08/2019 2213

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		48	40-140
2-Fluorobiphenyl (fractionation 1)		65	40-140
o - Terphenyl (aromatic)		58	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana EPH (aromatics) - LCSD

Sample ID: UQ20745-003
Batch: 20745
Analytical Method: Montana EPH

Matrix: Aqueous
Prep Method: Montana EPH
Prep Date: 06/26/2019 946

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C11 - C22 Aromatics	850	410		1	49	10	40-140	25	07/08/2019 2243

Surrogate	Q	% Rec	Acceptance Limit
2-Bromonaphthalene (fractionation 2)		61	40-140
2-Fluorobiphenyl (fractionation 1)		62	40-140
o - Terphenyl (aromatic)		54	40-140

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21144-001
Batch: 21144
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/27/2019 2240
C9 - C12 Aliphatics, Adjusted	ND		1	3.8	0.75	mg/kg	06/27/2019 2240

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21144-002
Batch: 21144
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.3		1	107	70-130	06/27/2019 2120
C9 - C12 Aliphatics, Adjusted	3.8	4.2		1	111	70-130	06/27/2019 2120

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Montana VPH (aliphatics) - LCSD

Sample ID: UQ21144-003
Batch: 21144
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	5.0	5.4		1	108	0.81	70-130	25	06/27/2019 2212
C9 - C12 Aliphatics, Adjusted	3.8	4.1		1	110	0.76	70-130	25	06/27/2019 2212

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21146-001
Batch: 21146
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	8.9	1.8	mg/kg	06/27/2019 2240

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		91	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21146-002
Batch: 21146
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	19	20		1	107	70-130	06/27/2019 2120

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		93	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21146-003
Batch: 21146
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	19	20		1	106	0.50	70-130	25	06/27/2019 2212

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - MB

Sample ID: UQ21206-001
Batch: 21206
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
C5 - C8 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/29/2019 1830
C9 - C12 Aliphatics, Adjusted	ND		1	75	15	ug/L	06/29/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCS

Sample ID: UQ21206-002
Batch: 21206
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	97		1	97	70-130	06/29/2019 1716
C9 - C12 Aliphatics, Adjusted	75	66		1	89	70-130	06/29/2019 1716

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		84	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aliphatics) - LCSD

Sample ID: UQ21206-003
Batch: 21206
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
C5 - C8 Aliphatics, Adjusted	100	110		1	105	7.8	70-130	25	06/29/2019 1745
C9 - C12 Aliphatics, Adjusted	75	73		1	98	10	70-130	25	06/29/2019 1745

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21207-001
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	ND		1	5.0	0.51	ug/L	06/29/2019 1830
C9 - C10 Aromatics	ND		1	25	5.0	ug/L	06/29/2019 1830
Ethylbenzene	ND		1	5.0	0.62	ug/L	06/29/2019 1830
Methyl tertiary butyl ether (MTBE)	ND		1	5.0	1.2	ug/L	06/29/2019 1830
Naphthalene	ND		1	5.0	0.70	ug/L	06/29/2019 1830
Toluene	ND		1	5.0	0.53	ug/L	06/29/2019 1830
m+p - Xylenes	ND		1	5.0	1.2	ug/L	06/29/2019 1830
o - Xylenes	ND		1	5.0	0.58	ug/L	06/29/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		78	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21207-002
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	25	22		1	86	70-130	06/29/2019 1716
C9 - C10 Aromatics	25	23		1	92	70-130	06/29/2019 1716
Ethylbenzene	25	22		1	87	70-130	06/29/2019 1716
Methyl tertiary butyl ether (MTBE)	25	22		1	87	70-130	06/29/2019 1716
Naphthalene	25	20		1	82	70-130	06/29/2019 1716
Toluene	25	22		1	86	70-130	06/29/2019 1716
m+p - Xylenes	50	44		1	88	70-130	06/29/2019 1716
o - Xylenes	25	22		1	89	70-130	06/29/2019 1716

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		80	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21207-003
Batch: 21207
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	25	26		1	102	17	70-130	25	06/29/2019 1745
C9 - C10 Aromatics	25	25		1	99	7.5	70-130	25	06/29/2019 1745
Ethylbenzene	25	25		1	100	15	70-130	25	06/29/2019 1745
Methyl tertiary butyl ether (MTBE)	25	25		1	101	15	70-130	25	06/29/2019 1745
Naphthalene	25	23		1	93	13	70-130	25	06/29/2019 1745
Toluene	25	26		1	102	17	70-130	25	06/29/2019 1745
m+p - Xylenes	50	51		1	102	14	70-130	25	06/29/2019 1745
o - Xylenes	25	25		1	98	9.4	70-130	25	06/29/2019 1745

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		86	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - MB

Sample ID: UQ21208-001
Batch: 21208
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
TPH	ND		1	180	35	ug/L	06/29/2019 1830

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCS

Sample ID: UQ21208-002
Batch: 21208
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
TPH	380	350		1	92	70-130	06/29/2019 1716

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (TPH) - LCSD

Sample ID: UQ21208-003
Batch: 21208
Analytical Method: Montana VPH

Matrix: Aqueous
Prep Method: VPH

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
TPH	380	390		1	104	12	70-130	25	06/29/2019 1745

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (FID)		88	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - MB

Sample ID: UQ21459-001
Batch: 21459
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Benzene	0.15	J	1	0.25	0.034	mg/kg	06/28/2019 1938
C9 - C10 Aromatics	ND		1	1.3	0.50	mg/kg	06/28/2019 1938
Ethylbenzene	ND		1	0.25	0.031	mg/kg	06/28/2019 1938
Methyl tertiary butyl ether (MTBE)	ND		1	0.25	0.054	mg/kg	06/28/2019 1938
Naphthalene	ND		1	0.25	0.13	mg/kg	06/28/2019 1938
Toluene	ND		1	0.25	0.040	mg/kg	06/28/2019 1938
m+p - Xylenes	ND		1	0.25	0.056	mg/kg	06/28/2019 1938
o - Xylenes	ND		1	0.25	0.028	mg/kg	06/28/2019 1938

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		82	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCS

Sample ID: UQ21459-002
Batch: 21459
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Benzene	1.3	1.3		1	104	70-130	06/28/2019 2023
C9 - C10 Aromatics	1.3	1.4		1	112	70-130	06/28/2019 2023
Ethylbenzene	1.3	1.3		1	104	70-130	06/28/2019 2023
Methyl tertiary butyl ether (MTBE)	1.3	1.2		1	96	70-130	06/28/2019 2023
Naphthalene	1.3	1.2		1	96	70-130	06/28/2019 2023
Toluene	1.3	1.3		1	104	70-130	06/28/2019 2023
m+p - Xylenes	2.5	2.7		1	108	70-130	06/28/2019 2023
o - Xylenes	1.3	1.3		1	104	70-130	06/28/2019 2023

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		92	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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Montana VPH (aromatics) - LCSD

Sample ID: UQ21459-003
Batch: 21459
Analytical Method: Montana VPH

Matrix: Solid
Prep Method: VPH

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% RPD	% Rec Limit	% RPD Limit	Analysis Date
Benzene	1.3	1.3		1	104	0.00	70-130	25	06/28/2019 1910
C9 - C10 Aromatics	1.3	1.3		1	104	7.4	70-130	25	06/28/2019 1910
Ethylbenzene	1.3	1.3		1	104	0.00	70-130	25	06/28/2019 1910
Methyl tertiary butyl ether (MTBE)	1.3	1.1		1	88	8.7	70-130	25	06/28/2019 1910
Naphthalene	1.3	1.1		1	88	8.7	70-130	25	06/28/2019 1910
Toluene	1.3	1.3		1	104	0.00	70-130	25	06/28/2019 1910
m+p - Xylenes	2.5	2.6		1	104	3.8	70-130	25	06/28/2019 1910
o - Xylenes	1.3	1.2		1	96	8.0	70-130	25	06/28/2019 1910

Surrogate	Q	% Rec	Acceptance Limit
2,5-Dibromotoluene (PID)		83	70-130

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20446-001
Batch: 20446
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/24/2019 1154

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	0.50	0.20	mg/kg	06/27/2019 1157
Arsenic	ND		1	0.50	0.20	mg/kg	06/27/2019 1157
Barium	ND		1	1.3	0.31	mg/kg	06/27/2019 1157
Beryllium	ND		1	0.10	0.034	mg/kg	06/27/2019 1157
Cadmium	ND		1	0.13	0.025	mg/kg	06/27/2019 1157
Chromium	ND		1	1.3	0.55	mg/kg	06/27/2019 1157
Cobalt	ND		1	1.3	0.30	mg/kg	06/27/2019 1157
Copper	ND		1	1.3	0.33	mg/kg	06/27/2019 1157
Lead	ND		1	0.25	0.068	mg/kg	06/27/2019 1157
Nickel	ND		1	1.3	0.30	mg/kg	06/27/2019 1157
Selenium	ND		1	1.3	0.47	mg/kg	06/27/2019 1157
Silver	ND		1	0.25	0.060	mg/kg	06/27/2019 1157
Vanadium	ND		1	1.3	0.25	mg/kg	06/27/2019 1157
Zinc	ND		1	2.5	0.50	mg/kg	06/27/2019 1157

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - LCS

Sample ID: UQ20446-002
Batch: 20446
Analytical Method: 6020B

Matrix: Solid
Prep Method: 3050B
Prep Date: 06/24/2019 1154

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	50	52		1	104	80-120	06/27/2019 1203
Arsenic	50	53		1	106	80-120	06/27/2019 1203
Barium	50	52		1	104	80-120	06/27/2019 1203
Beryllium	50	56		1	112	80-120	06/27/2019 1203
Cadmium	50	51		1	101	80-120	06/27/2019 1203
Chromium	50	53		1	107	80-120	06/27/2019 1203
Cobalt	50	55		1	110	80-120	06/27/2019 1203
Copper	50	53		1	105	80-120	06/27/2019 1203
Lead	50	53		1	105	80-120	06/27/2019 1203
Nickel	50	52		1	104	80-120	06/27/2019 1203
Selenium	50	48		1	97	80-120	06/27/2019 1203
Silver	50	56		1	111	80-120	06/27/2019 1203
Vanadium	50	55		1	109	80-120	06/27/2019 1203
Zinc	50	49		1	98	80-120	06/27/2019 1203

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

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ICP-MS - MB

Sample ID: UQ20830-001
Batch: 20830
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/26/2019 1925

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Antimony	ND		1	2.0	0.50	ug/L	06/27/2019 1716
Arsenic	ND		1	2.0	1.3	ug/L	06/27/2019 1716
Barium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Beryllium	ND		1	0.40	0.15	ug/L	06/27/2019 1716
Cadmium	ND		1	0.50	0.13	ug/L	06/27/2019 1716
Chromium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Cobalt	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Copper	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Lead	ND		1	1.0	0.25	ug/L	06/27/2019 1716
Nickel	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Selenium	ND		1	5.0	1.3	ug/L	06/27/2019 1716
Silver	ND		1	1.0	0.25	ug/L	06/27/2019 1716
Vanadium	ND		1	5.0	2.5	ug/L	06/27/2019 1716
Zinc	2.8	J	1	10	2.5	ug/L	06/27/2019 1716

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - LCS

Sample ID: UQ20830-002
Batch: 20830
Analytical Method: 6020B

Matrix: Aqueous
Prep Method: 3005A
Prep Date: 06/26/2019 1925

Parameter	Spike Amount (ug/L)	Result (ug/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Antimony	100	100		1	100	80-120	06/27/2019 1722
Arsenic	100	110		1	106	80-120	06/27/2019 1722
Barium	100	100		1	101	80-120	06/27/2019 1722
Beryllium	100	110		1	109	80-120	06/27/2019 1722
Cadmium	100	99		1	99	80-120	06/27/2019 1722
Chromium	100	100		1	102	80-120	06/27/2019 1722
Cobalt	100	100		1	105	80-120	06/27/2019 1722
Copper	100	100		1	104	80-120	06/27/2019 1722
Lead	100	110		1	105	80-120	06/27/2019 1722
Nickel	100	100		1	101	80-120	06/27/2019 1722
Selenium	100	97		1	97	80-120	06/27/2019 1722
Silver	100	110		1	105	80-120	06/27/2019 1722
Vanadium	100	100		1	104	80-120	06/27/2019 1722
Zinc	100	94		1	94	80-120	06/27/2019 1722

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - MB

Sample ID: UQ20452-001
Batch: 20452
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1843

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.083	0.020	mg/kg	06/25/2019 1547

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

ICP-MS - LCS

Sample ID: UQ20452-002
Batch: 20452
Analytical Method: 7471B

Matrix: Solid
Prep Method: 7471B
Prep Date: 06/24/2019 1843

Parameter	Spike Amount (mg/kg)	Result (mg/kg)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.83	0.87		1	104	80-120	06/25/2019 1550

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - MB

Sample ID: UQ20714-001
Batch: 20714
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Result	Q	Dil	LOQ	DL	Units	Analysis Date
Mercury	ND		1	0.00020	0.000091	mg/L	06/27/2019 1355

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

ICP-MS - LCS

Sample ID: UQ20714-002
Batch: 20714
Analytical Method: 7470A

Matrix: Aqueous
Prep Method:
Prep Date: 06/26/2019 1259

Parameter	Spike Amount (mg/L)	Result (mg/L)	Q	Dil	% Rec	% Rec Limit	Analysis Date
Mercury	0.0020	0.0019		1	94	80-120	06/27/2019 1358

LOQ = Limit of Quantitation
DL = Detection Limit
LOD = Limit of Detection

P = The RPD between two GC columns exceeds 40%
J = Estimated result < LOQ and ≥ DL
ND = Not detected at or above the DL

N = Recovery is out of criteria
+ = RPD is out of criteria

Note: Calculations are performed before rounding to avoid round-off errors in calculated results

Shealy Environmental Services, Inc.
106 Vantage Point Drive West Columbia, SC 29172 (803) 791-9700 Fax (803) 791-9111 www.shealylab.com

Chain of Custody
and
Miscellaneous Documents

Chain of Custody Record

SHEALY ENVIRONMENTAL SERVICES, INC.
106 Vantage Point Drive • West Columbia, SC 29172
Telephone No. 803-791-9700 Fax No. 803-791-9111
www.shealylab.com

Number 91649

Client: RAMBOLL US CORP	Report to Contact: MICHAEL WILSON/DAN PRICE	Telephone No. / E-mail: dprice@ramboll.com MWILSON@ramboll.com	Quote No.
Address: 1500 COLLEGE BLVD. #1905	Sampler's Signature: x [signature]	Analysis (Attach list if more space is needed)	Page 1 of 1
City: OVERLAND PARK State: KS Zip Code: 66210	Printed Name: BROOKS BALCOM ANDREW HARDWICK Lit. BORNICK		
Project Name: CMR-RAFM-WEST RAIL			
Project No.: 1690012344-003	P.O. No.		

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	Grab / Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No. of Containers by Preservative Type: Unpres.	HCl	HNO3	ICE	NaOH	ZnAc/NaOH	VOC	SVOC	ESPH	Metals	VPH	Remarks / Cooler I.D.
CMR-WB06-10.0-10.5-190620	6/20/19	1125	G		X		2				4	2	X	X	X	X	X	COOLER 1
CMR-WB06-6.0-6.5-190620	6.20.19	1130	G		X		2				4	2	X	X	X	X	X	COOLER 1
TB-19	—	—	MM	X						2			X					COOLER 1 / TRIP BLANK
CMR-WB06-190620	6.20.19	1545	G	X			2		1	7			X	X	X	X	X	

UF21029
KMN2

Turn Around Time Required (Prior lab approval required for expedited TAT.) ☒ Standard ☐ Rush (Specify)	**Sample Disposal** ☐ Return to Client ☐ Disposal by Lab	**Possible Hazard Identification** ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☒ Unknown	**QC Requirements (Specify)**		
1. Relinquished by [signature]	Date 6.20.19	Time 17:40	1. Received by	Date	Time
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by Fed Ex	Date 6-21-19	Time 1020	4. Laboratory received by [signature]	Date 6-21-19	Time 1020

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on Ice (Circle) (Yes) No Ice Pack — Receipt Temp. 2.4 °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 09-01-2014

SHEALY ENVIRONMENTAL SERVICES, INC.

Shealy Environmental Services, Inc.
Document Number: MED018C-14

Page 1 of 1
Effective Date: 8/2/2018

Sample Receipt Checklist (SRC)

Client: RAMBOLL US CORP. Cooler Inspected by/date: LKH / 06-21-2019 Lot #: UF21029

Means of receipt: ☐ SESI ☐ Client ☐ UPS ☑ FedEx ☐ Other: ____

☑ Yes	☐ No		1. Were custody seals present on the cooler?
☑ Yes	☐ No	☐ NA	2. If custody seals were present, were they intact and unbroken?

pH Strip ID: 18-2225 Chlorine Strip ID: NA Tested by: LKH

Original temperature upon receipt / Derived (Corrected) temperature upon receipt %Solid Snap-Cup ID: NA

2.4 /2.4 °C NA /NA °C NA /NA °C NA /NA °C

Method: ☑ Temperature Blank ☐ Against Bottles IR Gun ID: 6 IR Gun Correction Factor: 0 °C

Method of coolant: ☑ Wet Ice ☐ Ice Packs ☐ Dry Ice ☐ None

☐ Yes	☐ No	☑ NA	3. If temperature of any cooler exceeded 6.0°C, was Project Manager Notified? PM was Notified by: phone / email / face-to-face (circle one).
☑ Yes	☐ No	☐ NA	4. Is the commercial courier's packing slip attached to this form?
☑ Yes	☐ No		5. Were proper custody procedures (relinquished/received) followed?
☑ Yes	☐ No		6. Were sample IDs listed on the COC?
☑ Yes	☐ No		7. Were sample IDs listed on all sample containers?
☑ Yes	☐ No		8. Was collection date & time listed on the COC?
☑ Yes	☐ No		9. Was collection date & time listed on all sample containers?
☑ Yes	☐ No		10. Did all container label information (ID, date, time) agree with the COC?
☑ Yes	☐ No		11. Were tests to be performed listed on the COC?
☑ Yes	☐ No		12. Did all samples arrive in the proper containers for each test and/or in good condition (unbroken, lids on, etc.)?
☑ Yes	☐ No		13. Was adequate sample volume available?
☑ Yes	☐ No		14. Were all samples received within ½ the holding time or 48 hours, whichever comes first?
☐ Yes	☑ No		15. Were any samples containers missing/excess (circle one) samples Not listed on COC?
☐ Yes	☑ No	☐ NA	16. For VOA and RSK-175 samples, were bubbles present >"pea-size" (¼"or 6mm in diameter) in any of the VOA vials?
☑ Yes	☐ No	☐ NA	17. Were all DRO/metals/nutrient samples received at a pH of < 2?
☐ Yes	☐ No	☑ NA	18. Were all cyanide samples received at a pH > 12 and sulfide samples received at a pH > 9?
☐ Yes	☐ No	☑ NA	19. Were all applicable NH_3/TKN/cyanide/phenol/625 (< 0.5mg/L) samples free of residual chlorine?
☐ Yes	☐ No	☑ NA	20. Were client remarks/requests (i.e. requested dilutions, MS/MSD designations, etc…) correctly transcribed from the COC into the comment section in LIMS?
☐ Yes	☑ No		21. Was the quote number listed on the container label? If yes, Quote # NA

Sample Preservation (Must be completed for any sample(s) incorrectly preserved or with headspace.)

Sample(s) NA were received incorrectly preserved and were adjusted accordingly in sample receiving with NA mL of circle one: H_2SO_4, HNO_3, HCl, NaOH using SR # NA.
Time of preservation NA. If more than one preservative is needed, please note in the comments below.

Sample(s) NA were received with bubbles >6 mm in diameter.

Samples(s) NA were received with TRC > 0.5 mg/L (If #19 is ***no***) and were adjusted accordingly in sample receiving with sodium thiosulfate ($Na_2S_2O_3$) with Shealy ID: NA.

SR barcode labels applied by: LKH Date: 06-21-2019

Comments:

Petroleum Services Division
3437 Landco Dr.
Bakersfield, California 93308
Tel: 661-325-5657
Fax: 661-325-5808
www.corelab.com

August 29, 2019

Michael Wilson
Ramboll US Corporation
7500 College Blvd, Suite 925
Overland Park, KS 66210

Subject: Physical Properties Analysis
Project: CMR RIAIM - EAST/WEST RAIL
CL File No: 1901843

Dear Mr.Wilson:

The attached file presents the final physical properties determination results for the samples submitted from your Project CMR RIAIM - EAST/WEST RAIL.

Appropriate ASTM, EPA or API methodologies were used for this project and SOP's are available on request. The samples for this project are currently in storage and will be retained for thirty days past completion of testing at no charge. At the end of thirty days, the samples will be disposed. You may contact me regarding continued storage, disoposal, or return of the samples.

Thank you for this opportunity to be of service to Ramboll US Corporation. Please do not hesitate to contact us at (661-325-5657) if you have any questions regarding these results or if we can be of any additional service.

Sincerely,
Core Laboratories

Eva Lopez
Core Analyst

Physical Properties Data

Petroleum Services

Ramboll US Corporation

Core Lab File No.: 1901843

Project Name: CMR RIAIM - EAST/WEST RAIL

Project Number: 1690012344 221

		METHODS:	ASTM D2216		ASTM D2937	API RP40		Walkley-Black	
Sample ID.	Depth ft.	Sample [1] Orientation	Moisture Content %	Moisture Content ml/ml	Dry Bulk Density g/cc	Porosity Total [2] %Vb [4]	Porosity Air Filled [3] %Vb [4]	Total Organic Carbon mg/kg	Fractional Organic Carbon g/g
CMR-EB06-4.0-5.0-190516	4.0-5.0	V	16.6	0.305	1.84	31.1	0.568	11100	1.11E-02
CMR-EB11-2.0-2.5-190520	2.0-2.5	V	28.9	0.405	1.40	44.8	4.32	78000	7.80E-02
CMR-EB11-2.5-3.0-190520	2.5-3.0	V	20.7	0.346	1.67	36.1	1.51	40600	4.06E-02
CMR-EB04-7.5-10.0-190613-GT	7.5-10.0	V	17.0	0.297	1.75	33.2	3.50	11300	1.13E-02
CMR-WB06-9.0-11.5-190620-GT	9.0-11.5	V	22.0	0.346	1.57	40.0	5.48	3500	3.50E-03
CMR-EB07(DEEP)-17.0-18.0-190611-GT	17.0-18.0	V	9.64	0.187	1.94	28.8	10.1	6800	6.80E-03
CMR-EB11-22.5-23.5-190611-GT	22.5-23.5	V	12.0	0.211	1.76	35.5	14.3	11600	1.16E-02
CMR-WB13-2.0-4.5-190618-GT	2.0-4.5	V	12.5	0.248	1.99	26.9	2.03	6900	6.90E-03
CMR-WB09-5.0-7.5-190617-GT	5.0-7.5	V	10.0	0.206	2.05	23.5	2.90	7100	7.10E-03
CMR-WB08-5.0-7.0-190617-GT	5.0-7.0	V	13.3	0.262	1.97	27.4	1.12	5500	5.50E-03
CMR-WB04S-8.0-10.0-190620-GT	8.0-10.0	V	10.0	0.204	2.03	25.4	5.04	4500	4.50E-03
CMR-WB10-2.5-5.0-19621-GT	2.5-5.0	V	11.7	0.236	2.01	25.6	1.96	6700	6.70E-03
CMR-WB11S-2.5-5.0-190621-GT	2.5-5.0	V	9.27	0.191	2.06	23.9	4.84	4900	4.90E-03
CMR-WB01S-8.0-10.5-190622-GT	8.0-10.5	V	17.6	0.309	1.75	33.2	2.32	5800	5.80E-03
CMR-WB02S-8.5-11.0-190622-GT	8.5-11.0	V	13.5	0.262	1.94	28.7	2.44	10200	1.02E-02

Physical Properties Data

Petroleum Services

Ramboll US Corporation

Core Lab File No.: 1901843

Project Name: CMR RIAIM - EAST/WEST RAIL

Project Number: 1690012344 221

		METHODS:	ASTM D2216		ASTM D2937	API RP40		Walkley-Black	
Sample ID.	Depth ft.	Sample [1] Orientation	Moisture Content %	Moisture Content ml/ml	Dry Bulk Density g/cc	Porosity Total [2] %Vb [4]	Porosity Air Filled [3] %Vb [4]	Total Organic Carbon mg/kg	Fractional Organic Carbon g/g
CMR-WB14S-5.0-7.0-190625-GT	5.0-7.0	V	9.17	0.188	2.06	24.0	5.16	3700	3.70E-03
CMR-WB03-8.0-11.5-190622-GT	8.0-11.5	V	13.6	0.264	1.94	28.2	1.79	4900	4.90E-03

(1) Sample Orientation: H = horizontal; V = vertical.

(2) Total Porosity = no pore fluids in place; all interconnected pore channels.

(3) Air Filled Porosity= pore channels not occupied by pore fluids.

(4) Vb = Bulk Volume, cc.

VISCOSITY and DENSITY DATA

(METHODOLOGY: ASTM D445, ASTM D1481, API RP40)

PETROLEUM SERVICES

Ramboll US Corporation

Core Lab File No.: 1901843

Project Name: CMR RIAIM - EAST/WEST RAIL

Project Number: 1690012344 221

Sample ID	Matrix	Sample Date	Analysis Date	Temperature °F	Density g/cc	Viscosity	
						centistokes	centipoise
CMR-MW101-190703	NAPL	7/3/19	7/16/19	60	0.8625	7.72	6.66
				80	0.8545	5.67	4.85
				100	0.8466	4.34	3.68
CMR-MW101-190703	Water	7/3/19	7/16/19	60	1.0047	1.26	1.27
				80	0.9979	1.01	1.00
				100	0.9911	0.82	0.82
CMR-MW75-190801	NAPL	8/1/19	8/15/19	60	0.8412	5.83	4.91
				80	0.8333	4.32	3.60
				100	0.8245	3.33	2.75
CMR-MW75-190801	Water	8/1/19	8/15/19	60	1.0018	1.27	1.28
				80	0.9950	1.01	1.00
				100	0.9882	0.81	0.81

Interfacial Tension

(METHODOLOGY: ASTM D971)

PETROLEUM SERVICES

Ramboll US Corporation

Core Lab File No.: 1901843

Project Name: CMR RIAIM - EAST/WEST RAIL

Project Number: 1690012344 221

Sample	Temperature	Density of NAPL	Surface Tension	Interfacial Tension	Surface Tension
			Air/Water	NAPL/Water[1,2]	Air/NAPL
ID.	°F	gm/ml	dynes/cm	dynes/cm	dynes/cm
CMR-MW101-190703	60	0.863	70.4	13.4	27.1
CMR-MW75-190801	60	0.841	72.8	14.9	27.3

(1) NAPL over Water

(2) Field Water

Core Lab
RESERVOIR OPTIMIZATION

MECHANICAL SIEVE PARTICLE SIZE SUMMARY

Petroleum Services

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Date: 7/23/2019

Sample ID	Grain Size Description** (Mean from Folk)	Median Grain Size, in	Component Percentages								
			Gravel	Sand Size					C. Silt	M. Silt to Clay	Silt & Clay
				VCoarse	Coarse	Medium	Fine	VFine			
CMR-EB06-4.0-5.0-190516	Medium Grain Sand	0.0096	23.39	1.54	4.51	12.81	26.40	13.37	6.79	11.18	17.97
CMR-EB11-2.0-2.5-190520	Fine Grain Sand	0.0120	4.41	4.57	18.36	22.93	17.72	5.98	6.77	19.27	26.03
CMR-EB11-2.5-3.0-190520	Fine Grain Sand	0.0064	0.10	1.04	2.48	16.46	41.52	18.34	9.35	10.70	20.05
CMR-EB04-7.5-10.0-190613-GT	Fine Grain Sand	0.0070	0.00	0.12	0.06	9.82	59.86	15.58	4.51	10.06	14.56
CMR-WB06-9.0-11.5-190620-GT	Fine Grain Sand	0.0079	0.00	0.00	0.08	8.50	77.81	6.49	3.10	4.02	7.12
CMR-EB07(DEEP)-17.0-18.0-190611-GT	Silt	0.0023	0.00	0.00	0.05	0.96	31.96	15.45	11.41	40.17	51.58
CMR-EB11-22.5-23.5-190611-GT	Fine Grain Sand	0.0092	0.00	0.00	0.32	38.37	31.50	7.57	8.92	13.32	22.24
CMR-WB13-2.0-4.5-190618-GT	Very Fine Grain Sand	0.0049	0.00	0.00	0.17	1.47	48.04	24.04	7.14	19.15	26.29
CMR-WB09-5.0-7.5-190617-GT	Very Fine Grain Sand	0.0058	0.00	0.00	0.08	5.11	49.64	7.43	14.47	23.27	37.75
CMR-WB08-5.0-7.0-190617-GT	Very Fine Grain Sand	0.0060	0.00	0.00	0.06	3.37	58.61	10.76	4.02	23.19	27.21
CMR-WB04S-8.0-10.0-190620-GT	Very Fine Grain Sand	0.0053	0.00	0.00	0.03	2.52	52.45	16.10	13.69	15.21	28.91
CMR-WB10-2.5-5.0-19621-GT	Very Fine Grain Sand	0.0039	0.00	0.00	0.04	0.42	35.53	24.43	4.24	35.35	39.59
CMR-WB11S-2.5-5.0-190621-GT	Very Fine Grain Sand	0.0040	0.00	0.00	0.17	4.61	34.36	19.37	19.89	21.60	41.49
CMR-WB01S-8.0-10.5-190622-GT	Fine Grain Sand	0.0089	0.00	0.00	0.10	24.13	53.40	3.78	1.03	17.56	18.60
CMR-WB02S-8.5-11.0-190622-GT	Very Fine Grain Sand	0.0055	2.71	0.47	2.24	15.81	34.24	11.58	15.03	17.92	32.95

**Wentworth Scale

MECHANICAL SIEVE PARTICLE SIZE SUMMARY

Petroleum Services

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Date: 7/23/2019

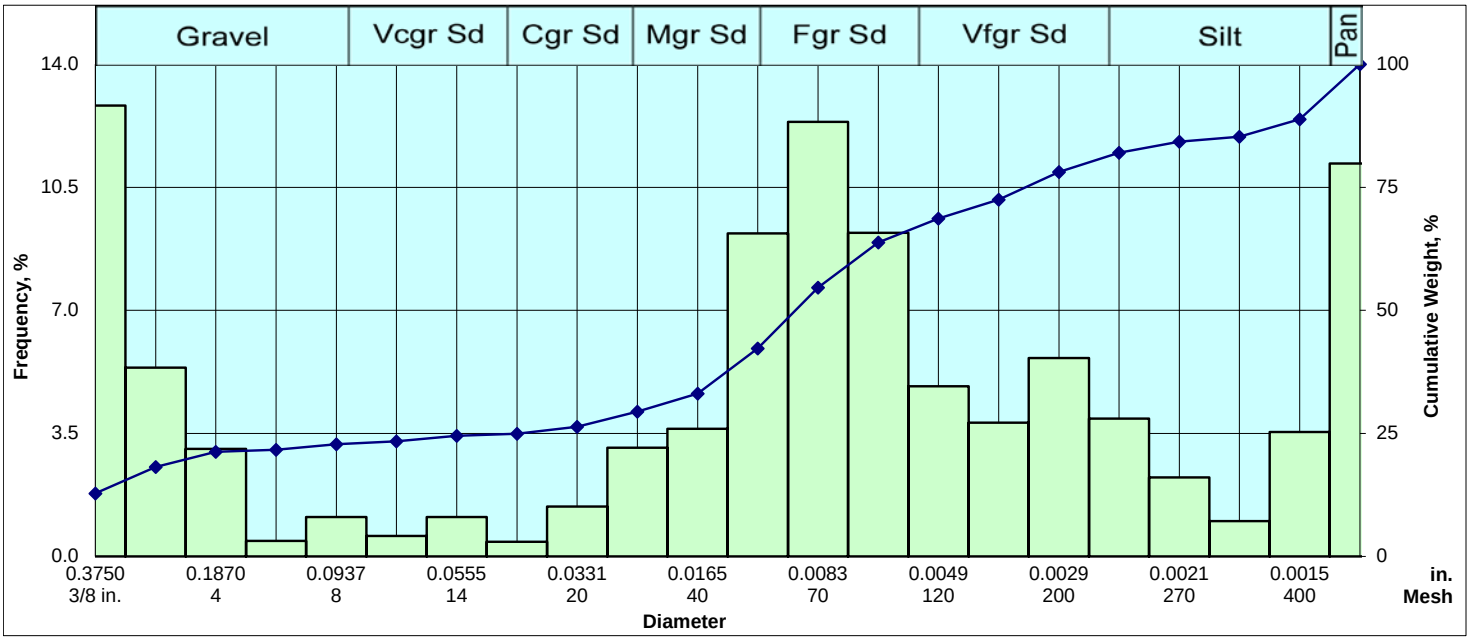
Sample ID	Grain Size Description** (Mean from Folk)	Median Grain Size, in	Component Percentages								
			Gravel	Sand Size					C. Silt	M. Silt to Clay	Silt & Clay
				VCoarse	Coarse	Medium	Fine	VFine			
CMR-WB14S-5.0-7.0-190625-GT	Silt	0.0014	0.00	0.00	0.12	0.75	21.14	18.00	6.62	53.37	59.99
CMR-WB03-8.0-11.5-190622-GT	Very Fine Grain Sand	0.0063	2.22	0.47	3.43	19.88	31.96	8.86	11.60	21.57	33.18

**Wentworth Scale

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-EB06-4.0-5.0-190516

Mechanical Sieve Particle Size Analysis



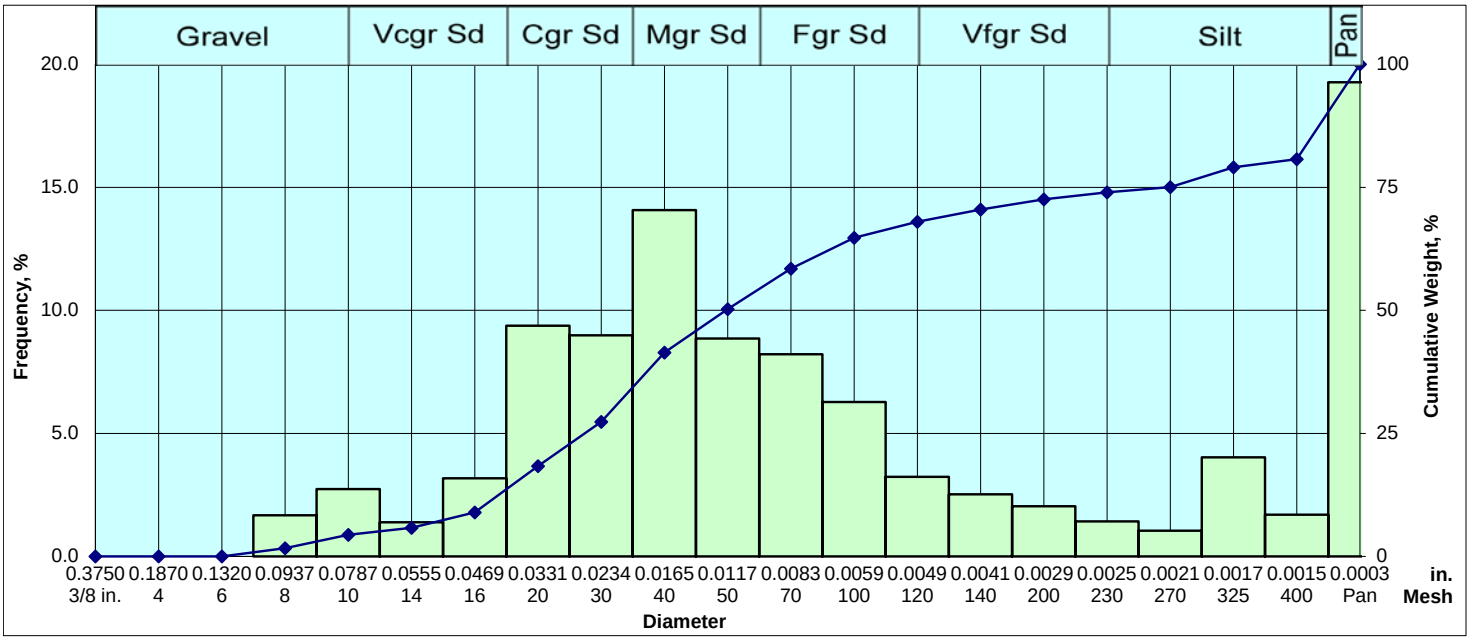
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	12.822	12.822
	1/4 in.	0.2500	6.3500	-2.67	5.366	18.188
	4	0.1870	4.7500	-2.25	3.061	21.250
	6	0.1320	3.3500	-1.75	0.438	21.688
	8	0.0937	2.3600	-1.25	1.123	22.811
	10	0.0787	2.0000	-1.00	0.583	23.393
Very Coarse Sand	14	0.0555	1.4100	-0.50	1.123	24.516
	16	0.0469	1.1800	-0.25	0.417	24.933
Coarse Sand	20	0.0331	0.8500	0.25	1.420	26.353
	30	0.0234	0.6000	0.75	3.090	29.444
Medium Sand	40	0.0165	0.4250	1.25	3.627	33.071
	50	0.0117	0.3000	1.75	9.184	42.255
Fine Sand	70	0.0083	0.2120	2.25	12.360	54.615
	100	0.0059	0.1500	2.75	9.203	63.818
	120	0.0049	0.1250	3.00	4.839	68.657
Very Fine Sand	140	0.0041	0.1060	3.25	3.806	72.463
	200	0.0029	0.0750	3.75	5.647	78.110
	230	0.0025	0.0630	4.00	3.919	82.029
Coarse Silt	270	0.0021	0.0530	4.25	2.247	84.275
	325	0.0017	0.0450	4.50	1.007	85.283
	400	0.0015	0.0380	4.75	3.539	88.822
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	11.178	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0096	0.0096	0.0096
(mm)	0.2449	0.2449	0.2449
Mean	Medium sand sized		
(in)	0.0247	0.0253	0.0184
(mm)	0.6283	0.6434	0.4663
Sorting	Very poor		
	3.556	3.569	3.193
Skewness	Strongly coarse skewed		
	1.337	-0.391	-0.316
Kurtosis	Mesokurtic		
	0.049	0.302	1.041
Percentile	[in.]	[mm]	[phi]
5	0.5271	13.3891	-3.7430
10	0.4293	10.9032	-3.4467
16	0.3006	7.6346	-2.9326
25	0.0458	1.1645	-0.2197
50	0.0096	0.2449	2.0300
75	0.0036	0.0921	3.4411
84	0.0021	0.0542	4.2049
90	0.0014	0.0348	4.8440
95	0.0008	0.0213	5.5524

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-EB11-2.0-2.5-190520

Mechanical Sieve Particle Size Analysis



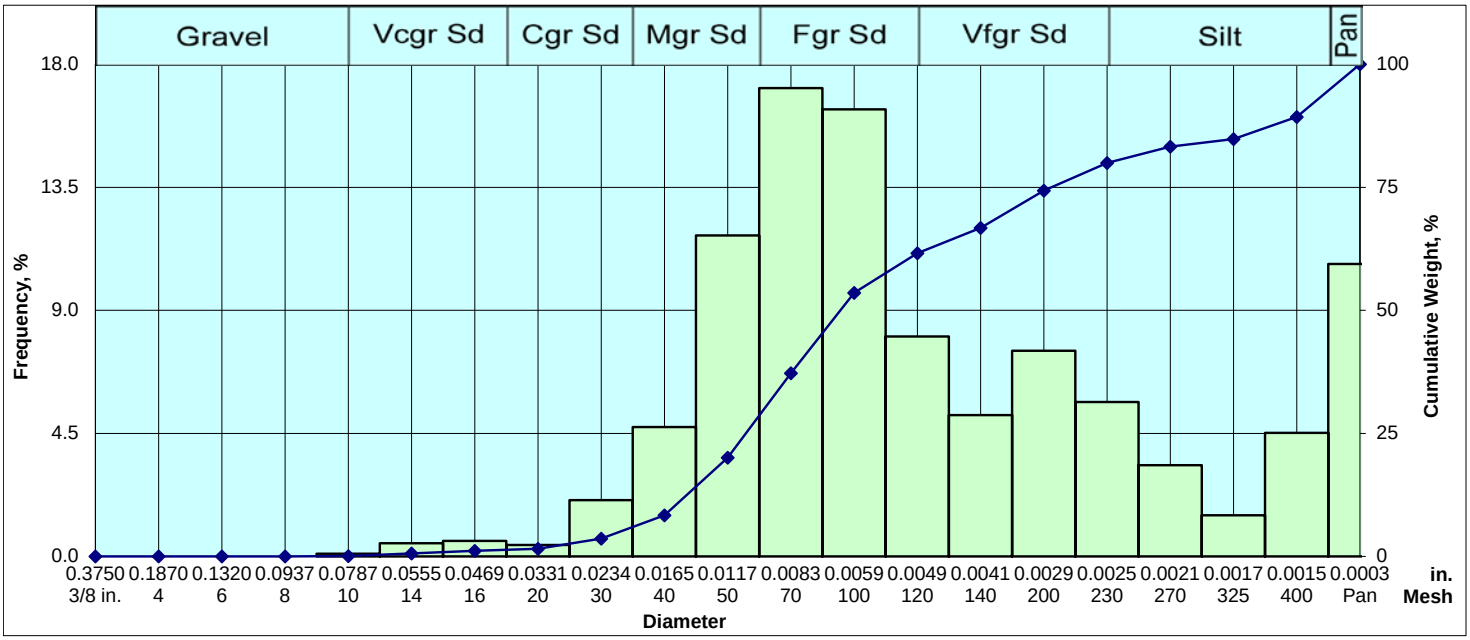
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	1.671	1.671
	10	0.0787	2.0000	-1.00	2.737	4.408
Very Coarse Sand	14	0.0555	1.4100	-0.50	1.388	5.796
	16	0.0469	1.1800	-0.25	3.179	8.975
Coarse Sand	20	0.0331	0.8500	0.25	9.378	18.353
	30	0.0234	0.6000	0.75	8.980	27.333
Medium Sand	40	0.0165	0.4250	1.25	14.070	41.403
	50	0.0117	0.3000	1.75	8.855	50.259
Fine Sand	70	0.0083	0.2120	2.25	8.218	58.477
	100	0.0059	0.1500	2.75	6.272	64.749
	120	0.0049	0.1250	3.00	3.235	67.983
Very Fine Sand	140	0.0041	0.1060	3.25	2.523	70.506
	200	0.0029	0.0750	3.75	2.041	72.547
	230	0.0025	0.0630	4.00	1.418	73.965
Coarse Silt	270	0.0021	0.0530	4.25	1.049	75.014
	325	0.0017	0.0450	4.50	4.022	79.035
	400	0.0015	0.0380	4.75	1.697	80.732
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	19.268	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Medium sand sized		
(in)	0.0120	0.0120	0.0120
(mm)	0.3037	0.3037	0.3037
Mean	Fine sand sized		
(in)	0.0141	0.0069	0.0083
(mm)	0.3590	0.1751	0.2104
Sorting	Very poor		
	3.538	2.413	2.237
Skewness	Finely skewed		
	0.619	0.329	0.294
Kurtosis	Platykurtic		
	0.273	0.409	0.765
Percentile	[in.]	[mm]	[phi]
5	0.0687	1.7441	-0.8025
10	0.0450	1.1439	-0.1940
16	0.0367	0.9328	0.1004
25	0.0262	0.6650	0.5887
50	0.0120	0.3037	1.7195
75	0.0021	0.0531	4.2343
84	0.0013	0.0329	4.9267
90	0.0009	0.0235	5.4128
95	0.0006	0.0156	5.9989

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-EB11-2.5-3.0-190520

Mechanical Sieve Particle Size Analysis



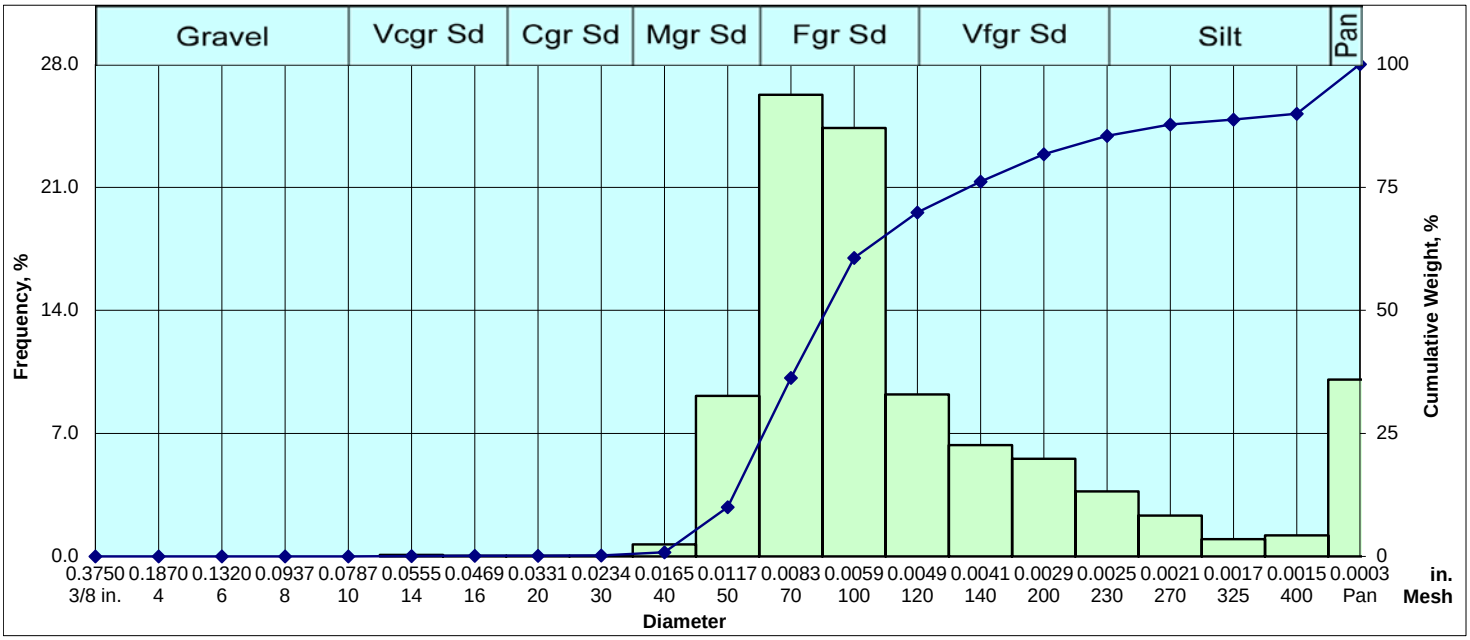
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.103	0.103
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.478	0.581
	16	0.0469	1.1800	-0.25	0.566	1.147
Coarse Sand	20	0.0331	0.8500	0.25	0.419	1.566
	30	0.0234	0.6000	0.75	2.062	3.628
Medium Sand	40	0.0165	0.4250	1.25	4.726	8.355
	50	0.0117	0.3000	1.75	11.736	20.091
Fine Sand	70	0.0083	0.2120	2.25	17.129	37.220
	100	0.0059	0.1500	2.75	16.355	53.574
	120	0.0049	0.1250	3.00	8.038	61.613
Very Fine Sand	140	0.0041	0.1060	3.25	5.169	66.782
	200	0.0029	0.0750	3.75	7.519	74.301
	230	0.0025	0.0630	4.00	5.650	79.950
Coarse Silt	270	0.0021	0.0530	4.25	3.333	83.283
	325	0.0017	0.0450	4.50	1.502	84.785
	400	0.0015	0.0380	4.75	4.518	89.303
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	10.697	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0064	0.0064	0.0064
(mm)	0.1636	0.1636	0.1636
Mean	Fine sand sized		
(in)	0.0069	0.0051	0.0055
(mm)	0.1741	0.1300	0.1403
Sorting	Poor		
	1.933	1.402	1.405
Skewness	Finely skewed		
	0.869	0.236	0.242
Kurtosis	Mesokurtic		
	0.271	0.657	1.001
Percentile	[in.]	[mm]	[phi]
5	0.0216	0.5492	0.8646
10	0.0160	0.4075	1.2952
16	0.0135	0.3436	1.5413
25	0.0108	0.2748	1.8637
50	0.0064	0.1636	2.6122
75	0.0029	0.0735	3.7658
84	0.0019	0.0492	4.3458
90	0.0014	0.0360	4.7946
95	0.0009	0.0219	5.5119

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-EB04-7.5-10.0-190613-GT

Mechanical Sieve Particle Size Analysis



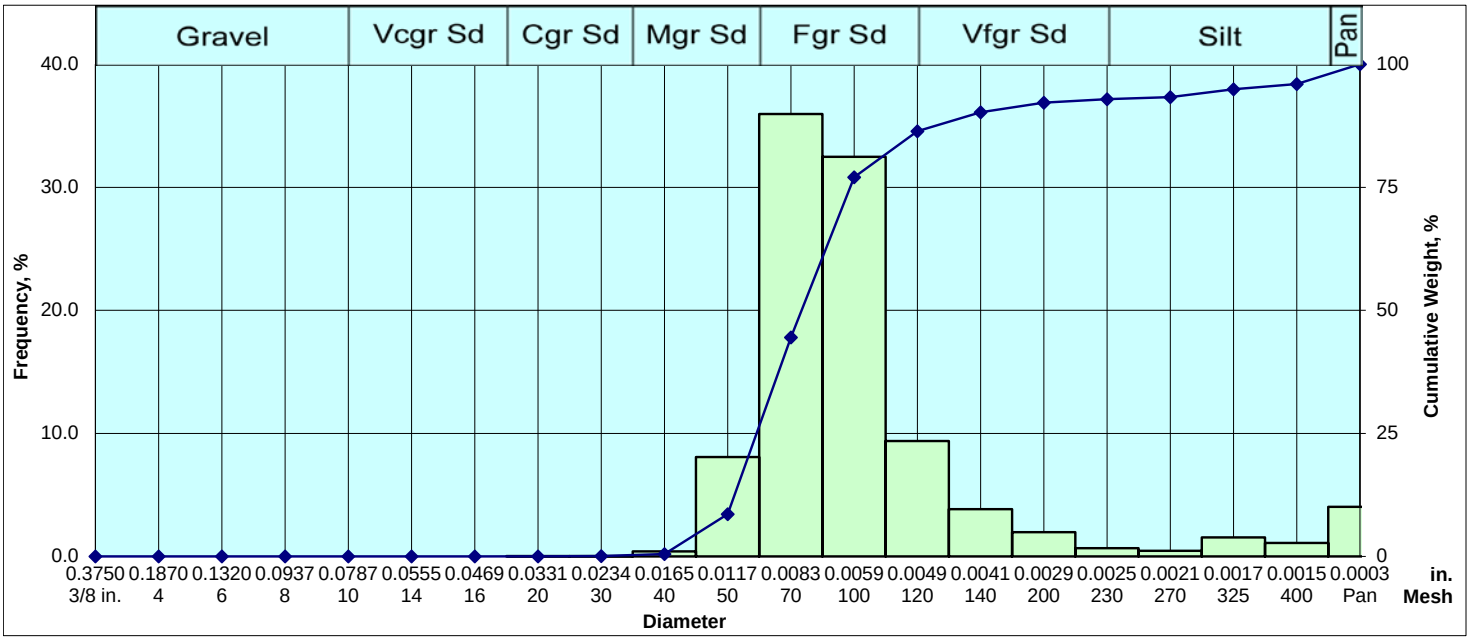
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.090	0.090
	16	0.0469	1.1800	-0.25	0.030	0.119
Coarse Sand	20	0.0331	0.8500	0.25	0.030	0.149
	30	0.0234	0.6000	0.75	0.030	0.179
Medium Sand	40	0.0165	0.4250	1.25	0.686	0.865
	50	0.0117	0.3000	1.75	9.132	9.997
Fine Sand	70	0.0083	0.2120	2.25	26.261	36.258
	100	0.0059	0.1500	2.75	24.381	60.639
	120	0.0049	0.1250	3.00	9.221	69.860
Very Fine Sand	140	0.0041	0.1060	3.25	6.326	76.186
	200	0.0029	0.0750	3.75	5.551	81.737
	230	0.0025	0.0630	4.00	3.700	85.437
Coarse Silt	270	0.0021	0.0530	4.25	2.328	87.765
	325	0.0017	0.0450	4.50	0.985	88.750
	400	0.0015	0.0380	4.75	1.194	89.943
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	10.057	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0070	0.0070	0.0070
(mm)	0.1771	0.1771	0.1771
Mean	Fine sand sized		
(in)	0.0071	0.0054	0.0059
(mm)	0.1796	0.1376	0.1497
Sorting	Poor		
	1.510	1.024	1.120
Skewness	Strongly fine skewed		
	0.934	0.355	0.414
Kurtosis	Lepokurtic		
	0.267	0.959	1.384
Percentile	[in.]	[mm]	[phi]
5	0.0145	0.3684	1.4406
10	0.0118	0.3000	1.7370
16	0.0110	0.2799	1.8371
25	0.0098	0.2497	2.0016
50	0.0070	0.1771	2.4977
75	0.0043	0.1096	3.1902
84	0.0027	0.0677	3.8855
90	0.0015	0.0378	4.7243
95	0.0009	0.0228	5.4539

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB06-9.0-11.5-190620-GT

Mechanical Sieve Particle Size Analysis



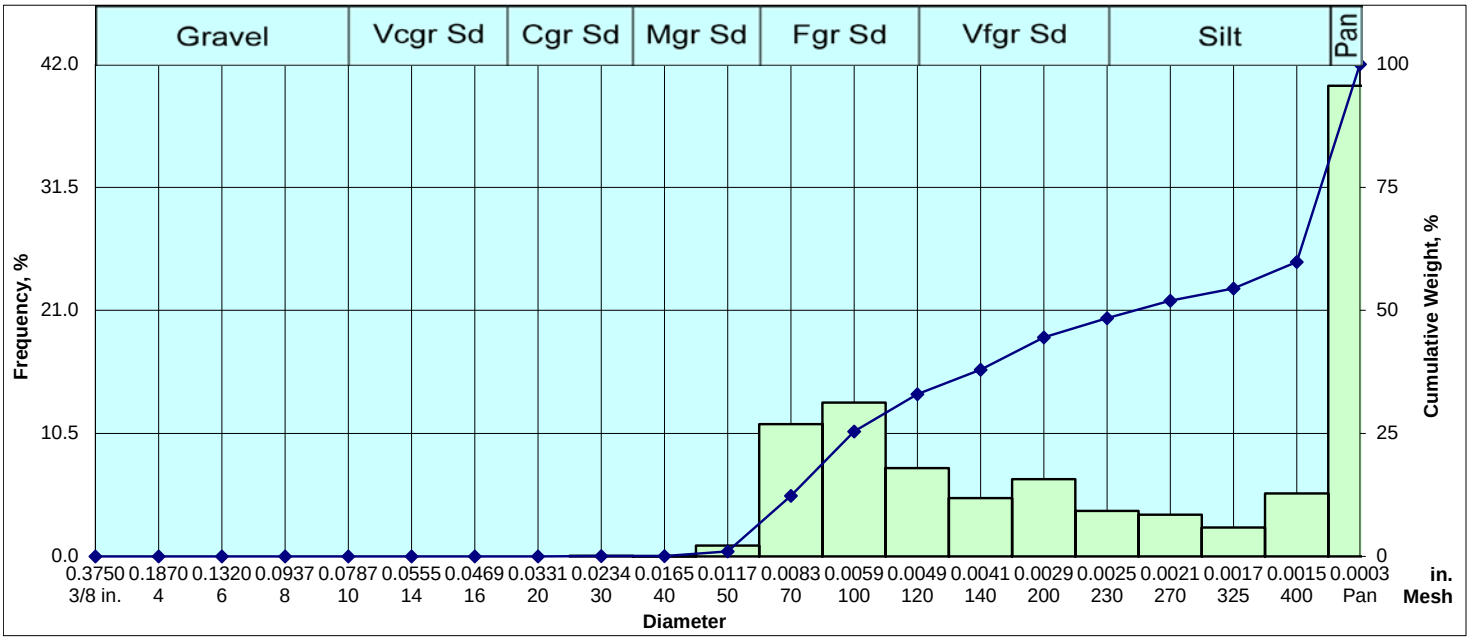
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.042	0.042
	30	0.0234	0.6000	0.75	0.042	0.084
Medium Sand	40	0.0165	0.4250	1.25	0.419	0.502
	50	0.0117	0.3000	1.75	8.079	8.581
Fine Sand	70	0.0083	0.2120	2.25	35.956	44.537
	100	0.0059	0.1500	2.75	32.482	77.020
	120	0.0049	0.1250	3.00	9.376	86.396
Very Fine Sand	140	0.0041	0.1060	3.25	3.851	90.247
	200	0.0029	0.0750	3.75	1.967	92.214
	230	0.0025	0.0630	4.00	0.670	92.884
Coarse Silt	270	0.0021	0.0530	4.25	0.460	93.344
	325	0.0017	0.0450	4.50	1.549	94.893
	400	0.0015	0.0380	4.75	1.088	95.982
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	4.018	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0079	0.0079	0.0079
(mm)	0.2016	0.2016	0.2016
Mean	Fine sand sized		
(in)	0.0081	0.0076	0.0077
(mm)	0.2068	0.1924	0.1954
Sorting	Moderate		
	1.300	0.551	0.730
Skewness	Finely skewed		
	0.992	0.122	0.288
Kurtosis	Very leptokurtic		
	0.280	1.728	1.628
Percentile	[in.]	[mm]	[phi]
5	0.0140	0.3554	1.4925
10	0.0117	0.2965	1.7538
16	0.0111	0.2818	1.8270
25	0.0102	0.2598	1.9444
50	0.0079	0.2016	2.3106
75	0.0061	0.1539	2.7004
84	0.0052	0.1314	2.9281
90	0.0042	0.1072	3.2214
95	0.0017	0.0443	4.4961

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-EB07(DEEP)-17.0-18.0-190611-GT

Mechanical Sieve Particle Size Analysis



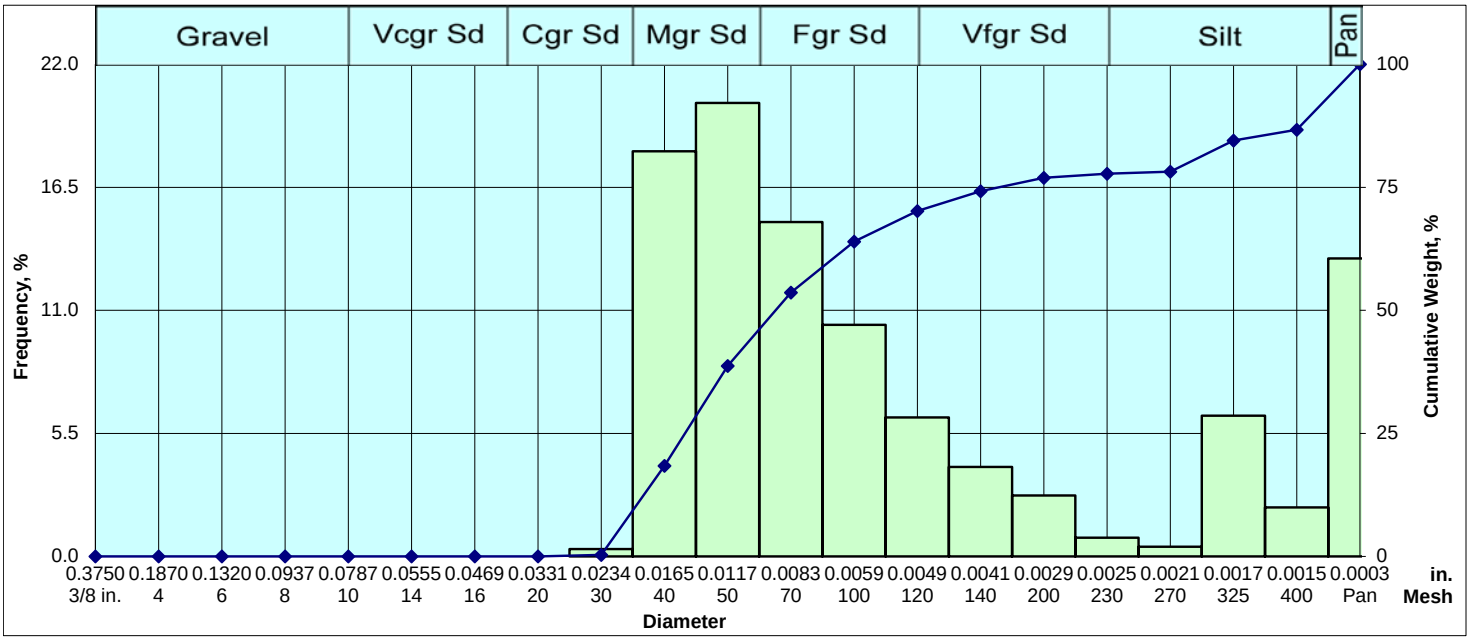
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.000	0.000
	30	0.0234	0.6000	0.75	0.050	0.050
Medium Sand	40	0.0165	0.4250	1.25	0.025	0.076
	50	0.0117	0.3000	1.75	0.934	1.010
Fine Sand	70	0.0083	0.2120	2.25	11.285	12.295
	100	0.0059	0.1500	2.75	13.128	25.423
	120	0.0049	0.1250	3.00	7.549	32.971
Very Fine Sand	140	0.0041	0.1060	3.25	4.973	37.945
	200	0.0029	0.0750	3.75	6.589	44.534
	230	0.0025	0.0630	4.00	3.888	48.422
Coarse Silt	270	0.0021	0.0530	4.25	3.560	51.982
	325	0.0017	0.0450	4.50	2.474	54.456
	400	0.0015	0.0380	4.75	5.377	59.833
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	40.167	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Silt sized		
(in)	0.0023	0.0023	0.0023
(mm)	0.0586	0.0586	0.0586
Mean	Silt sized		
(in)	0.0035	0.0024	0.0024
(mm)	0.0893	0.0621	0.0609
Sorting	Poor		
	2.391	1.647	1.511
Skewness	Near symmetrical		
	1.086	-0.051	-0.010
Kurtosis	Platykurtic		
	0.292	0.378	0.740
Percentile	[in.]	[mm]	[phi]
5	0.0106	0.2689	1.8949
10	0.0091	0.2299	2.1210
16	0.0077	0.1945	2.3621
25	0.0060	0.1520	2.7179
50	0.0023	0.0586	4.0938
75	0.0010	0.0266	5.2326
84	0.0008	0.0198	5.6562
90	0.0006	0.0153	6.0286
95	0.0005	0.0116	6.4348

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-EB11-22.5-23.5-190611-GT

Mechanical Sieve Particle Size Analysis



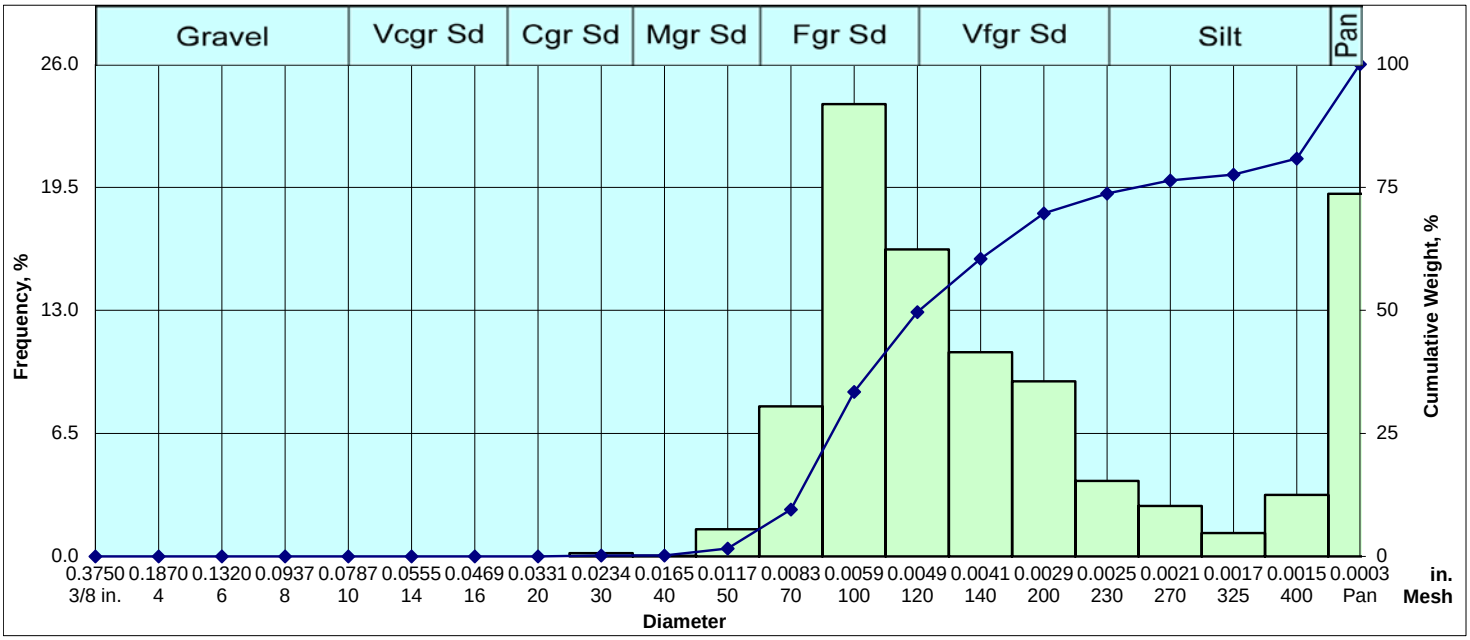
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.000	0.000
	30	0.0234	0.6000	0.75	0.324	0.324
Medium Sand	40	0.0165	0.4250	1.25	18.103	18.427
	50	0.0117	0.3000	1.75	20.265	38.692
Fine Sand	70	0.0083	0.2120	2.25	14.942	53.634
	100	0.0059	0.1500	2.75	10.349	63.983
	120	0.0049	0.1250	3.00	6.215	70.197
Very Fine Sand	140	0.0041	0.1060	3.25	3.999	74.196
	200	0.0029	0.0750	3.75	2.729	76.925
	230	0.0025	0.0630	4.00	0.838	77.763
Coarse Silt	270	0.0021	0.0530	4.25	0.432	78.195
	325	0.0017	0.0450	4.50	6.296	84.491
	400	0.0015	0.0380	4.75	2.189	86.679
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	13.321	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0092	0.0092	0.0092
(mm)	0.2334	0.2334	0.2334
Mean	Fine sand sized		
(in)	0.0095	0.0056	0.0066
(mm)	0.2407	0.1430	0.1684
Sorting	Poor		
	1.992	1.649	1.560
Skewness	Strongly fine skewed		
	0.827	0.428	0.457
Kurtosis	Mesokurtic		
	0.302	0.473	1.001
Percentile	[in.]	[mm]	[phi]
5	0.0218	0.5548	0.8500
10	0.0199	0.5065	0.9815
16	0.0177	0.4485	1.1569
25	0.0151	0.3845	1.3791
50	0.0092	0.2334	2.0991
75	0.0038	0.0969	3.3678
84	0.0018	0.0456	4.4541
90	0.0012	0.0305	5.0364
95	0.0008	0.0191	5.7076

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB13-2.0-4.5-190618-GT

Mechanical Sieve Particle Size Analysis



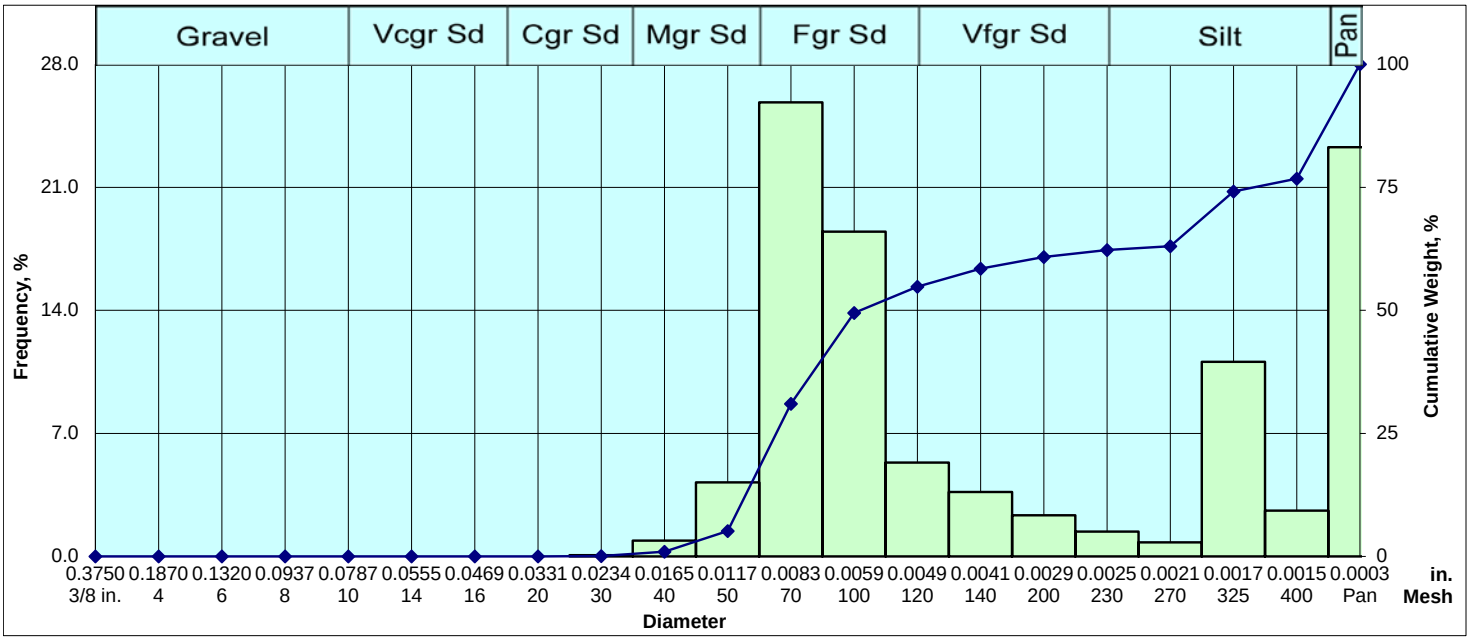
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.000	0.000
	30	0.0234	0.6000	0.75	0.171	0.171
Medium Sand	40	0.0165	0.4250	1.25	0.034	0.205
	50	0.0117	0.3000	1.75	1.434	1.639
Fine Sand	70	0.0083	0.2120	2.25	7.921	9.560
	100	0.0059	0.1500	2.75	23.899	33.459
	120	0.0049	0.1250	3.00	16.217	49.676
Very Fine Sand	140	0.0041	0.1060	3.25	10.789	60.464
	200	0.0029	0.0750	3.75	9.252	69.717
	230	0.0025	0.0630	4.00	3.995	73.711
Coarse Silt	270	0.0021	0.0530	4.25	2.663	76.374
	325	0.0017	0.0450	4.50	1.229	77.603
	400	0.0015	0.0380	4.75	3.243	80.847
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	19.153	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Very fine sand sized		
(in)	0.0049	0.0049	0.0049
(mm)	0.1244	0.1244	0.1244
Mean	Very fine sand sized		
(in)	0.0045	0.0032	0.0037
(mm)	0.1151	0.0803	0.0929
Sorting	Poor		
	1.719	1.282	1.257
Skewness	Strongly fine skewed		
	0.804	0.493	0.481
Kurtosis	Mesokurtic		
	0.304	0.586	1.066
Percentile	[in.]	[mm]	[phi]
5	0.0103	0.2627	1.9287
10	0.0083	0.2109	2.2457
16	0.0077	0.1953	2.3563
25	0.0068	0.1719	2.5400
50	0.0049	0.1244	3.0066
75	0.0023	0.0582	4.1038
84	0.0013	0.0330	4.9202
90	0.0009	0.0236	5.4071
95	0.0006	0.0157	5.9946

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB09-5.0-7.5-190617-GT

Mechanical Sieve Particle Size Analysis



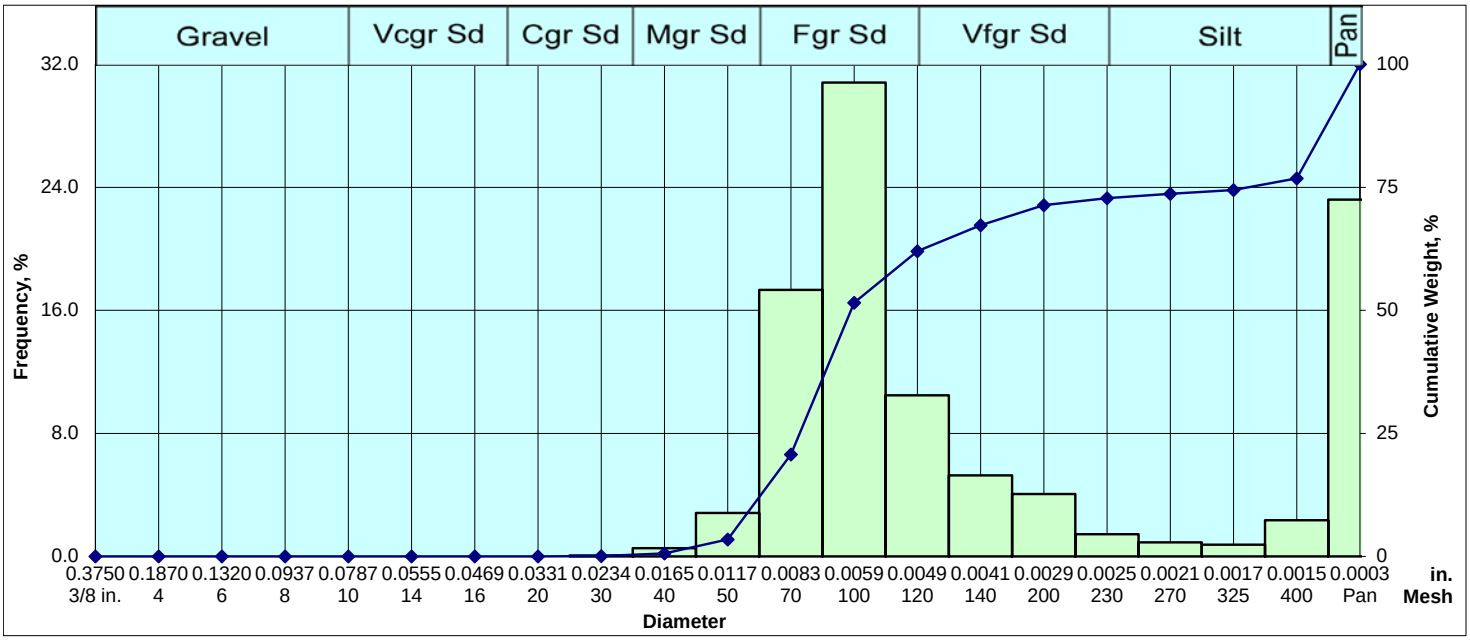
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.000	0.000
	30	0.0234	0.6000	0.75	0.077	0.077
Medium Sand	40	0.0165	0.4250	1.25	0.903	0.980
	50	0.0117	0.3000	1.75	4.205	5.186
Fine Sand	70	0.0083	0.2120	2.25	25.826	31.011
	100	0.0059	0.1500	2.75	18.473	49.484
	120	0.0049	0.1250	3.00	5.341	54.825
Very Fine Sand	140	0.0041	0.1060	3.25	3.664	58.488
	200	0.0029	0.0750	3.75	2.348	60.836
	230	0.0025	0.0630	4.00	1.419	62.255
Coarse Silt	270	0.0021	0.0530	4.25	0.800	63.055
	325	0.0017	0.0450	4.50	11.068	74.123
	400	0.0015	0.0380	4.75	2.606	76.729
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	23.271	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0058	0.0058	0.0058
(mm)	0.1476	0.1476	0.1476
Mean	Very fine sand sized		
(in)	0.0054	0.0034	0.0041
(mm)	0.1376	0.0867	0.1035
Sorting	Poor		
	2.335	1.602	1.470
Skewness	Strongly fine skewed		
	0.675	0.479	0.502
Kurtosis	Platykurtic		
	0.361	0.379	0.740
Percentile	[in.]	[mm]	[phi]
5	0.0120	0.3055	1.7107
10	0.0112	0.2836	1.8181
16	0.0104	0.2632	1.9260
25	0.0092	0.2325	2.1048
50	0.0058	0.1476	2.7604
75	0.0017	0.0426	4.5515
84	0.0011	0.0286	5.1297
90	0.0008	0.0208	5.5888
95	0.0006	0.0143	6.1290

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB08-5.0-7.0-190617-GT

Mechanical Sieve Particle Size Analysis



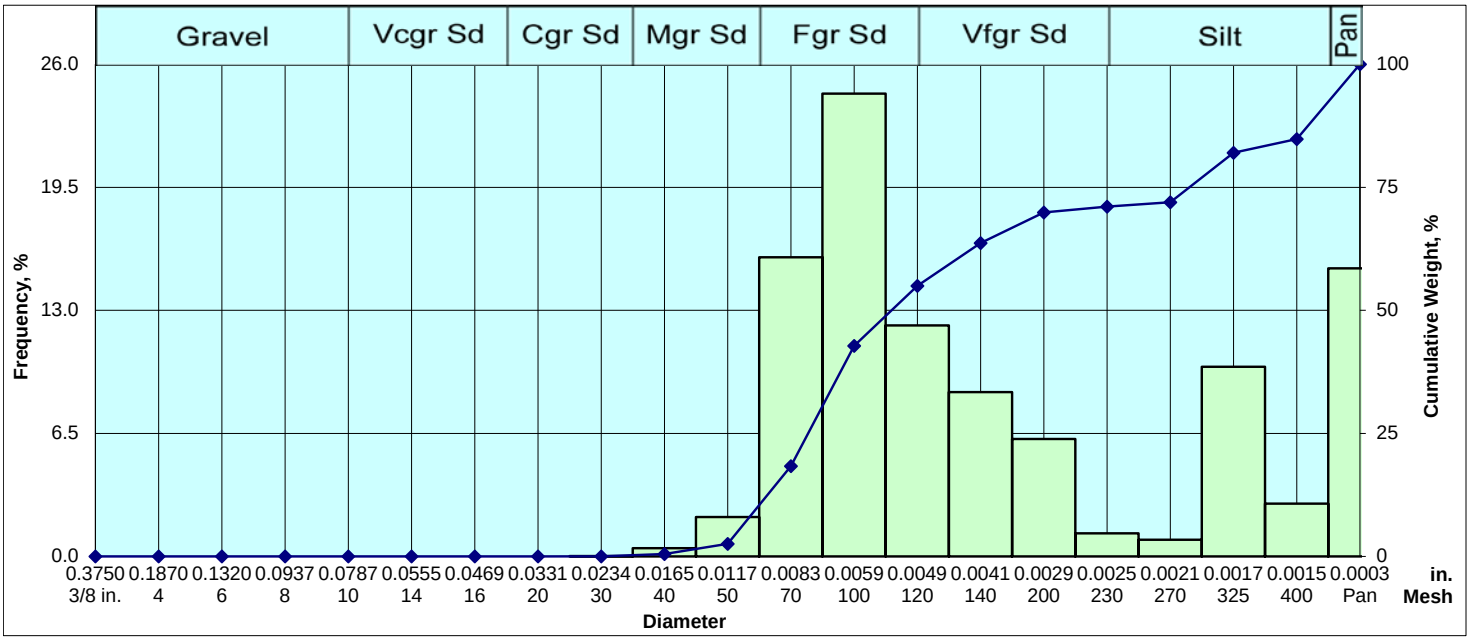
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.000	0.000
	30	0.0234	0.6000	0.75	0.057	0.057
Medium Sand	40	0.0165	0.4250	1.25	0.538	0.595
	50	0.0117	0.3000	1.75	2.831	3.426
Fine Sand	70	0.0083	0.2120	2.25	17.327	20.753
	100	0.0059	0.1500	2.75	30.804	51.557
	120	0.0049	0.1250	3.00	10.476	62.033
Very Fine Sand	140	0.0041	0.1060	3.25	5.266	67.299
	200	0.0029	0.0750	3.75	4.049	71.348
	230	0.0025	0.0630	4.00	1.444	72.792
Coarse Silt	270	0.0021	0.0530	4.25	0.906	73.698
	325	0.0017	0.0450	4.50	0.764	74.462
	400	0.0015	0.0380	4.75	2.350	76.812
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	23.188	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0060	0.0060	0.0060
(mm)	0.1531	0.1531	0.1531
Mean	Very fine sand sized		
(in)	0.0049	0.0032	0.0040
(mm)	0.1234	0.0822	0.1012
Sorting	Poor		
	2.165	1.522	1.420
Skewness	Strongly fine skewed		
	0.614	0.589	0.581
Kurtosis	Platykurtic		
	0.326	0.429	0.800
Percentile	[in.]	[mm]	[phi]
5	0.0115	0.2920	1.7759
10	0.0105	0.2666	1.9072
16	0.0093	0.2361	2.0823
25	0.0080	0.2035	2.2972
50	0.0060	0.1531	2.7071
75	0.0017	0.0434	4.5262
84	0.0011	0.0286	5.1259
90	0.0008	0.0208	5.5856
95	0.0006	0.0143	6.1266

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB04S-8.0-10.0-190620-GT

Mechanical Sieve Particle Size Analysis



Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.000	0.000
	30	0.0234	0.6000	0.75	0.028	0.028
Medium Sand	40	0.0165	0.4250	1.25	0.443	0.470
	50	0.0117	0.3000	1.75	2.075	2.545
Fine Sand	70	0.0083	0.2120	2.25	15.795	18.340
	100	0.0059	0.1500	2.75	24.454	42.794
	120	0.0049	0.1250	3.00	12.199	54.993
Very Fine Sand	140	0.0041	0.1060	3.25	8.686	63.679
	200	0.0029	0.0750	3.75	6.196	69.876
	230	0.0025	0.0630	4.00	1.217	71.093
Coarse Silt	270	0.0021	0.0530	4.25	0.885	71.978
	325	0.0017	0.0450	4.50	10.014	81.992
	400	0.0015	0.0380	4.75	2.794	84.786
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	15.214	100.000

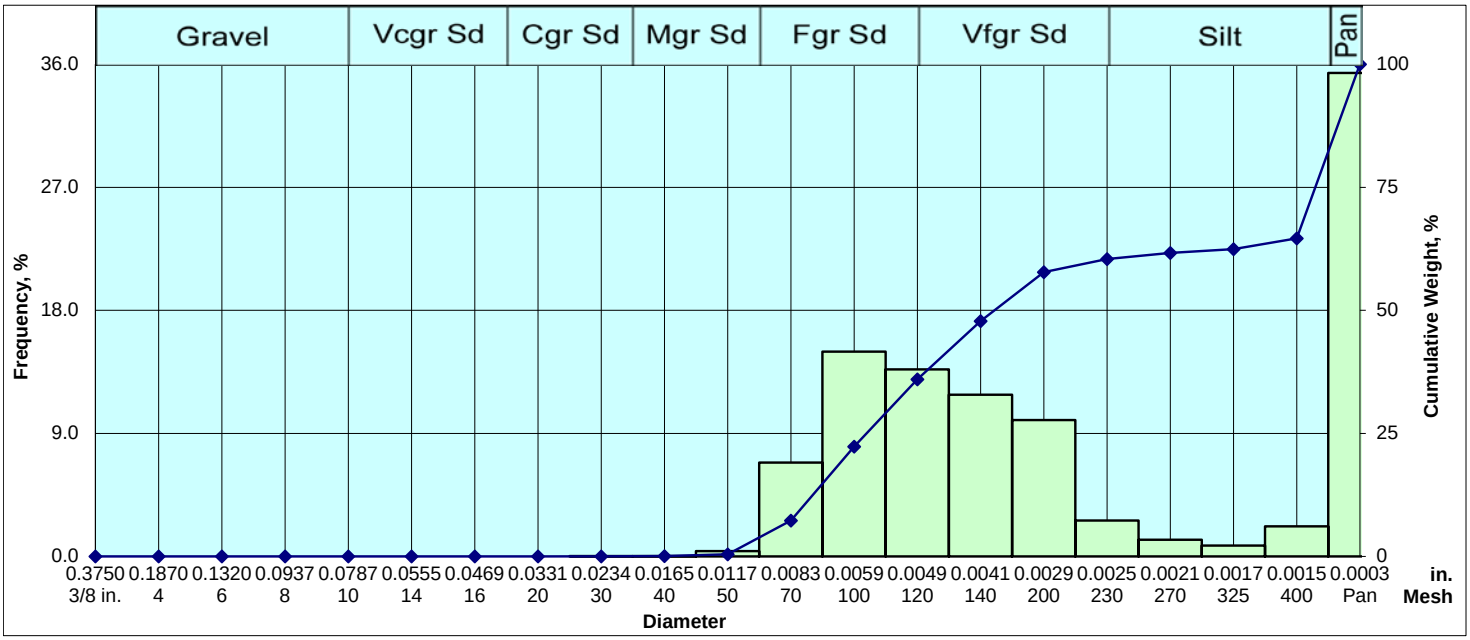
Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0053	0.0053	0.0053
(mm)	0.1352	0.1352	0.1352
Mean	Very fine sand sized		
(in)	0.0048	0.0037	0.0042
(mm)	0.1229	0.0948	0.1067
Sorting	Poor		
	1.964	1.247	1.231
Skewness	Strongly fine skewed		
	0.735	0.411	0.436
Kurtosis	Platykurtic		
	0.313	0.610	0.845

Percentile	[in.]	[mm]	[phi]
5	0.0113	0.2863	1.8043
10	0.0102	0.2585	1.9520
16	0.0089	0.2250	2.1518
25	0.0077	0.1951	2.3576
50	0.0053	0.1352	2.8865
75	0.0020	0.0506	4.3051
84	0.0016	0.0400	4.6450
90	0.0011	0.0276	5.1766
95	0.0007	0.0177	5.8181

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB10-2.5-5.0-19621-GT

Mechanical Sieve Particle Size Analysis



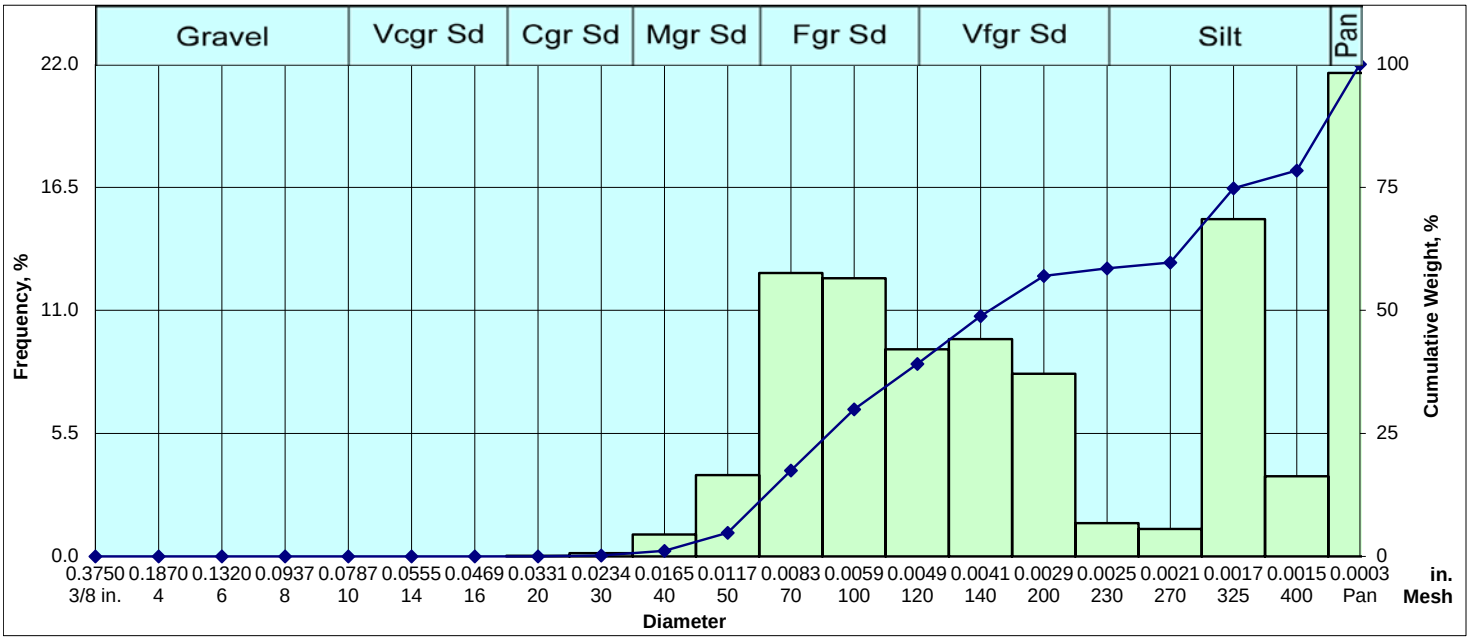
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.000	0.000
	30	0.0234	0.6000	0.75	0.035	0.035
Medium Sand	40	0.0165	0.4250	1.25	0.035	0.070
	50	0.0117	0.3000	1.75	0.385	0.455
Fine Sand	70	0.0083	0.2120	2.25	6.860	7.315
	100	0.0059	0.1500	2.75	14.981	22.296
	120	0.0049	0.1250	3.00	13.686	35.982
Very Fine Sand	140	0.0041	0.1060	3.25	11.831	47.812
	200	0.0029	0.0750	3.75	9.975	57.788
	230	0.0025	0.0630	4.00	2.625	60.413
Coarse Silt	270	0.0021	0.0530	4.25	1.225	61.638
	325	0.0017	0.0450	4.50	0.805	62.443
	400	0.0015	0.0380	4.75	2.205	64.648
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	35.352	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Very fine sand sized		
(in)	0.0039	0.0039	0.0039
(mm)	0.0992	0.0992	0.0992
Mean	Very fine sand sized		
(in)	0.0034	0.0024	0.0028
(mm)	0.0871	0.0615	0.0721
Sorting	Poor		
	2.231	1.518	1.414
Skewness	Strongly fine skewed		
	0.656	0.455	0.430
Kurtosis	Platykurtic		
	0.314	0.424	0.766
Percentile	[in.]	[mm]	[phi]
5	0.0095	0.2417	2.0487
10	0.0079	0.2009	2.3155
16	0.0069	0.1761	2.5059
25	0.0057	0.1451	2.7853
50	0.0039	0.0992	3.3335
75	0.0011	0.0292	5.1000
84	0.0008	0.0215	5.5416
90	0.0006	0.0163	5.9352
95	0.0005	0.0121	6.3723

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB11S-2.5-5.0-190621-GT

Mechanical Sieve Particle Size Analysis



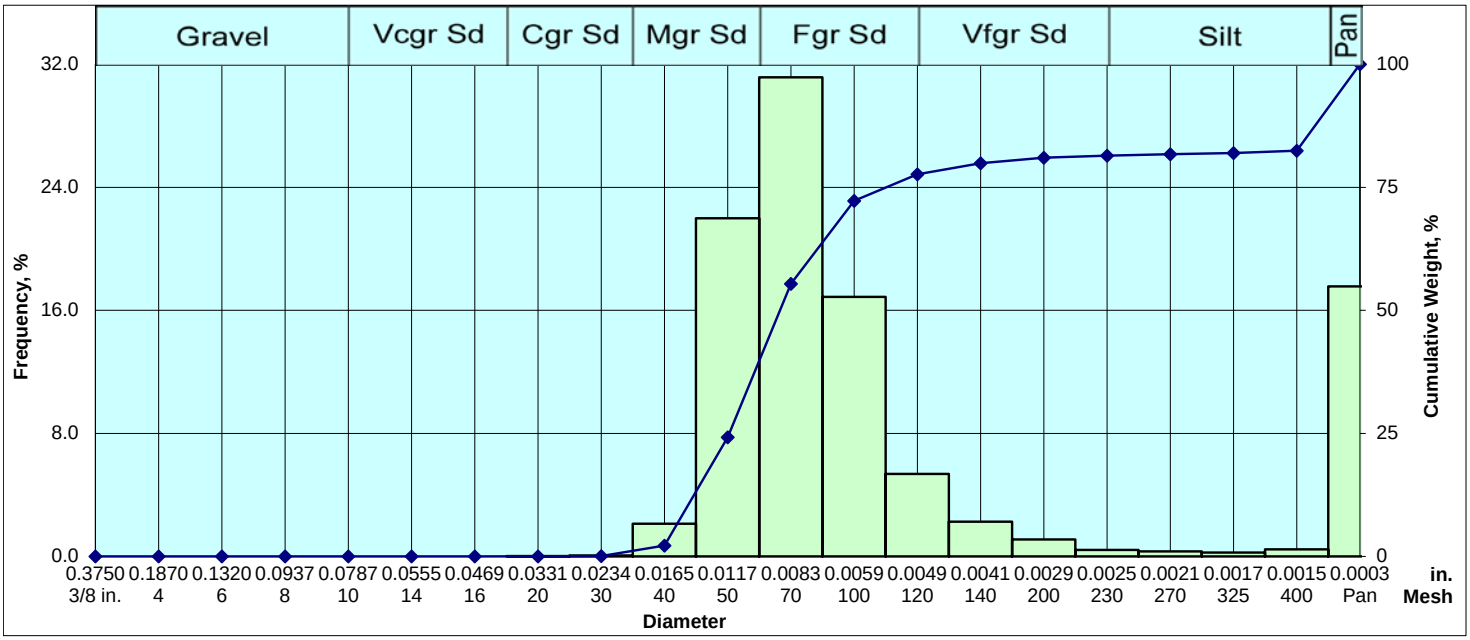
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.029	0.029
	30	0.0234	0.6000	0.75	0.143	0.172
Medium Sand	40	0.0165	0.4250	1.25	0.974	1.146
	50	0.0117	0.3000	1.75	3.639	4.785
Fine Sand	70	0.0083	0.2120	2.25	12.665	17.450
	100	0.0059	0.1500	2.75	12.436	29.885
	120	0.0049	0.1250	3.00	9.255	39.140
Very Fine Sand	140	0.0041	0.1060	3.25	9.713	48.854
	200	0.0029	0.0750	3.75	8.166	57.020
	230	0.0025	0.0630	4.00	1.490	58.510
Coarse Silt	270	0.0021	0.0530	4.25	1.232	59.742
	325	0.0017	0.0450	4.50	15.072	74.814
	400	0.0015	0.0380	4.75	3.582	78.395
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	21.605	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Very fine sand sized		
(in)	0.0040	0.0040	0.0040
(mm)	0.1016	0.1016	0.1016
Mean	Very fine sand sized		
(in)	0.0043	0.0032	0.0035
(mm)	0.1095	0.0818	0.0880
Sorting	Poor		
	1.976	1.440	1.377
Skewness	Finely skewed		
	0.868	0.217	0.250
Kurtosis	Mesokurtic		
	0.268	0.505	0.904
Percentile	[in.]	[mm]	[phi]
5	0.0118	0.2985	1.7442
10	0.0104	0.2638	1.9227
16	0.0087	0.2221	2.1709
25	0.0069	0.1744	2.5199
50	0.0040	0.1016	3.2983
75	0.0018	0.0446	4.4856
84	0.0012	0.0302	5.0510
90	0.0009	0.0218	5.5210
95	0.0006	0.0148	6.0793

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB01S-8.0-10.5-190622-GT

Mechanical Sieve Particle Size Analysis



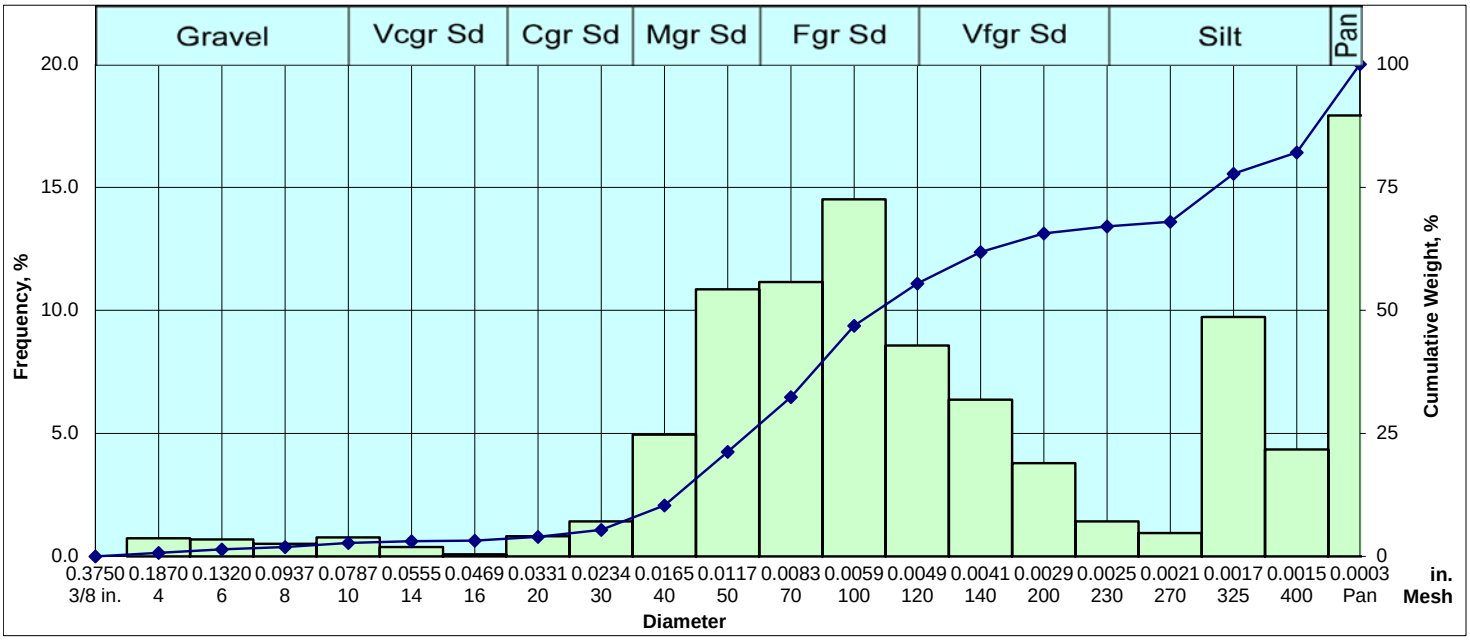
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.032	0.032
	30	0.0234	0.6000	0.75	0.065	0.097
Medium Sand	40	0.0165	0.4250	1.25	2.135	2.232
	50	0.0117	0.3000	1.75	21.992	24.224
Fine Sand	70	0.0083	0.2120	2.25	31.145	55.369
	100	0.0059	0.1500	2.75	16.882	72.251
	120	0.0049	0.1250	3.00	5.369	77.620
Very Fine Sand	140	0.0041	0.1060	3.25	2.264	79.884
	200	0.0029	0.0750	3.75	1.100	80.983
	230	0.0025	0.0630	4.00	0.420	81.404
Coarse Silt	270	0.0021	0.0530	4.25	0.323	81.727
	325	0.0017	0.0450	4.50	0.259	81.986
	400	0.0015	0.0380	4.75	0.453	82.439
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	17.561	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0089	0.0089	0.0089
(mm)	0.2272	0.2272	0.2272
Mean	Fine sand sized		
(in)	0.0086	0.0044	0.0055
(mm)	0.2175	0.1107	0.1406
Sorting	Poor		
	1.473	1.648	1.527
Skewness	Strongly fine skewed		
	0.890	0.630	0.632
Kurtosis	Very leptokurtic		
	0.226	0.408	1.701
Percentile	[in.]	[mm]	[phi]
5	0.0161	0.4093	1.2889
10	0.0150	0.3808	1.3927
16	0.0137	0.3467	1.5281
25	0.0117	0.2978	1.7476
50	0.0089	0.2272	2.1382
75	0.0054	0.1372	2.8657
84	0.0014	0.0353	4.8236
90	0.0010	0.0250	5.3221
95	0.0006	0.0164	5.9303

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB02S-8.5-11.0-190622-GT

Mechanical Sieve Particle Size Analysis



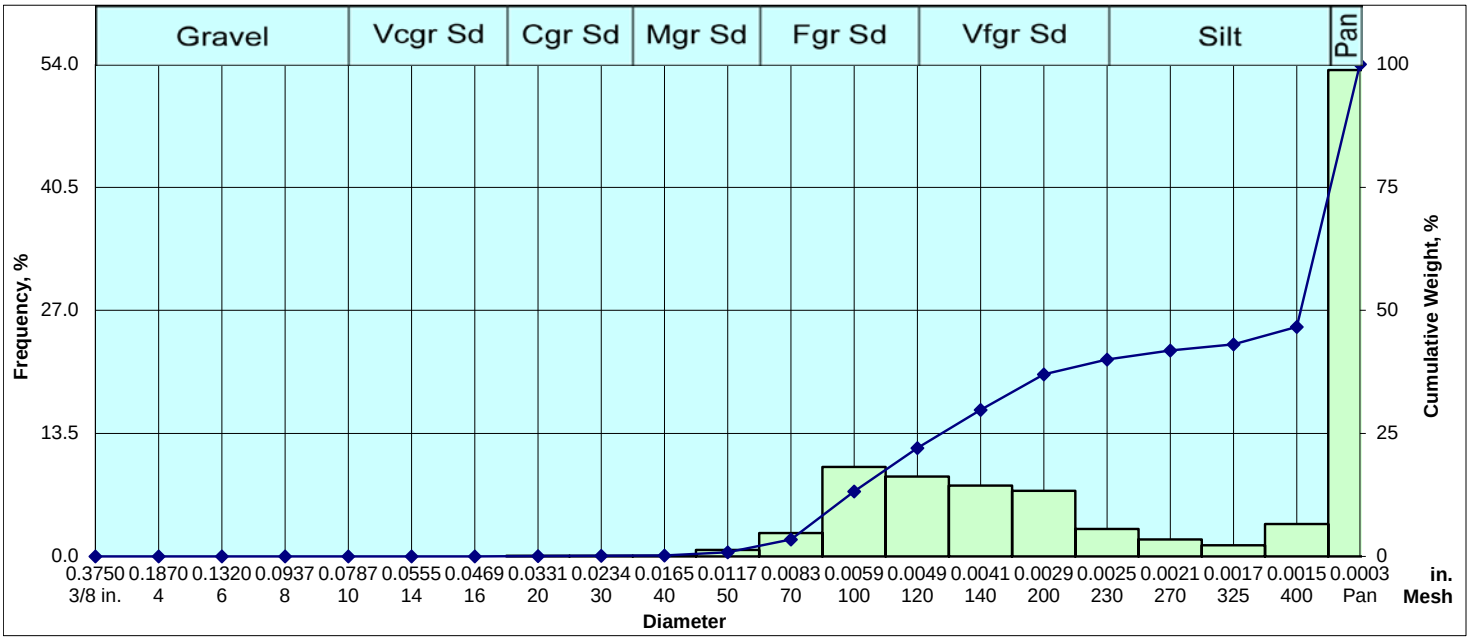
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.732	0.732
	6	0.1320	3.3500	-1.75	0.689	1.421
	8	0.0937	2.3600	-1.25	0.517	1.938
	10	0.0787	2.0000	-1.00	0.775	2.713
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.388	3.101
	16	0.0469	1.1800	-0.25	0.086	3.187
Coarse Sand	20	0.0331	0.8500	0.25	0.818	4.005
	30	0.0234	0.6000	0.75	1.421	5.426
Medium Sand	40	0.0165	0.4250	1.25	4.953	10.379
	50	0.0117	0.3000	1.75	10.853	21.232
Fine Sand	70	0.0083	0.2120	2.25	11.154	32.386
	100	0.0059	0.1500	2.75	14.513	46.899
	120	0.0049	0.1250	3.00	8.570	55.469
Very Fine Sand	140	0.0041	0.1060	3.25	6.374	61.843
	200	0.0029	0.0750	3.75	3.790	65.633
	230	0.0025	0.0630	4.00	1.421	67.054
Coarse Silt	270	0.0021	0.0530	4.25	0.947	68.002
	325	0.0017	0.0450	4.50	9.733	77.735
	400	0.0015	0.0380	4.75	4.350	82.084
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	17.916	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0055	0.0055	0.0055
(mm)	0.1410	0.1410	0.1410
Mean	Very fine sand sized		
(in)	0.0063	0.0044	0.0048
(mm)	0.1588	0.1119	0.1209
Sorting	Poor		
	2.392	1.687	1.658
Skewness	Finely skewed		
	0.802	0.197	0.179
Kurtosis	Platykurtic		
	0.270	0.594	0.876
Percentile	[in.]	[mm]	[phi]
5	0.0266	0.6750	0.5670
10	0.0173	0.4384	1.1897
16	0.0142	0.3603	1.4729
25	0.0106	0.2703	1.8875
50	0.0055	0.1410	2.8267
75	0.0019	0.0472	4.4036
84	0.0014	0.0348	4.8460
90	0.0010	0.0247	5.3419
95	0.0006	0.0162	5.9453

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB14S-5.0-7.0-190625-GT

Mechanical Sieve Particle Size Analysis



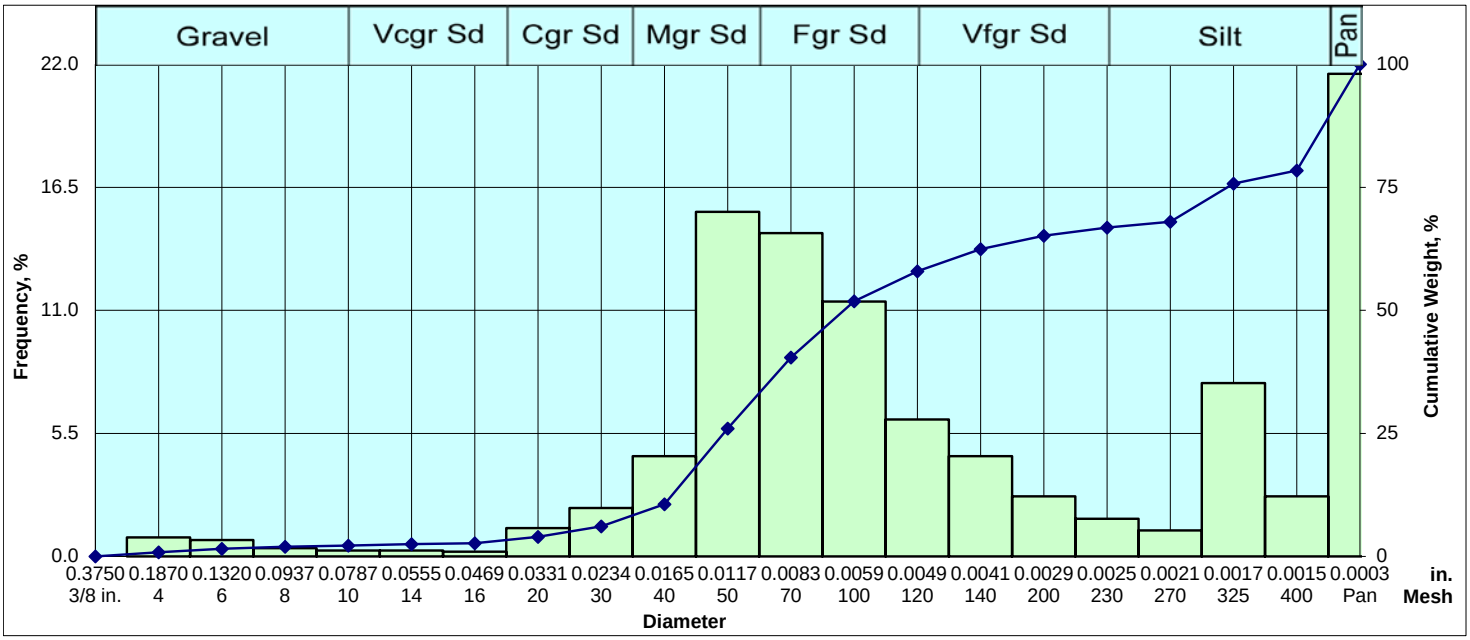
Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.000	0.000
	6	0.1320	3.3500	-1.75	0.000	0.000
	8	0.0937	2.3600	-1.25	0.000	0.000
	10	0.0787	2.0000	-1.00	0.000	0.000
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.000	0.000
	16	0.0469	1.1800	-0.25	0.000	0.000
Coarse Sand	20	0.0331	0.8500	0.25	0.058	0.058
	30	0.0234	0.6000	0.75	0.058	0.116
Medium Sand	40	0.0165	0.4250	1.25	0.058	0.174
	50	0.0117	0.3000	1.75	0.697	0.871
Fine Sand	70	0.0083	0.2120	2.25	2.555	3.426
	100	0.0059	0.1500	2.75	9.814	13.240
	120	0.0049	0.1250	3.00	8.769	22.009
Very Fine Sand	140	0.0041	0.1060	3.25	7.782	29.791
	200	0.0029	0.0750	3.75	7.201	36.992
	230	0.0025	0.0630	4.00	3.020	40.012
Coarse Silt	270	0.0021	0.0530	4.25	1.858	41.870
	325	0.0017	0.0450	4.50	1.220	43.089
	400	0.0015	0.0380	4.75	3.542	46.632
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	53.368	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Silt sized		
(in)	0.0014	0.0014	0.0014
(mm)	0.0361	0.0361	0.0361
Mean	Silt sized		
(in)	0.0027	0.0019	0.0017
(mm)	0.0698	0.0489	0.0442
Sorting	Poor		
	2.316	1.538	1.413
Skewness	Coarse skewed		
	1.408	-0.286	-0.228
Kurtosis	Platykurtic		
	0.305	0.381	0.719
Percentile	[in.]	[mm]	[phi]
5	0.0080	0.2021	2.3072
10	0.0067	0.1705	2.5524
16	0.0056	0.1421	2.8147
25	0.0046	0.1177	3.0868
50	0.0014	0.0361	4.7921
75	0.0009	0.0219	5.5098
84	0.0007	0.0169	5.8908
90	0.0005	0.0135	6.2153
95	0.0004	0.0106	6.5558

Company: Ramboll US Corporation
Project Name: CMR-RIAM-East/West Rail
Project Number: 1690012344-211

CL File No.: 1901843
Sample ID: CMR-WB03-8.0-11.5-190622-GT

Mechanical Sieve Particle Size Analysis



Particle Size Distribution						
	Diameter				Weight %	
	[US Mesh]	[in.]	[mm]	[ϕ]	[Incl.]	[Cum.]
Gravel	3/8 in.	0.3750	9.5000	-3.25	0.000	0.000
	4	0.1870	4.7500	-2.25	0.844	0.844
	6	0.1320	3.3500	-1.75	0.738	1.582
	8	0.0937	2.3600	-1.25	0.369	1.951
	10	0.0787	2.0000	-1.00	0.264	2.215
Very Coarse Sand	14	0.0555	1.4100	-0.50	0.264	2.479
	16	0.0469	1.1800	-0.25	0.211	2.690
Coarse Sand	20	0.0331	0.8500	0.25	1.266	3.956
	30	0.0234	0.6000	0.75	2.162	6.118
Medium Sand	40	0.0165	0.4250	1.25	4.483	10.601
	50	0.0117	0.3000	1.75	15.401	26.002
Fine Sand	70	0.0083	0.2120	2.25	14.451	40.454
	100	0.0059	0.1500	2.75	11.392	51.846
	120	0.0049	0.1250	3.00	6.118	57.964
Very Fine Sand	140	0.0041	0.1060	3.25	4.483	62.447
	200	0.0029	0.0750	3.75	2.690	65.137
	230	0.0025	0.0630	4.00	1.688	66.825
Coarse Silt	270	0.0021	0.0530	4.25	1.160	67.985
	325	0.0017	0.0450	4.50	7.753	75.738
	400	0.0015	0.0380	4.75	2.690	78.428
Medium Silt to Clay	Pan	0.0003	0.0078	7.00	21.572	100.000

Sorting Statistics (Folk)			
Parameter	Trask	Inman	Folk
Median	Fine sand sized		
(in)	0.0063	0.0063	0.0063
(mm)	0.1600	0.1600	0.1600
Mean	Very fine sand sized		
(in)	0.0070	0.0042	0.0048
(mm)	0.1769	0.1073	0.1226
Sorting	Poor		
	2.595	1.829	1.766
Skewness	Finely skewed		
	0.742	0.315	0.269
Kurtosis	Platykurtic		
	0.307	0.537	0.838
Percentile	[in.]	[mm]	[phi]
5	0.0287	0.7293	0.4555
10	0.0177	0.4485	1.1569
16	0.0150	0.3812	1.3914
25	0.0121	0.3081	1.6984
50	0.0063	0.1600	2.6434
75	0.0018	0.0458	4.4497
84	0.0012	0.0302	5.0493
90	0.0009	0.0218	5.5195
95	0.0006	0.0148	6.0783

48157★

Chain of Custody Record

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~~www.shealylab.com~~

CORE LABS LP 3437 LANDLO DRIVE BAKERSFIELD, CA 93308 AFH

Number 94138

Client: RAMBOLL US CORPORATION	Report to Contact: MICHAEL WILSON mwilson@ramboll.com	Telephone No. / E-mail: (316) 644-2303	Quote No.
Address: 7500 COLLEGE BLVD. SUITE 925	Sampler's Signature: X	Analysis (Attach list if more space is needed)	Page 1 of 1
City: OVERLAND PARK State: KS Zip Code: 66210	Printed Name: ANDREW HARDWICK		
Project Name: CMR RIAIM - EAST RAIL			
Project No.: 1690012344 TASK 221	P.O. No.: —		Laboratory Lot Num

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	BULK DENSITY	POROSITY (TOTAL)	TOTAL ORGANIC CARBON	MOISTURE CONTENT	GRAIN SIZE	Remarks / Cooler I
CMR-EB06-4.0-5.0-190516	5/16/19	1330	G		X		X						X	X	X	X	X	
CMR-EB11-2.0-2.5-190520	5/20/19	1530	G		X		X						X	X	X	X	X	
CMR-EB11-2.5-3.0-190520	5/20/19	1535	G		X		X						X	X	X	X	X	

AFH 5/22/19

Turn Around Time Required (Prior lab approval required for expedited TAT.) ☒ Standard ☐ Rush (Specify)

Sample Disposal: ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification: ☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☐ Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by	5/22/19	1710	1. Received by: FEDEX	5/22/19	1710
2. Relinquished by	Date	Time	2. Received by: alowker (CORE LAB)	5/23/19	10:47 am
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory received by	Date	Time

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) Yes No Ice Pack

Receipt Temp. _____ °C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 08-01-20

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AFH 6/21/19

CORE LABS LP
3437 LANDCO DRIVE
BAKERSFIELD, CA 93308

Number 91166

Client: RAMBOLL US CORP.	Report to Contact: DANIEL PRICE, MICHAEL WILSON	Telephone No. / E-mail: DPRICE@RAMBOLL.COM, MWILSON@RAMBOLL.COM	Quote No.
Address: 7500 COLLEGE BLVD. #925	Sampler's Signature: X	Analysis (Attach list if more space is needed)	Page 1 of 1
City: OVERLAND PARK	State: KS	Zip Code: 66210	Printed Name: ANDREW HARDWICK
Project Name: CMR-RAIM-EAST/WEST RAIL			
Project No.: 1690012344 . 221	P.O. No.		Laboratory Lot Number

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Solid	Non-Aqueous	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	BULK DENSITY	POROSITY	TOC	MOISTURE	GRAIN SIZE	Remarks / Cooler I.D.
CMR-EB04-7.5-10.0-190613-GT	6/13/19	1630	G		X		X						X	X	X	X	X	SHELBY TUBE
CMR-WB06-9.0-11.5-190620-GT	6/20/19	1340			X		X						X	X	X	X	X	SHELBY TUBE
CMR-EB07(DEEP)-17.0-18.0-190611-GT	6/11/19	1055			X		X						X	X	X	X	X	Bag Sample
CMR-EB11-22.5-23.5-190611-GT	6/11/19	1915			X		X						X	X	X	X	X	Bag Sample
CMR-WB13-2.0-4.5-190618-GT	6/18/19	1130			X		X						X	X	X	X	X	SHELBY TUBE.
CMR-WB09-5.0-7.5-190617-GT	6/17/19	1200	V		X		X						X	X	X	X	X	SHELBY TUBE

AFH 6/24/19

Turn Around Time Required (Prior lab approval required for expedited TAT.)	Sample Disposal	Possible Hazard Identification	QC Requirements (Specify)
X Standard ☐ Rush (Specify)	☐ Return to Client X Disposal by Lab	☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison X Unknown	

	Date	Time		Date	Time
1. Relinquished by	6/21/19	1600	1. Received by: alowken CORE LAB	6/24/19	10:20am
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory received by	Date	Time

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) Yes No Ice Pack

Receipt Temp._____°C

1902231

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 08-01-2014

CORE LABS LP - 3437 LANDCO DRIVE - BAKERSFIELD, CA 93308

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KAH 6/21/19

Number 92779

Client: RAMBOLL US CORP.	Report to Contact: DANIEL PRICE, MICHAEL WILSON	Telephone No. / E-mail: -DPRICE@RAMBOLL.COM -MWILSON@RAMBOLL.C
Address: 7500 COLLEGE BLVD. #925	Sampler's Signature: X	Quote No.
City: OVERLAND PARK / State: KS / Zip Code: 66210	Printed Name: Andrew Hardwick	Page 1 of 1
Project Name: CMR-RAIM-WEST RAIL		
Project No.: 1690012344.221	P.O. No.	Laboratory Lot Number

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	BULK DENSITY	POROSITY	TOC	Moisture	GRAIN SIZE	Remarks / Cooler I.D.
CMR-WB03-5.0-7.0-190617-GT	6/17/19	1500	G		X		X						X	X	X	X	X	SHELBY TUBE
CMR-WB04S-8.0-10.0-190620-GT	6/20/19	1000																
CMR-WB10S-2.5-5.0-190624-GT	6/24/19	0930																
CMR-WB11S-2.5-5.0-190621-GT	6/24/19	0955																

KAH 6/24/19

Turn Around Time Required (Prior lab approval required for expedited TAT.)	Sample Disposal	Possible Hazard Identification	QC Requirements (Specify)
☒ Standard ☐ Rush (Specify)	☐ Return to Client ☒ Disposal by Lab	☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☒ Unknown	

	Date	Time		Date	Time
1. Relinquished by	6/21/19	1600	1. Received by: alowken CORELAB	6/24/19	10:20am
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory received by	Date	Time

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) Yes No Ice Pack

Receipt Temp._____ °C

1622091

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 08-01-2014

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Number 89276

Client Ramboll	**Report to Contact** Daniel Price, Michael Wilson	**Telephone No. / E-mail** dprice@ramboll.com, mwilson@ramboll.com	**Quote No.**
Address 7500 College Blvd #925	**Sampler's Signature** X	**Analysis (Attach list if more space is needed)**	**Page** 1 of 1
City Overland Park **State** KS **Zip Code** 66210	**Printed Name** KIT CARSON		
Project Name CMR - RIAIM - West Rail			**Laboratory Lot Number**
Project No. 1690412344-221	**P.O. No.**		

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	Bulk Density	Porosity	TOC	Moisture	Grainsize	LNAPL-Water-Fluid Properties Group	Remarks / Cooler I.D.
CMR-WB01S-8.0-10.5-190622-GT	6.22.19	17:05	G		X		X						X	X	X	X	X		
CMR-WB02S-8.5-11.0-190622-GT	6.22.19	14:10	G		X		X						X	X	X	X	X		
CMR-WB14S-5.0-7.0-190625-GT	6.25.19	11:40	G		X		X						X	X	X	X	X		
CMR-WB03-8.0-11.5-190622-GT	6.22.19	11:15	G		X		X						X	X	X	X	X		
CMR-MW101-190703	7.3.19	10:30	G	X			X											X	4-40ml VOAs (GW) 4-40ml VOAs (LNAPL)

KC 7/9/19

KC 7/9/19

Turn Around Time Required (Prior lab approval required for expedited TAT.) ☒ Standard ☐ Rush (Specify)

Sample Disposal ☐ Return to Client ☒ Disposal by Lab

Possible Hazard Identification ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison ☒ Unknown

QC Requirements (Specify)

	Date	Time		Date	Time
1. Relinquished by	7.9.19	15:15	1. Received by	7/10/19	1126
2. Relinquished by			2. Received by		
3. Relinquished by			3. Received by		
4. Relinquished by			4. Laboratory received by		

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) Yes No Ice Pack

Receipt Temp._____°C

DISTRIBUTION: WHITE & YELLOW-Return to laboratory with Sample(s); PINK-Field/Client Copy

Document Number: F-AD-133 Effective Date: 08-01-2014

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Number 86209

Client: Ramboll	Report to Contact: Daniel Price, Michael Wilson	Telephone No. / E-mail: dprice@ramboll.com, mwilson@ramboll.com	Quote No.
Address: 7500 College Blvd #925	Sampler's Signature: X	Analysis (Attach list if more space is needed)	Page 1 of 1
City: Overland Park / State: KS / Zip Code: 66210	Printed Name: KIT CARSON		
Project Name: CRM - RIAM - West Rail			
Project No.: 169001234-221	P.O. No.		Laboratory Lot Number

Sample ID / Description (Containers for each sample may be combined on one line.)	Date	Time	G=Grab C=Composite	Matrix: Aqueous	Matrix: Solid	Matrix: Non-Aqueous	No of Containers by Preservative Type: Unpres.	H2SO4	HNO3	HCl	NaOH	5035 Kit	Fluid Properties Group - LNAPL/water	Remarks / Cooler I.D.
CMR - MW75 - 190801	8/1/19	0900	G	X	X		X						X	4-40ml VOAs (GW) 4-40ml VOAs (LNAPL)

kc 8/1/19

kc 8/1/19

Turn Around Time Required (Prior lab approval required for expedited TAT.)	Sample Disposal	Possible Hazard Identification	QC Requirements (Specify)
X Standard ☐ Rush (Specify)	☐ Return to Client X Disposal by Lab	☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison X Unknown	

	Date	Time		Date	Time
1. Relinquished by	8-1-19	11:00	1. Received by	8/2/19	11:30 am
2. Relinquished by	Date	Time	2. Received by	Date	Time
3. Relinquished by	Date	Time	3. Received by	Date	Time
4. Relinquished by	Date	Time	4. Laboratory received by	Date	Time

Note: All samples are retained for four weeks from receipt unless other arrangements are made.

LAB USE ONLY
Received on ice (Circle) Yes No Ice Pack

Receipt Temp._____ °C

Data Validation and Usability Review

Following the lab analysis of all samples Ramboll completed a separate QA/QC review of the reported laboratory data in accordance with the QAPP. This step (referred to generally as validation) consisted of an additional independent review of quality control information provided by the laboratory as well as quality control samples collected in the field by sampling staff. The review was equivalent to the Stage 2A validation as defined by USEPA (USEPA 2009). To ensure the validation process was consistent and rigorous a worksheet format was used to assess each sample delivery group report. Completed memos and worksheets are provided in Appendix E. Validation principles and guidance were be based on the USEPA National Functional Guidelines (USEPA 2017).

During the review Ramboll did not find any significant data quality issues that effected the overall usability of the lab data. All results were acceptably complete and largely met the data quality objectives as laid out in the QAPP. Minor issues existed in some SDGs but these issues were either isolated to non-constituents of concern or only affected a subset of sample results. These non-conformances are addressed individually in each SDG's validation worksheet and memo. Two common usability concerns seen in project data and their implications are listed below:

- Blank Detections: In multiple SDGs some analytes were detected in blank samples, either within the laboratory analytical process or from the field. These blank detections indicate possible cross-contamination concerns. In general these results were validated as non-detect as the source of the possible contamination could not be determined.
- Spike Recovery Non-Conformances: In multiple SDGs for multiple analytes some spike sample (matrix spikes, lab control spikes) recoveries were out of criteria. These out of criteria results indicate a possible accuracy bias. In order to account for this possible bias these results were validated as estimated.

Following the validation and usability review Ramboll summarized the results by applying validation qualifiers to the final result data. These qualifiers communicate the biases found during validation efforts. Qualifiers were uploaded to the project EQuIS database and will be presented with project results in all reporting and engineering tasks to ensure that ALL data users are aware of quality and usability limitations.

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UE17007	UE17007-001	CMR-EB06-4.5-5.0-190516	5/16/2019	Soil	SW6020B	T	Antimony		U	mg/kg	Y	UJ	low	ms/msd recoveries
UE17007	UE17007-001	CMR-EB06-4.5-5.0-190516	5/16/2019	Soil	SW6020B	T	Arsenic	20		mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-001	CMR-EB06-4.5-5.0-190516	5/16/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UE17007	UE17007-002	CMR-EB06-6.25-6.75-190516	5/16/2019	Soil	SW6020B	T	Arsenic	2.6		mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-002	CMR-EB06-6.25-6.75-190516	5/16/2019	Soil	SW6020B	T	Antimony		U	mg/kg	Y	UJ	low	ms/msd recoveries
UE17007	UE17007-002	CMR-EB06-6.25-6.75-190516	5/16/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UE17007	UE17007-003	CMR-EB07-0.0-1.0-190516	5/16/2019	Soil	SW6020B	T	Arsenic	40		mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-003	CMR-EB07-0.0-1.0-190516	5/16/2019	Soil	SW6020B	T	Antimony	0.71		mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-003	CMR-EB07-0.0-1.0-190516	5/16/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UE17007	UE17007-004	CMR-EB07-5.25-5.75-190516	5/16/2019	Soil	SW6020B	T	Antimony	0.23	J	mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-004	CMR-EB07-5.25-5.75-190516	5/16/2019	Soil	SW6020B	T	Arsenic	22		mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-004	CMR-EB07-5.25-5.75-190516	5/16/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UE17007	UE17007-005	CMR-EB07-7.5-8.0-190516	5/16/2019	Soil	SW6020B	T	Antimony		U	mg/kg	Y	UJ	low	ms/msd recoveries
UE17007	UE17007-005	CMR-EB07-7.5-8.0-190516	5/16/2019	Soil	SW6020B	T	Arsenic	0.42	J	mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-005	CMR-EB07-7.5-8.0-190516	5/16/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UE17007	UE17007-007	CMR-EB05-6-7-190517	5/17/2019	Soil	SW6020B	T	Arsenic	6.2		mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-007	CMR-EB05-6-7-190517	5/17/2019	Soil	SW6020B	T	Antimony		U	mg/kg	Y	UJ	low	ms/msd recoveries
UE17007	UE17007-007	CMR-EB05-6-7-190517	5/17/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UE17007	UE17007-008	CMR-EB05-11-12-190517	5/17/2019	Soil	SW6020B	T	Arsenic	2.0		mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-008	CMR-EB05-11-12-190517	5/17/2019	Soil	SW6020B	T	Antimony	0.23	J	mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-008	CMR-EB05-11-12-190517	5/17/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UE17007	UE17007-009	CMR-EB09-6-7-190517	5/17/2019	Soil	SW6020B	T	Antimony		U	mg/kg	Y	UJ	low	ms/msd recoveries
UE17007	UE17007-009	CMR-EB09-6-7-190517	5/17/2019	Soil	SW6020B	T	Arsenic	0.56	J	mg/kg	Y	J	low	ms/msd recoveries
UE17007	UE17007-009	CMR-EB09-6-7-190517	5/17/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UE22021	UE22021-001	CMR-EB02-0.5-1.0-190521	5/21/2019	Soil	MTDEQ EPH	T	C11 through C22 Aromatic Hydrocarbons	40		mg/kg	Y	J	-	FD RPDs
UE22021	UE22021-001	CMR-EB02-0.5-1.0-190521	5/21/2019	Soil	SW8260B	T	Benzene	8.2		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-001	CMR-EB02-0.5-1.0-190521	5/21/2019	Soil	SW8270D	T	2-Methylnaphthalene	17	J	ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-001	CMR-EB02-0.5-1.0-190521	5/21/2019	Soil	SW8270D	T	Naphthalene	12	J	ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-002	CMR-EB02-5.5-6.0-190521	5/21/2019	Soil	MTDEQ EPH	T	C11 through C22 Aromatic Hydrocarbons	1400		mg/kg	Y	J	-	FD RPDs
UE22021	UE22021-002	CMR-EB02-5.5-6.0-190521	5/21/2019	Soil	MTDEQ VPH	T	Benzene	68		mg/kg	Y	J	-	FD RPDs
UE22021	UE22021-002	CMR-EB02-5.5-6.0-190521	5/21/2019	Soil	MTDEQ VPH	T	Naphthalene	93		mg/kg	Y	J	-	FD RPDs
UE22021	UE22021-002	CMR-EB02-5.5-6.0-190521	5/21/2019	Soil	SW8260B	T	Naphthalene	15000		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-002	CMR-EB02-5.5-6.0-190521	5/21/2019	Soil	SW8260B	T	Benzene	23000		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-002	CMR-EB02-5.5-6.0-190521	5/21/2019	Soil	SW8270D	T	Fluorene	1700		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-002	CMR-EB02-5.5-6.0-190521	5/21/2019	Soil	SW8270D	T	Naphthalene	9900		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-002	CMR-EB02-5.5-6.0-190521	5/21/2019	Soil	SW8270D	T	Anthracene	480		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-002	CMR-EB02-5.5-6.0-190521	5/21/2019	Soil	SW8270D	T	2-Methylnaphthalene	13000		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-003	CMR-EB02-5.5-6.0-190521-FD	5/21/2019	Soil	MTDEQ EPH	T	C11 through C22 Aromatic Hydrocarbons	1700		mg/kg	Y	J	-	FD RPDs
UE22021	UE22021-003	CMR-EB02-5.5-6.0-190521-FD	5/21/2019	Soil	MTDEQ VPH	T	Benzene	46		mg/kg	Y	J	-	FD RPDs
UE22021	UE22021-003	CMR-EB02-5.5-6.0-190521-FD	5/21/2019	Soil	MTDEQ VPH	T	Naphthalene	79		mg/kg	Y	J	-	FD RPDs
UE22021	UE22021-003	CMR-EB02-5.5-6.0-190521-FD	5/21/2019	Soil	SW8260B	T	Naphthalene	28000		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-003	CMR-EB02-5.5-6.0-190521-FD	5/21/2019	Soil	SW8260B	T	Benzene	24000		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-003	CMR-EB02-5.5-6.0-190521-FD	5/21/2019	Soil	SW8270D	T	Anthracene	1800		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-003	CMR-EB02-5.5-6.0-190521-FD	5/21/2019	Soil	SW8270D	T	Naphthalene	31000		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-003	CMR-EB02-5.5-6.0-190521-FD	5/21/2019	Soil	SW8270D	T	2-Methylnaphthalene	56000		ug/kg	Y	J	-	FD RPDs
UE22021	UE22021-003	CMR-EB02-5.5-6.0-190521-FD	5/21/2019	Soil	SW8270D	T	Fluorene	3900		ug/kg	Y	J	-	FD RPDs
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	MTDEQ VPH	T	Toluene	1.6	J	ug/l	Y	U	-	blank detection
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW6020B	D	Beryllium		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Pentachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Acenaphthylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Benzo(a)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Dimethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Dibenzofuran	3.1	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Benzo(g,h,i)perylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Indeno(1,2,3-cd)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Benzo(b)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2,4-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Benzo(k)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2,4-Dichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Chrysene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Benzo(a)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2,4-Dinitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	4,6-Dinitro-2-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Dibenz(a,h)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	1,3-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	bis(2-Chloroethyl) ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	4-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	3-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	4-Bromophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2,4-Dimethylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	1,4-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Pyrene	0.58	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	4-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	bis(2-Chloroethoxy)methane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Di-n-octylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Hexachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Anthracene	0.92	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	1,2,4-Trichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2,2'-oxybis(1-Chloropropane)		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	N-Nitrosodiphenylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2-Chlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	1,2-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	3,3'-Dichlorobenzidine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2-Chloronaphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2-Methylnaphthalene	0.77	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Naphthalene	4.7		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	1,2,4,5-Tetrachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2,4,6-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2,4,5-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Hexachlorobutadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Fluorene	4.5		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Butylbenzylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2,3,4,6-Tetrachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	4-Chloro-3-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	2,6-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	N-Nitroso-di-n-propylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Hexachloroethane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Carbazole	17		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Hexachlorocyclopentadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Phenanthrene	1.3	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Isophorone		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Nitrobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Acenaphthene	6.9		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Diethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	Di-n-butylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-001	CMR-EB06-190516	5/16/2019	Groundwater	SW8270D	T	4-Chlorophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW6020B	D	Beryllium		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Hexachloroethane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	N-Nitrosodiphenylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	4,6-Dinitro-2-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Dibenz(a,h)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	1,3-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Benzo(a)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2,3,4,6-Tetrachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Benzo(a)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2,6-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Chrysene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Hexachlorocyclopentadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Isophorone		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Acenaphthene	6.6		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Diethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Di-n-butylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Phenanthrene	8.5		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Butylbenzylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	4-Chloro-3-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Dimethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	4-Chlorophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Di-n-octylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Hexachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Anthracene	2.0		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	1,2,4-Trichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2,4-Dichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2,4-Dinitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Pyrene	1.5	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	N-Nitroso-di-n-propylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Dibenzofuran	5.9	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Benzo(g,h,i)perylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Indeno(1,2,3-cd)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Benzo(b)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Benzo(k)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Acenaphthylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2,4-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2,4,5-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Fluorene	8.9		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Nitrobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	1,2,4,5-Tetrachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2-Chlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	1,2-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	3,3'-Dichlorobenzidine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2-Chloronaphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Pentachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Carbazole		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	3-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Hexachlorobutadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2,4,6-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Naphthalene	95		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2-Methylnaphthalene	420		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	1,4-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2,4-Dimethylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	bis(2-Chloroethyl) ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	4-Bromophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	4-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	4-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	bis(2-Chloroethoxy)methane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-002	CMR-EB07-190516	5/16/2019	Groundwater	SW8270D	T	2,2'-oxybis(1-Chloropropane)		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	MTDEQ VPH	T	Toluene	1.7	J	ug/l	Y	U	-	blank detection
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW6020B	D	Beryllium		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	3-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Dibenz(a,h)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2,6-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Hexachlorocyclopentadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	4-Chlorophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Hexachloroethane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	N-Nitroso-di-n-propylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Acenaphthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Isophorone		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	4-Chloro-3-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2,3,4,6-Tetrachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	1,3-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Acenaphthylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	4,6-Dinitro-2-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2,4-Dinitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Diethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2-Methylnaphthalene	1.8		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Benzo(a)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Chrysene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Benzo(a)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Naphthalene	1.7		ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	N-Nitrosodiphenylamine		U	ug/l	Y	UJ	low	ms/msd recoveries

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	4-Bromophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Benzo(k)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Fluorene	0.051	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Carbazole		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Hexachlorobutadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Pentachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2,4,6-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	3,3'-Dichlorobenzidine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Di-n-butylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2-Chloronaphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Butylbenzylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	1,2-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2-Chlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	1,2,4,5-Tetrachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2,4,5-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Nitrobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Phenanthrene	0.090	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2,2'-oxybis(1-Chloropropane)		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	1,4-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	4-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2,4-Dimethylphenol	0.51	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	4-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	bis(2-Chloroethyl) ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	bis(2-Chloroethoxy)methane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.49	J	ug/l	Y	U	-	blank detection
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Di-n-octylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Dibenzofuran		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Benzo(b)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Hexachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Indeno(1,2,3-cd)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Benzo(g,h,i)perylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Dimethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Pyrene	0.045	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2,4-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	2,4-Dichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	1,2,4-Trichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-003	CMR-EB11-190520	5/20/2019	Groundwater	SW8270D	T	Anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	MTDEQ VPH	T	Toluene	0.76	J	ug/l	Y	U	-	blank detection
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW6020B	D	Beryllium		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Hexachlorocyclopentadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	N-Nitrosodiphenylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Butylbenzylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Phenanthrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Di-n-butylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Diethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Isophorone		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Fluorene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	4-Chlorophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Hexachloroethane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2,3,4,6-Tetrachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2,6-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	1,2,4,5-Tetrachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Acenaphthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2-Methylnaphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Nitrobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2,4,5-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2-Chlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Benzo(a)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	1,2-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2-Chloronaphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Carbazole		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Naphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2,4,6-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Pentachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Hexachlorobutadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	3,3'-Dichlorobenzidine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	1,4-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Dibenzofuran		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Di-n-octylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.53	J	ug/l	Y	U	-	blank detection
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	bis(2-Chloroethoxy)methane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	bis(2-Chloroethyl) ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2,2'-oxybis(1-Chloropropane)		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	1,2,4-Trichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2,4-Dimethylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	4-Bromophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	4-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	4-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	3-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	N-Nitroso-di-n-propylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Dibenz(a,h)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	4,6-Dinitro-2-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2,4-Dinitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Benzo(a)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Chrysene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Hexachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Benzo(k)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	1,3-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Benzo(b)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Indeno(1,2,3-cd)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Benzo(g,h,i)perylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Dimethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2,4-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	2,4-Dichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	Acenaphthylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-004	CMR-EB14-190520	5/20/2019	Groundwater	SW8270D	T	4-Chloro-3-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-005	CMR-EB05-190521	5/21/2019	Groundwater	MTDEQ VPH	T	Toluene	4.8	J	ug/l	Y	U	-	blank detection
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	MTDEQ VPH	T	Naphthalene	0.85	J	ug/l	Y	U	-	blank detection
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	MTDEQ VPH	T	Toluene	0.95	J	ug/l	Y	U	-	blank detection
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW6020B	D	Beryllium		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	N-Nitroso-di-n-propylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2,6-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	4-Chloro-3-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2,3,4,6-Tetrachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Benzo(a)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	1,3-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Dibenz(a,h)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	4,6-Dinitro-2-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2,4-Dinitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Benzo(a)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Chrysene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Di-n-octylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Benzo(k)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	4-Chlorophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Benzo(b)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Indeno(1,2,3-cd)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Benzo(g,h,i)perylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Dibenzofuran		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Dimethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2,4-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2,4-Dichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	1,2,4-Trichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Hexachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Acenaphthylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Hexachlorobutadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	3-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Nitrobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2,4,5-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	1,2,4,5-Tetrachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2-Chlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	1,2-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	3,3'-Dichlorobenzidine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2-Methylnaphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Naphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Pentachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Hexachloroethane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Carbazole		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Fluorene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	N-Nitrosodiphenylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Butylbenzylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Phenanthrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Di-n-butylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Diethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Acenaphthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Isophorone		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Hexachlorocyclopentadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2-Chloronaphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2,4,6-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.55	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	4-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	4-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	4-Bromophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2,4-Dimethylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	2,2'-oxybis(1-Chloropropane)		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	bis(2-Chloroethyl) ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	1,4-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-006	CMR-EB-01-20190521	5/21/2019	Blank Water	SW8270D	T	bis(2-Chloroethoxy)methane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	MTDEQ VPH	T	Toluene	0.59	J	ug/l	Y	U	-	blank detection
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW6020B	D	Beryllium		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Chrysene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Dimethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Dibenzofuran		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Benzo(g,h,i)perylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Indeno(1,2,3-cd)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Benzo(b)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Acenaphthylene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2-Chlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2,4-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2,2'-oxybis(1-Chloropropane)		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	3-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	bis(2-Chloroethyl) ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Nitrobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Benzo(k)fluoranthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2-Chloronaphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2,4-Dimethylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	4-Bromophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	4-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	4-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2-Nitroaniline		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2-Nitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2,4,5-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2-Methylnaphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2,4,6-Trichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	3,3'-Dichlorobenzidine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Di-n-octylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	1,4-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	1,2,4,5-Tetrachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	1,2-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Naphthalene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Di-n-butylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.43	J	ug/l	Y	J	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	N-Nitroso-di-n-propylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	bis(2-Chloroethoxy)methane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Hexachloroethane		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	4-Chlorophenyl-phenyl ether		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Hexachlorocyclopentadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Isophorone		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	4-Chloro-3-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Diethylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2,6-Dinitrotoluene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Phenanthrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Butylbenzylphthalate		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	N-Nitrosodiphenylamine		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Fluorene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Carbazole		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Hexachlorobutadiene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Pentachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Acenaphthene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	1,2,4-Trichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2,3,4,6-Tetrachlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Benzo(a)pyrene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2,4-Dichlorophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Hexachlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	2,4-Dinitrophenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	4,6-Dinitro-2-methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Dibenz(a,h)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	1,3-Dichlorobenzene		U	ug/l	Y	UJ	low	ms/msd recoveries
UE22029	UE22029-007	CMR-EB-02-20190521	5/21/2019	Blank Water	SW8270D	T	Benzo(a)anthracene		U	ug/l	Y	UJ	low	ms/msd recoveries
UF07044	UF07044-001	CMR-EB10-0.5-1.0-190606	6/6/2019	Soil	SW6020B	T	Beryllium	0.36		mg/kg	Y	J	low	ms/msd recoveries
UF07044	UF07044-002	CMR-EB10-2.5-5.0-190606	6/6/2019	Soil	SW6020B	T	Beryllium	0.98		mg/kg	Y	J	low	ms/msd recoveries
UF07044	UF07044-002	CMR-EB10-2.5-5.0-190606	6/6/2019	Soil	SW8260B	T	Methylcyclohexane	230000		ug/kg	Y	J	high	lsc recovery
UF07044	UF07044-003	CMR-EB10-7.5-8.5-190606	6/6/2019	Soil	SW6020B	T	Beryllium	0.64		mg/kg	Y	J	low	ms/msd recoveries
UF07044	UF07044-003	CMR-EB10-7.5-8.5-190606	6/6/2019	Soil	SW8260B	T	Methylcyclohexane	21000		ug/kg	Y	J	high	lsc recovery
UF08028	UF08028-001	CMR-EB01-0.5-1.0-190607	6/7/2019	Soil	SW6020B	T	Antimony	1.5		mg/kg	Y	J	low	ms/msd recoveries
UF08028	UF08028-001	CMR-EB01-0.5-1.0-190607	6/7/2019	Soil	SW8260B	T	Methylcyclohexane	780		ug/kg	Y	J	high	lsc recovery
UF08028	UF08028-002	CMR-EB01-4.0-5.0-190607	6/7/2019	Soil	SW6020B	T	Antimony		U	mg/kg	Y	UJ	low	ms/msd recoveries
UF08028	UF08028-002	CMR-EB01-4.0-5.0-190607	6/7/2019	Soil	SW6020B	T	Zinc	53		mg/kg	Y	U	-	blank detection
UF08028	UF08028-002	CMR-EB01-4.0-5.0-190607	6/7/2019	Soil	SW8260B	T	Methylcyclohexane	180000		ug/kg	Y	J	high	lsc recovery
UF08028	UF08028-003	CMR-EB01-14.0-15.0-190607	6/7/2019	Soil	SW6020B	T	Zinc	110		mg/kg	Y	U	-	blank detection
UF08028	UF08028-003	CMR-EB01-14.0-15.0-190607	6/7/2019	Soil	SW6020B	T	Antimony	0.23	J	mg/kg	Y	J	low	ms/msd recoveries
UF08028	UF08028-003	CMR-EB01-14.0-15.0-190607	6/7/2019	Soil	SW8260B	T	Methylcyclohexane	4700		ug/kg	Y	J	high	lsc recovery
UF08028	UF08028-004	CMR-EB10-190606	6/6/2019	Groundwater	SW6020B	T	Zinc	15		ug/l	Y		-	removed lab qual
UF08028	UF08028-004	CMR-EB10-190606	6/6/2019	Groundwater	SW6020B	T	Antimony	1.0	J	ug/l	Y	J	low	ms/msd recoveries
UF08028	UF08028-004	CMR-EB10-190606	6/6/2019	Groundwater	SW8260B	T	Methylcyclohexane	240	J	ug/l	Y	J	high	lsc recovery
UF08028	UF08028-005	CMR-EB09-190607	6/7/2019	Groundwater	SW6020B	T	Zinc	27		ug/l	Y		-	removed lab qual
UF08028	UF08028-005	CMR-EB09-190607	6/7/2019	Groundwater	SW6020B	T	Antimony		U	ug/l	Y	UJ	low	ms/msd recoveries
UF08028	UF08028-005	CMR-EB09-190607	6/7/2019	Groundwater	SW8260B	T	Methylcyclohexane	6.3		ug/l	Y	J	high	lsc recovery
UF08028	UF08028-005	CMR-EB09-190607	6/7/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.91	BJ	ug/l	Y	U	-	blank detection
UF13022	UF13022-001	CMR-EB03-0.0-1.0-190612	6/12/2019	Soil	MTDEQ VPH	T	Total Petroleum Hydrocarbons (GC/FID)	3.0	J	mg/kg	Y	J	-	FDs
UF13022	UF13022-001	CMR-EB03-0.0-1.0-190612	6/12/2019	Soil	SW6020B	T	Beryllium	0.21		mg/kg	Y		-	removed lab qual
UF13022	UF13022-001	CMR-EB03-0.0-1.0-190612	6/12/2019	Soil	SW6020B	T	Chromium (total)	4.7	B	mg/kg	Y	U	-	blank detections
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	MTDEQ VPH	T	Total Petroleum Hydrocarbons (GC/FID)	31		mg/kg	Y	J	-	FDs
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	MTDEQ VPH	T	C5 through C8 Aliphatic Hydrocarbons (Adjusted)	30		mg/kg	Y	J	-	FDs
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	MTDEQ VPH	T	Benzene	0.62		mg/kg	Y	J	-	FDs
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	SW6020B	T	Chromium (total)	23		mg/kg	Y		-	removed lab qual

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	SW6020B	T	Beryllium	0.87		mg/kg	Y		-	removed lab qual
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	SW6020B	T	Antimony	0.33	BJ	mg/kg	Y	U	-	blank detections
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	SW8260B	T	Benzene	260	E	ug/kg	Y	J	-	FDs
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	SW8260B	T	Methylcyclohexane	150		ug/kg	Y	J	-	FDs
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	SW8260B	T	Cyclohexane	180		ug/kg	Y	J	-	FDs
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	SW8270D	T	2-Methylnaphthalene	110	J	ug/kg	Y	J	-	FDs
UF13022	UF13022-002	CMR-EB03-4.0-4.5-190612	6/12/2019	Soil	SW8270D	T	Pyrene	69	J	ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	MTDEQ VPH	T	C5 through C8 Aliphatic Hydrocarbons (Adjusted)	11		mg/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	MTDEQ VPH	T	Benzene	0.29	J	mg/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	MTDEQ VPH	T	Total Petroleum Hydrocarbons (GC/FID)	11		mg/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW6020B	T	Antimony	0.25	BJ	mg/kg	Y	U	-	blank detections
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW6020B	T	Chromium (total)	23		mg/kg	Y		-	removed lab qual
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW6020B	T	Beryllium	0.87		mg/kg	Y		-	removed lab qual
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8260B	T	Methylcyclohexane	1300		ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8260B	T	Cyclohexane	780		ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8260B	T	Benzene	580		ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8270D	T	Benzo(b)fluoranthene	51	J	ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8270D	T	Pyrene	260		ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8270D	T	Anthracene	54	J	ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8270D	T	Fluoranthene	51	J	ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8270D	T	2-Methylnaphthalene	540		ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8270D	T	Benzo(a)pyrene	50	J	ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8270D	T	Naphthalene	170		ug/kg	Y	J	-	FDs
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8270D	T	3,3'-Dichlorobenzidine		U	ug/kg	Y	UJ	low	lsc recovery
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UF13022	UF13022-003	CMR-EB03-4.0-4.5-190612-DUP	6/12/2019	Soil	SW8270D	T	Phenanthrene	200		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	MTDEQ VPH	T	Benzene	17		mg/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	MTDEQ VPH	T	C5 through C8 Aliphatic Hydrocarbons (Adjusted)	1200		mg/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	MTDEQ VPH	T	Total Petroleum Hydrocarbons (GC/FID)	2700		mg/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW6020B	T	Beryllium	0.79		mg/kg	Y		-	removed lab qual
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW6020B	T	Chromium (total)	45		mg/kg	Y		-	removed lab qual
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW6020B	T	Antimony	0.33	BJ	mg/kg	Y	U	-	blank detections
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8260B	T	Methylcyclohexane	90000		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8260B	T	Cyclohexane	22000		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8260B	T	Benzene	14000		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Chrysene	220		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Benzo(g,h,i)perylene	51	J	ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Benzo(b)fluoranthene	200		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Fluoranthene	220		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Benzo(a)pyrene	120	J	ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Benzo(a)anthracene	170		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Anthracene	760		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	3,3'-Dichlorobenzidine		U	ug/kg	Y	UJ	low	lsc recovery
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Naphthalene	7300		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Pyrene	750		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	2-Methylnaphthalene	21000		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Phenanthrene	3000		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Acenaphthene	540		ug/kg	Y	J	-	FDs
UF13022	UF13022-004	CMR-EB03-5.0-6.0-190612	6/12/2019	Soil	SW8270D	T	Fluorene	1600		ug/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	MTDEQ VPH	T	Benzene	1.5		mg/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	MTDEQ VPH	T	Total Petroleum Hydrocarbons (GC/FID)	1000		mg/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	MTDEQ VPH	T	C5 through C8 Aliphatic Hydrocarbons (Adjusted)	480		mg/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW6020B	T	Antimony	0.23	BJ	mg/kg	Y	U	-	blank detections
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW6020B	T	Beryllium	1.2		mg/kg	Y		-	removed lab qual
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW6020B	T	Chromium (total)	21		mg/kg	Y		-	removed lab qual
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8260B	T	Methylcyclohexane	9000		ug/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8260B	T	Cyclohexane	3400		ug/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8260B	T	Benzene	490		ug/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8270D	T	Phenanthrene	97		ug/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8270D	T	Acenaphthene	20	J	ug/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8270D	T	Fluorene	99		ug/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8270D	T	3,3'-Dichlorobenzidine		U	ug/kg	Y	UJ	low	lsc recovery
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8270D	T	2-Methylnaphthalene	1500		ug/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8270D	T	Anthracene	24	J	ug/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8270D	T	Naphthalene	580		ug/kg	Y	J	-	FDs
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8270D	T	Dibenzofuran	57	J	ug/kg	Y	J	-	FDs

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UF13022	UF13022-005	CMR-EB03-9.0-10.0-190612	6/12/2019	Soil	SW8270D	T	Pyrene	25	J	ug/kg	Y	J	-	FDs
UF14018	UF14018-001	CMR-EB04-0.0-1.0-190613	6/13/2019	Soil	SW6020B	T	Antimony	0.36	BJ	mg/kg	Y	U	-	blank results
UF14018	UF14018-001	CMR-EB04-0.0-1.0-190613	6/13/2019	Soil	SW6020B	T	Beryllium	0.49		mg/kg	Y		-	removed lab qual
UF14018	UF14018-001	CMR-EB04-0.0-1.0-190613	6/13/2019	Soil	SW6020B	T	Chromium (total)	12		mg/kg	Y		-	removed lab qual
UF14018	UF14018-001	CMR-EB04-0.0-1.0-190613	6/13/2019	Soil	SW8260B	T	Acetone	29		ug/kg	Y	J	low	lsc recovery
UF14018	UF14018-001	CMR-EB04-0.0-1.0-190613	6/13/2019	Soil	SW8270D	T	3-Nitroaniline		U	ug/kg	Y	UJ	low	lsc recovery
UF14018	UF14018-001	CMR-EB04-0.0-1.0-190613	6/13/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UF14018	UF14018-002	CMR-EB04-4.0-5.0-190613	6/13/2019	Soil	SW6020B	T	Antimony	0.28	BJ	mg/kg	Y	U	-	blank results
UF14018	UF14018-002	CMR-EB04-4.0-5.0-190613	6/13/2019	Soil	SW6020B	T	Chromium (total)	14		mg/kg	Y		-	removed lab qual
UF14018	UF14018-002	CMR-EB04-4.0-5.0-190613	6/13/2019	Soil	SW6020B	T	Beryllium	0.82		mg/kg	Y		-	removed lab qual
UF14018	UF14018-002	CMR-EB04-4.0-5.0-190613	6/13/2019	Soil	SW8260B	T	Methylcyclohexane	5300		ug/kg	Y	J	high	lcs out
UF14018	UF14018-002	CMR-EB04-4.0-5.0-190613	6/13/2019	Soil	SW8260B	T	Acetone		U	ug/kg	Y	UJ	low	lsc recovery
UF14018	UF14018-002	CMR-EB04-4.0-5.0-190613	6/13/2019	Soil	SW8270D	T	3-Nitroaniline		U	ug/kg	Y	UJ	low	lsc recovery
UF14018	UF14018-002	CMR-EB04-4.0-5.0-190613	6/13/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UF14018	UF14018-003	CMR-EB04-8.0-8.5-190613	6/13/2019	Soil	SW6020B	T	Beryllium	0.51		mg/kg	Y		-	removed lab qual
UF14018	UF14018-003	CMR-EB04-8.0-8.5-190613	6/13/2019	Soil	SW6020B	T	Chromium (total)	11		mg/kg	Y		-	removed lab qual
UF14018	UF14018-003	CMR-EB04-8.0-8.5-190613	6/13/2019	Soil	SW8260B	T	Acetone		U	ug/kg	Y	UJ	low	lsc recovery
UF14018	UF14018-003	CMR-EB04-8.0-8.5-190613	6/13/2019	Soil	SW8260B	T	Methylcyclohexane	8100		ug/kg	Y	J	high	lcs out
UF14018	UF14018-003	CMR-EB04-8.0-8.5-190613	6/13/2019	Soil	SW8270D	T	Hexachlorocyclopentadiene		U	ug/kg	Y	UJ	low	lsc recovery
UF14018	UF14018-003	CMR-EB04-8.0-8.5-190613	6/13/2019	Soil	SW8270D	T	3-Nitroaniline		U	ug/kg	Y	UJ	low	lsc recovery
UF14018	UF14018-004	TB-10-20190613	6/13/2019	Blank Water	SW8260B	T	Acetone	2.2	J	ug/l	Y	UJ	low	lsc recovery
UF14020	UF14020-001	CMR-EB07-190613-GW	6/13/2019	Groundwater	SW6020B	T	Zinc	7.6	BJ	ug/l	Y	U	-	blank detections
UF14020	UF14020-001	CMR-EB07-190613-GW	6/13/2019	Groundwater	SW8260B	T	Acetone	11		ug/l	Y	J	low	lcs results
UF14020	UF14020-001	CMR-EB07-190613-GW	6/13/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.71	BJ	ug/l	Y	U	-	blank results
UF14020	UF14020-002	CMR-EB14-190613-GW	6/13/2019	Groundwater	SW6020B	T	Zinc	8.3	BJ	ug/l	Y	U	-	blank detections
UF14020	UF14020-002	CMR-EB14-190613-GW	6/13/2019	Groundwater	SW8260B	T	Acetone	13		ug/l	Y	J	low	lcs results
UF14020	UF14020-002	CMR-EB14-190613-GW	6/13/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.43	BJ	ug/l	Y	U	-	blank results
UF14020	UF14020-003	TB-11-20190613	6/13/2019	Blank Water	SW8260B	T	Acetone		U	ug/l	Y	UJ	low	lcs results
UF15015	UF15015-001	CMR-EB15-0.5-1.0-190614	6/14/2019	Soil	MTDEQ VPH	T	Naphthalene	0.47		mg/kg	Y	J	low	spike recoveries
UF15015	UF15015-001	CMR-EB15-0.5-1.0-190614	6/14/2019	Soil	SW6020B	T	Antimony	0.27	BJ	mg/kg	Y	UJ	-	blank detection
UF15015	UF15015-001	CMR-EB15-0.5-1.0-190614	6/14/2019	Soil	SW6020B	T	Chromium (total)	16		mg/kg	Y		-	removed lab qual
UF15015	UF15015-001	CMR-EB15-0.5-1.0-190614	6/14/2019	Soil	SW6020B	T	Beryllium	0.74		mg/kg	Y		-	removed lab qual
UF15015	UF15015-001	CMR-EB15-0.5-1.0-190614	6/14/2019	Soil	SW8260B	T	Acetone	11	J	ug/kg	Y	J	low	spike recoveries
UF15015	UF15015-001	CMR-EB15-0.5-1.0-190614	6/14/2019	Soil	SW8260B	T	Cyclohexane		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-001	CMR-EB15-0.5-1.0-190614	6/14/2019	Soil	SW8260B	T	Cumene		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-001	CMR-EB15-0.5-1.0-190614	6/14/2019	Soil	SW8260B	T	Naphthalene	49		ug/kg	Y	J	low	spike recoveries
UF15015	UF15015-001	CMR-EB15-0.5-1.0-190614	6/14/2019	Soil	SW8270D	T	Naphthalene		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-002	CMR-EB15-15.0-16.0-190614	6/14/2019	Soil	MTDEQ VPH	T	Naphthalene		U	mg/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-002	CMR-EB15-15.0-16.0-190614	6/14/2019	Soil	SW6020B	T	Chromium (total)	23		mg/kg	Y		-	removed lab qual
UF15015	UF15015-002	CMR-EB15-15.0-16.0-190614	6/14/2019	Soil	SW6020B	T	Beryllium	0.93		mg/kg	Y		-	removed lab qual
UF15015	UF15015-002	CMR-EB15-15.0-16.0-190614	6/14/2019	Soil	SW6020B	T	Antimony	0.38	BJ	mg/kg	Y	UJ	-	blank detection
UF15015	UF15015-002	CMR-EB15-15.0-16.0-190614	6/14/2019	Soil	SW8260B	T	Naphthalene	6.2		ug/kg	Y	J	low	spike recoveries
UF15015	UF15015-002	CMR-EB15-15.0-16.0-190614	6/14/2019	Soil	SW8260B	T	Cumene		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-002	CMR-EB15-15.0-16.0-190614	6/14/2019	Soil	SW8260B	T	Acetone	40		ug/kg	Y	J	low	spike recoveries
UF15015	UF15015-002	CMR-EB15-15.0-16.0-190614	6/14/2019	Soil	SW8260B	T	Cyclohexane		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-002	CMR-EB15-15.0-16.0-190614	6/14/2019	Soil	SW8270D	T	Naphthalene	5.9		ug/kg	Y	J	low	spike recoveries
UF15015	UF15015-003	CMR-EB15-18.0-19.0-190614	6/14/2019	Soil	MTDEQ VPH	T	Naphthalene	1.2		mg/kg	Y	J	low	spike recoveries
UF15015	UF15015-003	CMR-EB15-18.0-19.0-190614	6/14/2019	Soil	SW6020B	T	Chromium (total)	17		mg/kg	Y		-	removed lab qual
UF15015	UF15015-003	CMR-EB15-18.0-19.0-190614	6/14/2019	Soil	SW6020B	T	Beryllium	0.86		mg/kg	Y		-	removed lab qual
UF15015	UF15015-003	CMR-EB15-18.0-19.0-190614	6/14/2019	Soil	SW6020B	T	Antimony	0.46		mg/kg	Y		-	removed lab qual
UF15015	UF15015-003	CMR-EB15-18.0-19.0-190614	6/14/2019	Soil	SW8260B	T	Cyclohexane		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-003	CMR-EB15-18.0-19.0-190614	6/14/2019	Soil	SW8260B	T	Acetone	48		ug/kg	Y	J	low	spike recoveries
UF15015	UF15015-003	CMR-EB15-18.0-19.0-190614	6/14/2019	Soil	SW8260B	T	Naphthalene	4.1	J	ug/kg	Y	J	low	spike recoveries
UF15015	UF15015-003	CMR-EB15-18.0-19.0-190614	6/14/2019	Soil	SW8260B	T	Cumene		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-003	CMR-EB15-18.0-19.0-190614	6/14/2019	Soil	SW8270D	T	Naphthalene		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-004	CMR-EB15-20.5-21.5-190614	6/14/2019	Soil	MTDEQ VPH	T	Naphthalene	2.5		mg/kg	Y	J	low	spike recoveries
UF15015	UF15015-004	CMR-EB15-20.5-21.5-190614	6/14/2019	Soil	SW6020B	T	Chromium (total)	23		mg/kg	Y		-	removed lab qual
UF15015	UF15015-004	CMR-EB15-20.5-21.5-190614	6/14/2019	Soil	SW6020B	T	Beryllium	0.60		mg/kg	Y		-	removed lab qual
UF15015	UF15015-004	CMR-EB15-20.5-21.5-190614	6/14/2019	Soil	SW6020B	T	Antimony	0.42	BJ	mg/kg	Y	UJ	-	blank detection
UF15015	UF15015-004	CMR-EB15-20.5-21.5-190614	6/14/2019	Soil	SW8260B	T	Naphthalene		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-004	CMR-EB15-20.5-21.5-190614	6/14/2019	Soil	SW8260B	T	Cumene		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-004	CMR-EB15-20.5-21.5-190614	6/14/2019	Soil	SW8260B	T	Cyclohexane		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-004	CMR-EB15-20.5-21.5-190614	6/14/2019	Soil	SW8260B	T	Acetone	72		ug/kg	Y	J	low	spike recoveries
UF15015	UF15015-004	CMR-EB15-20.5-21.5-190614	6/14/2019	Soil	SW8270D	T	Naphthalene		U	ug/kg	Y	UJ	low	spike recoveries
UF15015	UF15015-005	TB-12-20190614	6/14/2019	Blank Water	SW8260B	T	Cumene		U	ug/l	Y	UJ	low	spike recoveries
UF15015	UF15015-005	TB-12-20190614	6/14/2019	Blank Water	SW8260B	T	Naphthalene		U	ug/l	Y	UJ	low	spike recoveries
UF15015	UF15015-005	TB-12-20190614	6/14/2019	Blank Water	SW8260B	T	Cyclohexane		U	ug/l	Y	UJ	low	spike recoveries
UF15015	UF15015-005	TB-12-20190614	6/14/2019	Blank Water	SW8260B	T	Acetone		U	ug/l	Y	UJ	low	spike recoveries

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UF18024	UF18024-001	CMR-WB09-2.0-3.0-190617	6/17/2019	Soil	SW6020B	T	Chromium (total)	21		mg/kg	Y		-	removed lab qual
UF18024	UF18024-001	CMR-WB09-2.0-3.0-190617	6/17/2019	Soil	SW8260B	T	Methylcyclohexane		U	ug/kg	Y	UJ	low	lsc recovery
UF18024	UF18024-001	CMR-WB09-2.0-3.0-190617	6/17/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lsc recovery
UF18024	UF18024-001	CMR-WB09-2.0-3.0-190617	6/17/2019	Soil	SW8260B	T	Acetone	38		ug/kg	Y	J	low	lsc recovery
UF18024	UF18024-002	CMR-WB09-6.0-6.75-190617	6/17/2019	Soil	SW6020B	T	Chromium (total)	14		mg/kg	Y		-	removed lab qual
UF18024	UF18024-002	CMR-WB09-6.0-6.75-190617	6/17/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lsc recovery
UF18024	UF18024-002	CMR-WB09-6.0-6.75-190617	6/17/2019	Soil	SW8260B	T	Methylcyclohexane	520		ug/kg	Y	J	low	lsc recovery
UF18024	UF18024-002	CMR-WB09-6.0-6.75-190617	6/17/2019	Soil	SW8260B	T	Acetone		U	ug/kg	Y	UJ	low	lsc recovery
UF18024	UF18024-003	CMR-WB08-5.0-6.0-190617	6/17/2019	Soil	SW6020B	T	Chromium (total)	12		mg/kg	Y		-	removed lab qual
UF18024	UF18024-003	CMR-WB08-5.0-6.0-190617	6/17/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lsc recovery
UF18024	UF18024-003	CMR-WB08-5.0-6.0-190617	6/17/2019	Soil	SW8260B	T	Methylcyclohexane		U	ug/kg	Y	UJ	low	lsc recovery
UF18024	UF18024-003	CMR-WB08-5.0-6.0-190617	6/17/2019	Soil	SW8260B	T	Acetone		U	ug/kg	Y	UJ	low	lsc recovery
UF18024	UF18024-004	CMR-WB07-5.0-6.0-190617	6/17/2019	Soil	SW6020B	T	Chromium (total)	12		mg/kg	Y		-	removed lab qual
UF18024	UF18024-004	CMR-WB07-5.0-6.0-190617	6/17/2019	Soil	SW8260B	T	Acetone	13	J	ug/kg	Y	J	low	lsc recovery
UF18024	UF18024-004	CMR-WB07-5.0-6.0-190617	6/17/2019	Soil	SW8260B	T	Methylcyclohexane		U	ug/kg	Y	UJ	low	lsc recovery
UF18024	UF18024-004	CMR-WB07-5.0-6.0-190617	6/17/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lsc recovery
UF18024	UF18024-005	TB-13-20190617	6/17/2019	Blank Water	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF18024	UF18024-005	TB-13-20190617	6/17/2019	Blank Water	SW8260B	T	Methylcyclohexane		U	ug/l	Y	UJ	low	lsc recovery
UF18024	UF18024-005	TB-13-20190617	6/17/2019	Blank Water	SW8260B	T	Acetone		U	ug/l	Y	UJ	low	lsc recovery
UF18034	UF18034-001	CMR-EB04D-190617-GW	6/15/2019	Groundwater	SW6020B	T	Chromium (total)	1.8	BJ	ug/l	Y	U	-	blank detection
UF18034	UF18034-001	CMR-EB04D-190617-GW	6/15/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	spike recoveries
UF18034	UF18034-001	CMR-EB04D-190617-GW	6/15/2019	Groundwater	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	spike recoveries
UF18034	UF18034-001	CMR-EB04D-190617-GW	6/15/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	spike recoveries
UF18034	UF18034-001	CMR-EB04D-190617-GW	6/15/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	4.9	BJ	ug/l	Y	U	-	blank detection
UF18034	UF18034-002	CMR-MW81S-190617-GW	6/17/2019	Groundwater	SW6020B	T	Chromium (total)	1.7	BJ	ug/l	Y	U	-	blank detection
UF18034	UF18034-002	CMR-MW81S-190617-GW	6/17/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	spike recoveries
UF18034	UF18034-002	CMR-MW81S-190617-GW	6/17/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	4.8	BJ	ug/l	Y	U	-	blank detection
UF18034	UF18034-002	CMR-MW81S-190617-GW	6/17/2019	Groundwater	SW8270D	T	Phenol	1.9	J	ug/l	Y	J	low	spike recoveries
UF18034	UF18034-002	CMR-MW81S-190617-GW	6/17/2019	Groundwater	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	spike recoveries
UF18034	UF18034-003	CMR-MW81D-190617-GW	6/17/2019	Groundwater	SW6020B	T	Chromium (total)	1.6	BJ	ug/l	Y	U	-	blank detection
UF18034	UF18034-003	CMR-MW81D-190617-GW	6/17/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	spike recoveries
UF18034	UF18034-003	CMR-MW81D-190617-GW	6/17/2019	Groundwater	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	spike recoveries
UF18034	UF18034-003	CMR-MW81D-190617-GW	6/17/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	5.9	BJ	ug/l	Y	U	-	blank detection
UF18034	UF18034-003	CMR-MW81D-190617-GW	6/17/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	spike recoveries
UF18034	UF18034-004	TB-14-20190617	6/17/2019	Blank Water	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	spike recoveries
UF19039	UF19039-001	CMR-WB13-3.0-3.5-190618	6/18/2019	Soil	SW6020B	T	Barium	270		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-001	CMR-WB13-3.0-3.5-190618	6/18/2019	Soil	SW6020B	T	Copper	21		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-002	CMR-WB13-3.0-3.5-190618-DUP	6/18/2019	Soil	SW6020B	T	Copper	9.0		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-002	CMR-WB13-3.0-3.5-190618-DUP	6/18/2019	Soil	SW6020B	T	Barium	190		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-002	CMR-WB13-3.0-3.5-190618-DUP	6/18/2019	Soil	SW8270D	T	Di-n-butylphthalate	16	B	ug/kg	Y	U	-	blank results
UF19039	UF19039-003	CMR-WB12-0.0-1.0-190618	6/18/2019	Soil	SW6020B	T	Copper	42		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-003	CMR-WB12-0.0-1.0-190618	6/18/2019	Soil	SW6020B	T	Barium	480		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-004	CMR-WB12-2.0-2.5-190618	6/18/2019	Soil	SW6020B	T	Barium	230		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-004	CMR-WB12-2.0-2.5-190618	6/18/2019	Soil	SW6020B	T	Copper	8.2		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-005	CMR-WB11-1.0-2.0-190618	6/18/2019	Soil	SW6020B	T	Copper	8.3		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-005	CMR-WB11-1.0-2.0-190618	6/18/2019	Soil	SW6020B	T	Barium	150		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-005	CMR-WB11-1.0-2.0-190618	6/18/2019	Soil	SW8260B	T	Methylcyclohexane	1800		ug/kg	Y	J	high	lsc recovery
UF19039	UF19039-006	CMR-WB11-3.0-3.9-190618	6/18/2019	Soil	SW6020B	T	Barium	220		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-006	CMR-WB11-3.0-3.9-190618	6/18/2019	Soil	SW6020B	T	Copper	12		mg/kg	Y	J	-	FD RPDs
UF19039	UF19039-006	CMR-WB11-3.0-3.9-190618	6/18/2019	Soil	SW8260B	T	Methylcyclohexane	1200		ug/kg	Y	J	high	lsc recovery
UF19040	UF19040-001	CMR-WB07-190618-GW	6/18/2019	Groundwater	SW6020B	T	Chromium (total)	1.9	BJ	ug/l	Y	U	-	blank results
UF19040	UF19040-001	CMR-WB07-190618-GW	6/18/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF19040	UF19040-001	CMR-WB07-190618-GW	6/18/2019	Groundwater	SW8260B	T	Bromomethane		U	ug/l	Y	UJ	low	lsc recovery
UF19040	UF19040-002	CMR-WB08-190618-GW	6/18/2019	Groundwater	SW8260B	T	Bromomethane		U	ug/l	Y	UJ	low	lsc recovery
UF19040	UF19040-002	CMR-WB08-190618-GW	6/18/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF19040	UF19040-003	CMR-WB09S-190618-GW	6/18/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF19040	UF19040-003	CMR-WB09S-190618-GW	6/18/2019	Groundwater	SW8260B	T	Bromomethane		U	ug/l	Y	UJ	low	lsc recovery
UF19040	UF19040-004	TB-16-20190618	6/18/2019	Blank Water	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF19040	UF19040-004	TB-16-20190618	6/18/2019	Blank Water	SW8260B	T	Bromomethane		U	ug/l	Y	UJ	low	lsc recovery
UF21029	UF21029-003	TB-19-20190620	6/20/2019	Blank Water	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF21029	UF21029-004	CMR-WB06S-190620	6/20/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF21102	UF21102-001	CMR-WB13D-190619	6/19/2019	Groundwater	SW6020B	T	Zinc	13	B	ug/l	Y	U	-	blank detections
UF21102	UF21102-001	CMR-WB13D-190619	6/19/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF21102	UF21102-001	CMR-WB13D-190619	6/19/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	1.1	BJ	ug/l	Y	U	-	blank results
UF21102	UF21102-002	CMR-WB12-190619	6/19/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF21102	UF21102-002	CMR-WB12-190619	6/19/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	1.1	BJ	ug/l	Y	U	-	blank results
UF21102	UF21102-003	CMR-WB11D-190619	6/19/2019	Groundwater	SW6020B	T	Zinc	9.9	BJ	ug/l	Y	U	-	blank detections
UF21102	UF21102-003	CMR-WB11D-190619	6/19/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery

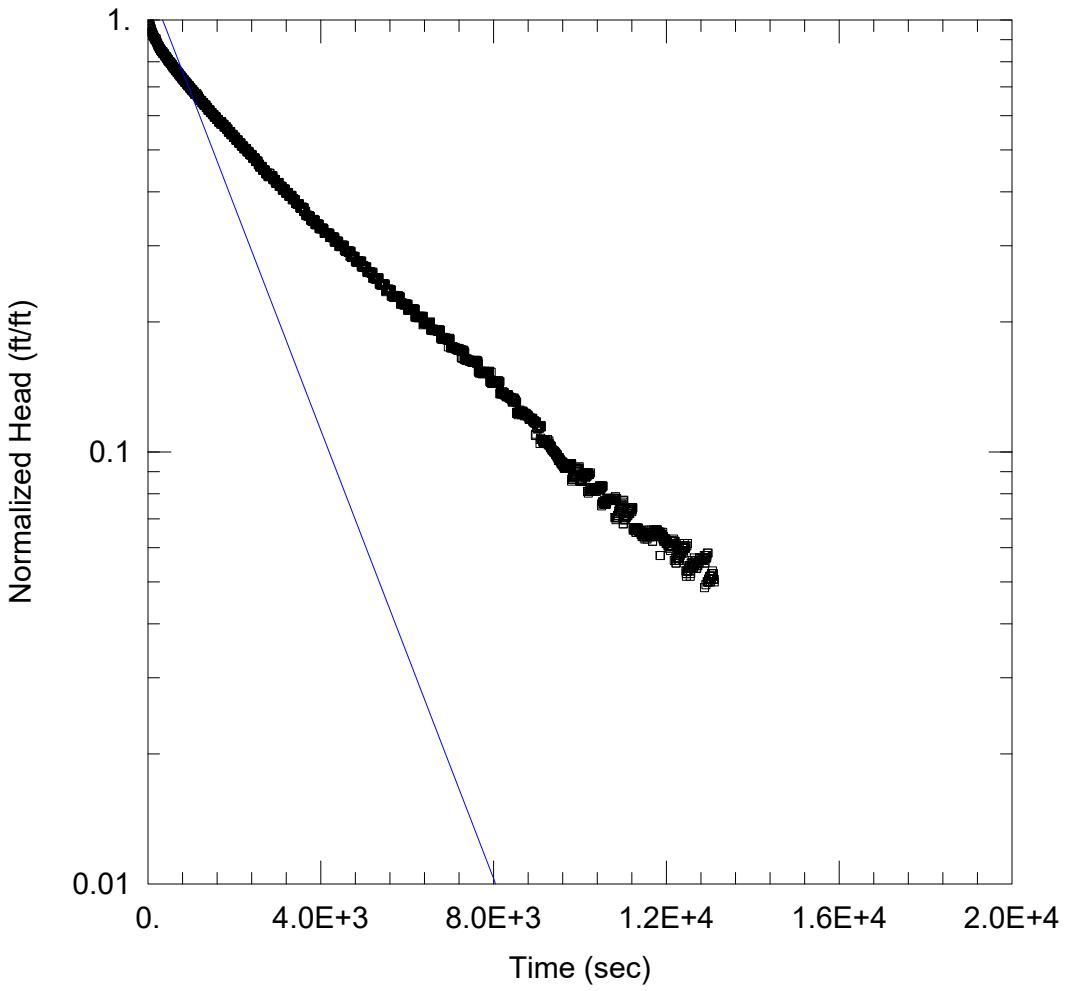
Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UF21102	UF21102-003	CMR-WB11D-190619	6/19/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.93	BJ	ug/l	Y	U	-	blank results
UF21102	UF21102-004	TB-18-20190619	6/19/2019	Blank Water	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF21103	UF21103-001	CMR-WB13S-190620	6/20/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF21103	UF21103-001	CMR-WB13S-190620	6/20/2019	Groundwater	SW8260B	T	Acetone	13	H	ug/l	Y	J	high	lsc recovery
UF21103	UF21103-001	CMR-WB13S-190620	6/20/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.68	BJ	ug/l	Y	U	-	blank detection
UF21103	UF21103-002	CMR-WB05S-190620	6/20/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF21103	UF21103-002	CMR-WB05S-190620	6/20/2019	Groundwater	SW8260B	T	Acetone	15	H	ug/l	Y	J	high	lsc recovery
UF21103	UF21103-002	CMR-WB05S-190620	6/20/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.89	BJ	ug/l	Y	U	-	blank detection
UF21103	UF21103-003	CMR-WB104S-190620	6/20/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF21103	UF21103-003	CMR-WB104S-190620	6/20/2019	Groundwater	SW8260B	T	Acetone	8.9	HJ	ug/l	Y	J	high	lsc recovery
UF21103	UF21103-003	CMR-WB104S-190620	6/20/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	2.6	BJ	ug/l	Y	U	-	blank detection
UF21103	UF21103-004	TB-20-20190620	6/20/2019	Blank Water	SW8260B	T	Acetone		U	ug/l	Y	UJ	low	lsc recovery
UF21103	UF21103-004	TB-20-20190620	6/20/2019	Blank Water	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF22026	UF22026-001	CMR-WB11S-190621	6/21/2019	Groundwater	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lcs out
UF22026	UF22026-001	CMR-WB11S-190621	6/21/2019	Groundwater	SW8260B	T	Acetone	9.7	HJ	ug/l	Y	U	-	blank detection
UF22026	UF22026-001	CMR-WB11S-190621	6/21/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	2.7	BJ	ug/l	Y	U	-	blank detection
UF22026	UF22026-002	CMR-WB10-190621	6/21/2019	Groundwater	SW8260B	T	Methyl Acetate	0.50	J	ug/l	Y	J	low	lcs out
UF22026	UF22026-002	CMR-WB10-190621	6/21/2019	Groundwater	SW8260B	T	Acetone	18	H	ug/l	Y	U	-	blank detection
UF22026	UF22026-002	CMR-WB10-190621	6/21/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	3.3	BJ	ug/l	Y	U	-	blank detection
UF22026	UF22026-003	TB-20-20190621	6/21/2019	Blank Water	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lcs out
UF24002	UF24002-001	CMR-WB10-3.0-4.0-190621	6/21/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF24002	UF24002-002	CMR-WB10-6.0-7.0-190621	6/21/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF24002	UF24002-003	CMR-WB10-9.0-9.5-190621	6/21/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF24002	UF24002-004	TB-21-20190621	6/21/2019	Blank Water	SW8260B	T	Chloromethane		U	ug/l	Y	UJ	low	lsc recovery
UF25037	UF25037-001	CMR-WB03S-190622	6/22/2019	Groundwater	SW8260B	T	Acetone	7.3	J	ug/l	Y	U	-	blank detections
UF25037	UF25037-001	CMR-WB03S-190622	6/22/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UF25037	UF25037-001	CMR-WB03S-190622	6/22/2019	Groundwater	SW8270D	T	2-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UF25037	UF25037-001	CMR-WB03S-190622	6/22/2019	Groundwater	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UF25037	UF25037-002	CMR-WB02S-190622	6/22/2019	Groundwater	SW8270D	T	3&4-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UF25037	UF25037-002	CMR-WB02S-190622	6/22/2019	Groundwater	SW8270D	T	2-Methylphenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UF25037	UF25037-002	CMR-WB02S-190622	6/22/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	ms/msd recoveries
UF25037	UF25037-003	TB-22-20190622	6/22/2019	Blank Water	SW8260B	T	Acetone	4.5	J	ug/l	Y	U	-	blank detections
UF25038	UF25038-001	CMR-WB01-1.5-2.0-190622	6/22/2019	Soil	SW6020B	T	Beryllium	0.29		mg/kg	Y	UJ	low	ms/msd recoveries
UF25038	UF25038-001	CMR-WB01-1.5-2.0-190622	6/22/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF25038	UF25038-001	CMR-WB01-1.5-2.0-190622	6/22/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lsc recovery
UF25038	UF25038-001	CMR-WB01-1.5-2.0-190622	6/22/2019	Soil	SW8260B	T	Acetone	51		ug/kg	Y	U	-	blank detections
UF25038	UF25038-002	CMR-WB01-3.0-4.0-190622	6/22/2019	Soil	SW6020B	T	Beryllium	0.12		mg/kg	Y	UJ	low	ms/msd recoveries
UF25038	UF25038-002	CMR-WB01-3.0-4.0-190622	6/22/2019	Soil	SW8260B	T	Acetone	20		ug/kg	Y	U	-	blank detections
UF25038	UF25038-002	CMR-WB01-3.0-4.0-190622	6/22/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF25038	UF25038-002	CMR-WB01-3.0-4.0-190622	6/22/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lsc recovery
UF25038	UF25038-003	CMR-WB01-6.0-6.5-190622	6/22/2019	Soil	SW6020B	T	Beryllium	0.089	J	mg/kg	Y	J	low	ms/msd recoveries
UF25038	UF25038-003	CMR-WB01-6.0-6.5-190622	6/22/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lsc recovery
UF25038	UF25038-003	CMR-WB01-6.0-6.5-190622	6/22/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF25038	UF25038-004	CMR-WB01-6.0-6.5-190622-DUP	6/22/2019	Soil	SW6020B	T	Beryllium	0.10	J	mg/kg	Y	J	low	ms/msd recoveries
UF25038	UF25038-004	CMR-WB01-6.0-6.5-190622-DUP	6/22/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lsc recovery
UF25038	UF25038-004	CMR-WB01-6.0-6.5-190622-DUP	6/22/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF25038	UF25038-005	TB-24-20190622	6/22/2019	Blank Water	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lsc recovery
UF25038	UF25038-005	TB-24-20190622	6/22/2019	Blank Water	SW8260B	T	Bromomethane		U	ug/l	Y	UJ	low	lsc recovery
UF25040	UF25040-001	CMR-WB01S-190624	6/24/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	lsc recovery
UF25040	UF25040-001	CMR-WB01S-190624	6/24/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.83	BJ	ug/l	Y	U	-	blank detection
UF25040	UF25040-002	CMR-WB03D-190624	6/24/2019	Groundwater	SW8260B	T	Acetone	5.6	J	ug/l	Y	U	-	blank detection
UF25040	UF25040-002	CMR-WB03D-190624	6/24/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	lsc recovery
UF25040	UF25040-003	TB-23-20190624	6/24/2019	Blank Water	SW8260B	T	Acetone	5.1	J	ug/l	Y	U	-	blank detection
UF25046	UF25046-001	CMR-WB03-0.5-1.0-190622	6/22/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lcs out
UF25046	UF25046-001	CMR-WB03-0.5-1.0-190622	6/22/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lcs out
UF25046	UF25046-001	CMR-WB03-0.5-1.0-190622	6/22/2019	Soil	SW8260B	T	Acetone	84		ug/kg	Y	U	-	blank detection
UF25046	UF25046-002	CMR-WB03-3.5-4.0-190622	6/22/2019	Soil	SW8260B	T	Acetone	79		ug/kg	Y	U	-	blank detection
UF25046	UF25046-002	CMR-WB03-3.5-4.0-190622	6/22/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lcs out
UF25046	UF25046-002	CMR-WB03-3.5-4.0-190622	6/22/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lcs out
UF25046	UF25046-003	CMR-WB03-5.0-5.5-190622	6/22/2019	Soil	SW8260B	T	Acetone	150		ug/kg	Y	U	-	blank detection
UF25046	UF25046-003	CMR-WB03-5.0-5.5-190622	6/22/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lcs out
UF25046	UF25046-003	CMR-WB03-5.0-5.5-190622	6/22/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lcs out
UF25046	UF25046-004	CMR-WB03-2.0-2.5-190622	6/22/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lcs out
UF25046	UF25046-004	CMR-WB03-2.0-2.5-190622	6/22/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lcs out
UF25046	UF25046-004	CMR-WB03-2.0-2.5-190622	6/22/2019	Soil	SW8260B	T	Acetone	37		ug/kg	Y	U	-	blank detection
UF25046	UF25046-005	CMR-WB03-10.0-10.75-190622	6/22/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lcs out
UF25046	UF25046-005	CMR-WB03-10.0-10.75-190622	6/22/2019	Soil	SW8260B	T	Acetone	2100	J	ug/kg	Y	U	-	blank detection
UF25046	UF25046-005	CMR-WB03-10.0-10.75-190622	6/22/2019	Soil	SW8260B	T	Methyl Acetate		U	ug/kg	Y	UJ	low	lcs out

Summary of Validator Qualifiers
Calumet Monana Refinery, LLC - Great Falls, Montana

SDG	Sample	Name	Date	Matrix	Method	Total or Dissolved	Chemical Name	Result	Lab Qualifier	Unit	Changed Values? (Y/N)	Validator Qualifier	Bias Direction	Comments
UF25046	UF25046-006	TB-25-20190622	6/22/2019	Blank Water	SW8260B	T	Methyl Acetate		U	ug/l	Y	UJ	low	lcs out
UF25046	UF25046-006	TB-25-20190622	6/22/2019	Blank Water	SW8260B	T	Bromomethane		U	ug/l	Y	UJ	low	lcs out
UF26019	UF26019-001	CMR-MW79D-190625	6/25/2019	Groundwater	SW8260B	T	Acetone	88	J	ug/l	Y	U	-	blank detection
UF26019	UF26019-001	CMR-MW79D-190625	6/25/2019	Groundwater	SW8270D	T	Phenol	51		ug/l	Y	J	low	lsc recovery
UF26019	UF26019-002	CMR-MW79S-190625	6/25/2019	Groundwater	SW8260B	T	Acetone	180	J	ug/l	Y	U	-	blank detection
UF26019	UF26019-002	CMR-MW79S-190625	6/25/2019	Groundwater	SW8270D	T	Phenol	24	J	ug/l	Y	J	low	lsc recovery
UF26019	UF26019-003	CMR-MW99-190625	6/25/2019	Groundwater	SW8260B	T	Acetone	8.5	J	ug/l	Y	U	-	blank detection
UF26019	UF26019-003	CMR-MW99-190625	6/25/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	lsc recovery
UF26025	UF26025-001	CMR-WB14-5.0-6.0-190625	6/25/2019	Soil	SW6020B	T	Beryllium	0.095	J	mg/kg	Y	J	low	lsc recovery
UF26025	UF26025-001	CMR-WB14-5.0-6.0-190625	6/25/2019	Soil	SW6020B	T	Antimony	0.32	J	mg/kg	Y	J	low	lsc recovery
UF26025	UF26025-001	CMR-WB14-5.0-6.0-190625	6/25/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF26025	UF26025-001	CMR-WB14-5.0-6.0-190625	6/25/2019	Soil	SW8260B	T	Acetone	36		ug/kg	Y	J	high	lsc recovery
UF26025	UF26025-002	CMR-WB14-20.0-21.0-190625	6/25/2019	Soil	SW6020B	T	Antimony	0.34	J	mg/kg	Y	J	low	lsc recovery
UF26025	UF26025-002	CMR-WB14-20.0-21.0-190625	6/25/2019	Soil	SW6020B	T	Beryllium	0.070	J	mg/kg	Y	J	low	lsc recovery
UF26025	UF26025-002	CMR-WB14-20.0-21.0-190625	6/25/2019	Soil	SW8260B	T	Acetone	94		ug/kg	Y	J	high	lsc recovery
UF26025	UF26025-002	CMR-WB14-20.0-21.0-190625	6/25/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF26025	UF26025-003	CMR-WB14-20.0-21.0-190625-DUP	6/25/2019	Soil	SW6020B	T	Beryllium	0.073	J	mg/kg	Y	J	low	lsc recovery
UF26025	UF26025-003	CMR-WB14-20.0-21.0-190625-DUP	6/25/2019	Soil	SW6020B	T	Antimony	0.30	J	mg/kg	Y	J	low	lsc recovery
UF26025	UF26025-003	CMR-WB14-20.0-21.0-190625-DUP	6/25/2019	Soil	SW8260B	T	Acetone	96		ug/kg	Y	J	high	lsc recovery
UF26025	UF26025-003	CMR-WB14-20.0-21.0-190625-DUP	6/25/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF26025	UF26025-004	CMR-WB15-4.0-5.0-190625	6/25/2019	Soil	SW6020B	T	Beryllium	0.097	J	mg/kg	Y	J	low	lsc recovery
UF26025	UF26025-004	CMR-WB15-4.0-5.0-190625	6/25/2019	Soil	SW6020B	T	Antimony	0.27	J	mg/kg	Y	J	low	lsc recovery
UF26025	UF26025-004	CMR-WB15-4.0-5.0-190625	6/25/2019	Soil	SW8260B	T	Bromomethane		U	ug/kg	Y	UJ	low	lsc recovery
UF26025	UF26025-005	TB-27-20190625	6/25/2019	Blank Water	SW8260B	T	Bromomethane		U	ug/l	Y	UJ	low	lsc recovery
UF26052	UF26052-001	CMR-WB14D-190625	6/25/2019	Groundwater	SW6020B	T	Zinc	11		ug/l	Y	U	-	blank detection
UF26052	UF26052-001	CMR-WB14D-190625	6/25/2019	Groundwater	SW8260B	T	Acetone	7.2	J	ug/l	Y	U	-	blank detection
UF26052	UF26052-001	CMR-WB14D-190625	6/25/2019	Groundwater	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	lsc recovery
UF26052	UF26052-001	CMR-WB14D-190625	6/25/2019	Groundwater	SW8270D	T	bis(2-Ethylhexyl)phthalate	2.3	BJ	ug/l	Y	U	-	blank detection
UF26052	UF26052-002	CMR-190625-EB	6/25/2019	Blank Water	SW6020B	T	Zinc	5.0	J	ug/l	Y	U	-	blank detection
UF26052	UF26052-002	CMR-190625-EB	6/25/2019	Blank Water	SW8260B	T	Acetone	8.4	J	ug/l	Y	U	-	blank detection
UF26052	UF26052-002	CMR-190625-EB	6/25/2019	Blank Water	SW8270D	T	Phenol		U	ug/l	Y	UJ	low	lsc recovery
UF26052	UF26052-002	CMR-190625-EB	6/25/2019	Blank Water	SW8270D	T	bis(2-Ethylhexyl)phthalate	0.81	BJ	ug/l	Y	U	-	blank detection
UF26052	UF26052-003	TB-28-20190625	6/25/2019	Blank Water	SW8260B	T	Acetone	5.1	J	ug/l	Y	U	-	blank detection

APPENDIX F
Groundwater Slug Test Data



MW-79S (EB-01) SLUG TEST

Data Set: K:\...\MW-79S_EB-01.aqt
Date: 07/18/19 Time: 15:23:52

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-79S (EB-01)
Test Date: 6/27/2019

AQUIFER DATA

Saturated Thickness: 12.28 ft Anisotropy Ratio (Kz/Kr): 1.

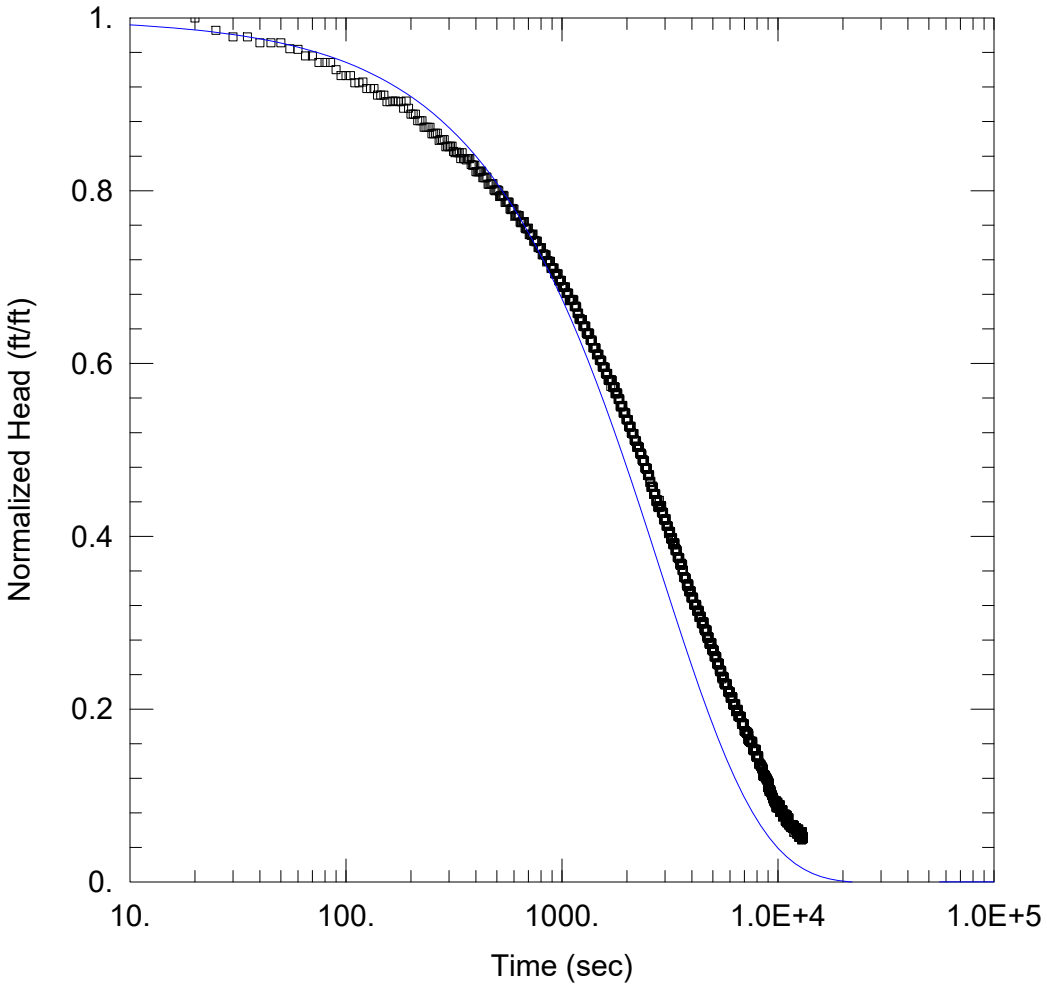
WELL DATA (MW-79S (EB-01))

Initial Displacement: 1.32 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.083 ft
Static Water Column Height: 12.28 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.07036 ft/day y0 = 1.617 ft



MW-79S (EB-01) SLUG TEST

Data Set: K:\...\MW-79S_EB-01.aqt
Date: 07/18/19 Time: 15:22:31

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-79S (EB-01)
Test Date: 6/27/2019

AQUIFER DATA

Saturated Thickness: 12.28 ft

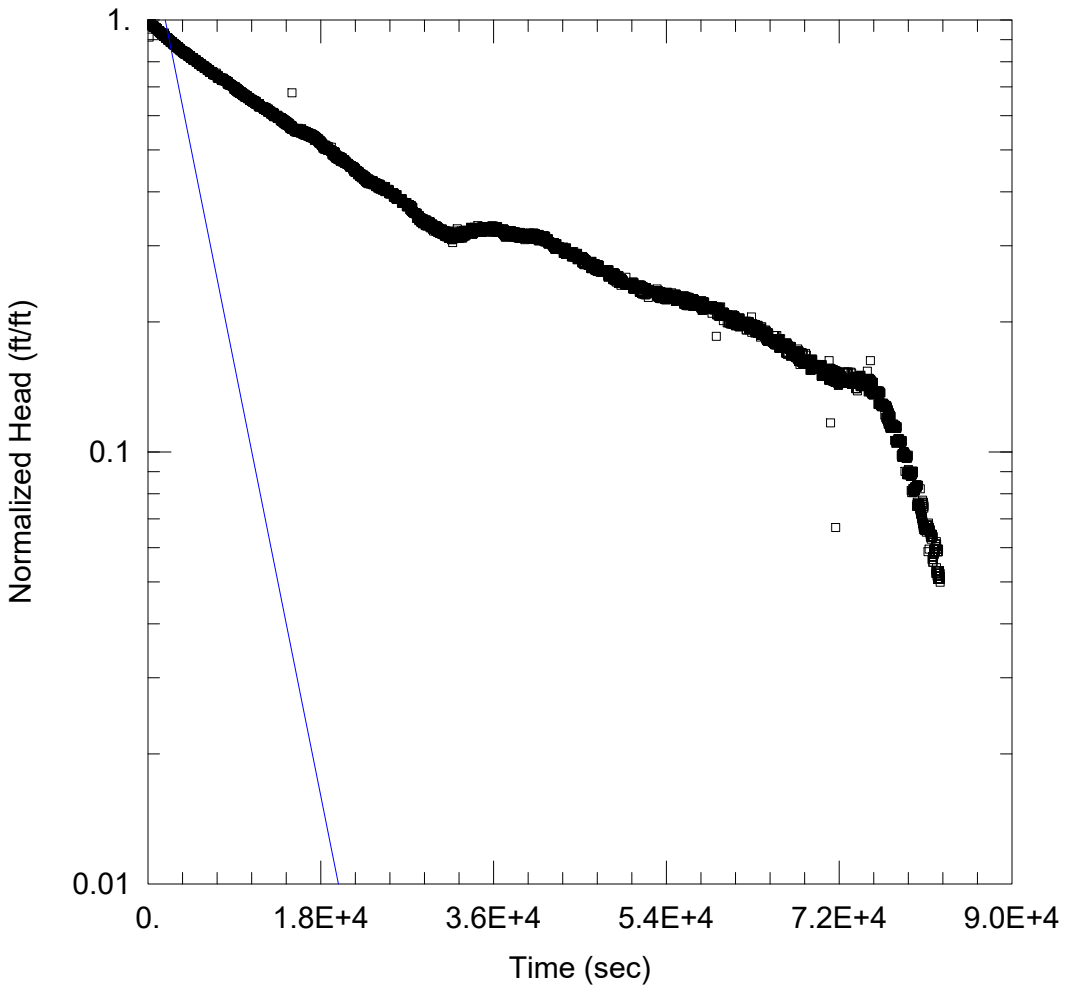
WELL DATA (MW-79S (EB-01))

Initial Displacement: 1.32 ft
Total Well Penetration Depth: 15. ft
Casing Radius: 0.083 ft
Static Water Column Height: 12.28 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.07036 ft/day
Kz/Kr = 1.
Ss = 3.025E-5 ft^{-1}



MW-79D (EB-01) SLUG TEST

Data Set: K:\...\MW-79D_EB-01.aqt
Date: 07/18/19 Time: 16:55:55

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-79D (EB-01)
Test Date: 6/27/2019

AQUIFER DATA

Saturated Thickness: 20.12 ft Anisotropy Ratio (Kz/Kr): 1.

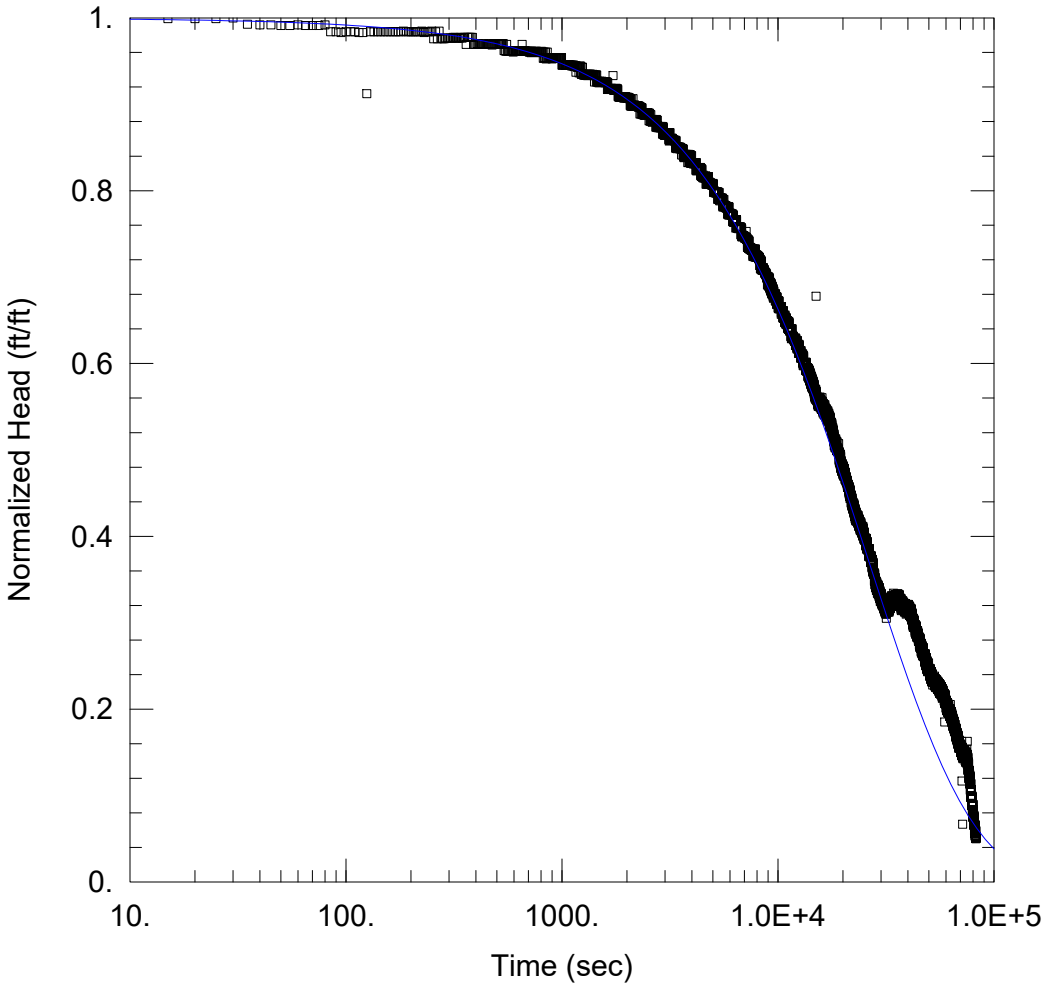
WELL DATA (MW-79D (EB-01))

Initial Displacement: 1.242 ft
Total Well Penetration Depth: 26. ft
Casing Radius: 0.083 ft
Static Water Column Height: 20.12 ft
Screen Length: 7.5 ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.04294 ft/day y0 = 1.964 ft



MW-79D (EB-01) SLUG TEST

Data Set: K:\...\MW-79D_EB-01.aqt
Date: 07/18/19 Time: 16:54:20

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-79D (EB-01)
Test Date: 6/27/2019

AQUIFER DATA

Saturated Thickness: 20.12 ft

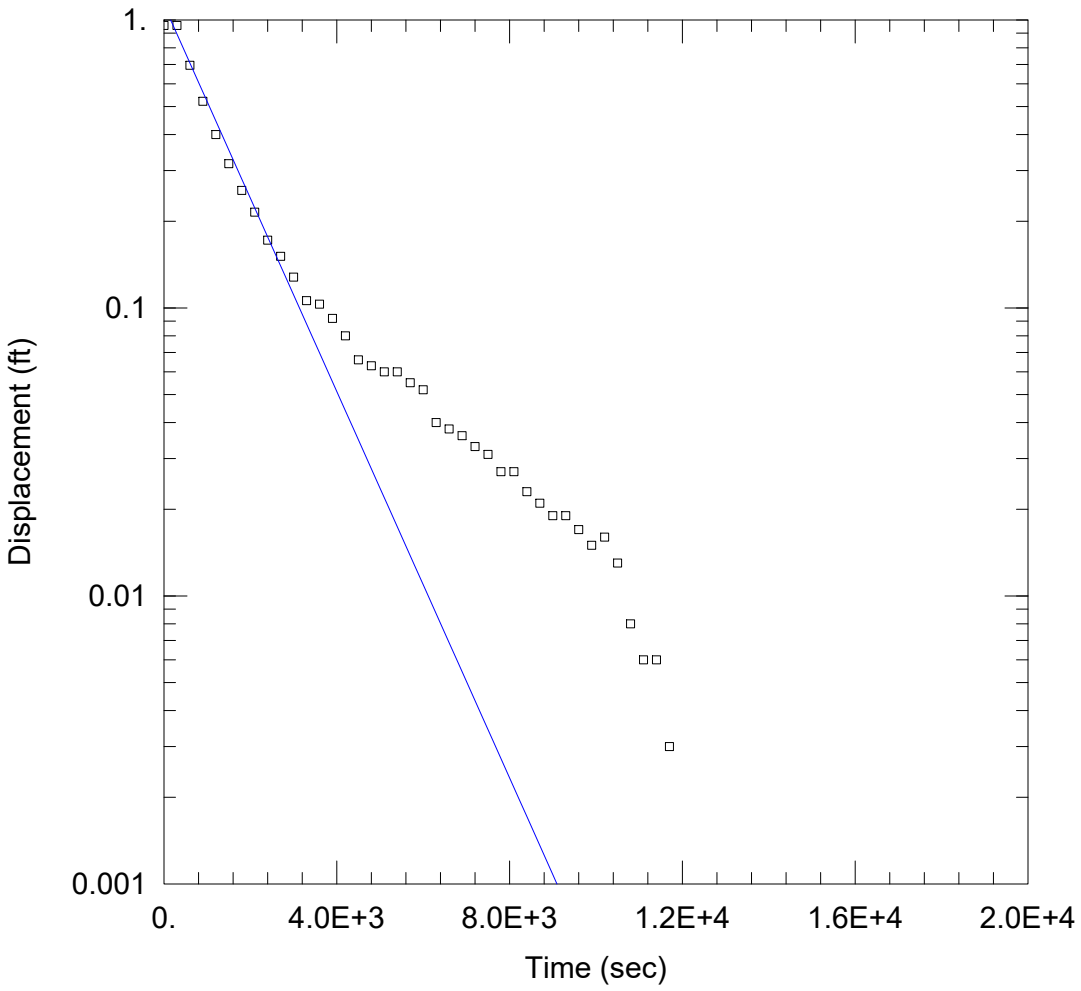
WELL DATA (MW-79D (EB-01))

Initial Displacement: 1.242 ft
Total Well Penetration Depth: 26. ft
Casing Radius: 0.083 ft
Static Water Column Height: 20.12 ft
Screen Length: 7.5 ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.008865 ft/day
Kz/Kr = 1.
Ss = 3.838E-5 ft^{-1}



MW-81S (EB-06) SLUG TEST

Data Set: K:\...\MW-81S_EB-06.aqt
Date: 07/18/19 Time: 15:27:19

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-81S (EB-06)
Test Date: 6/13/2019

AQUIFER DATA

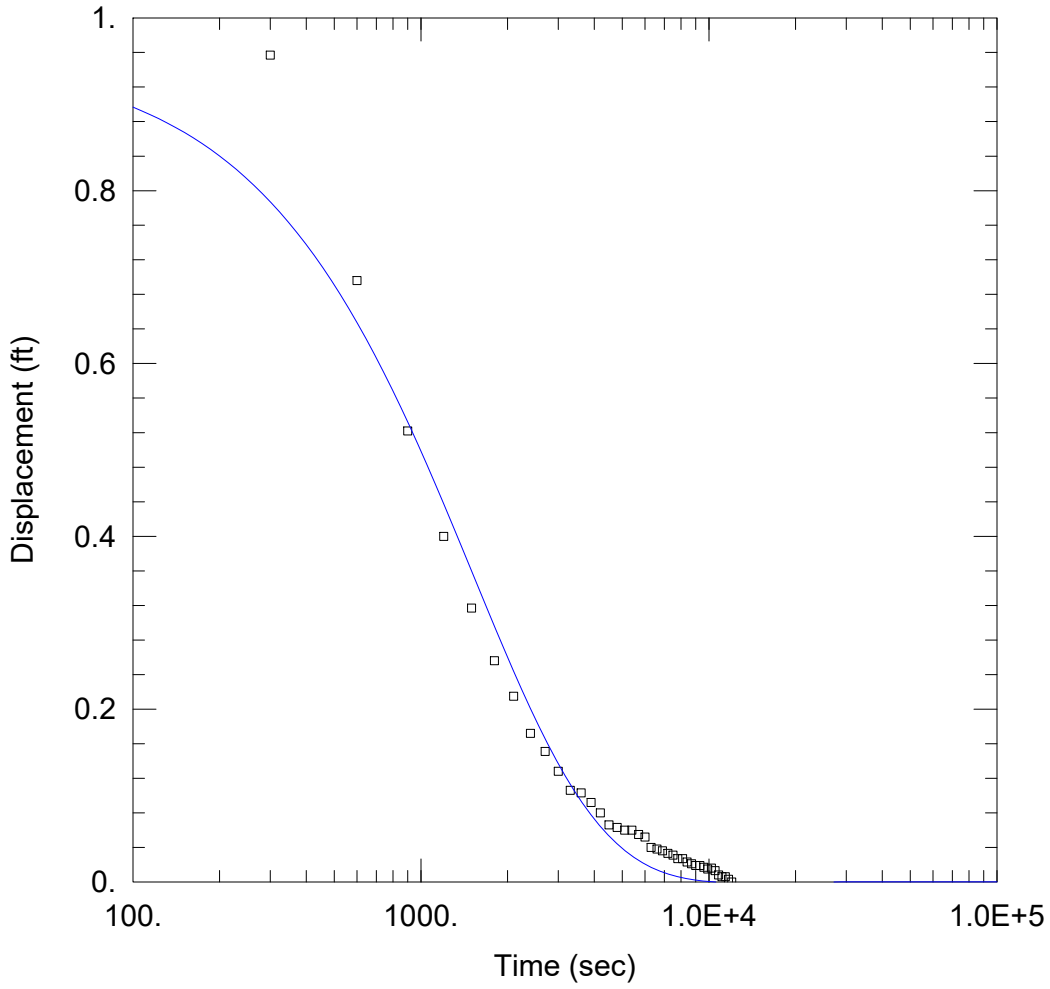
Saturated Thickness: 14.88 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-81S (EB-06))

Initial Displacement: 0.957 ft
Total Well Penetration Depth: 17. ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.88 ft
Screen Length: 12. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.07802 ft/day
y0 = 1.126 ft



MW-81S (EB-06) SLUG TEST

Data Set: K:\...\MW-81S_EB-06.aqt
Date: 07/18/19 Time: 15:26:16

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-81S (EB-06)
Test Date: 6/13/2019

AQUIFER DATA

Saturated Thickness: 14.88 ft

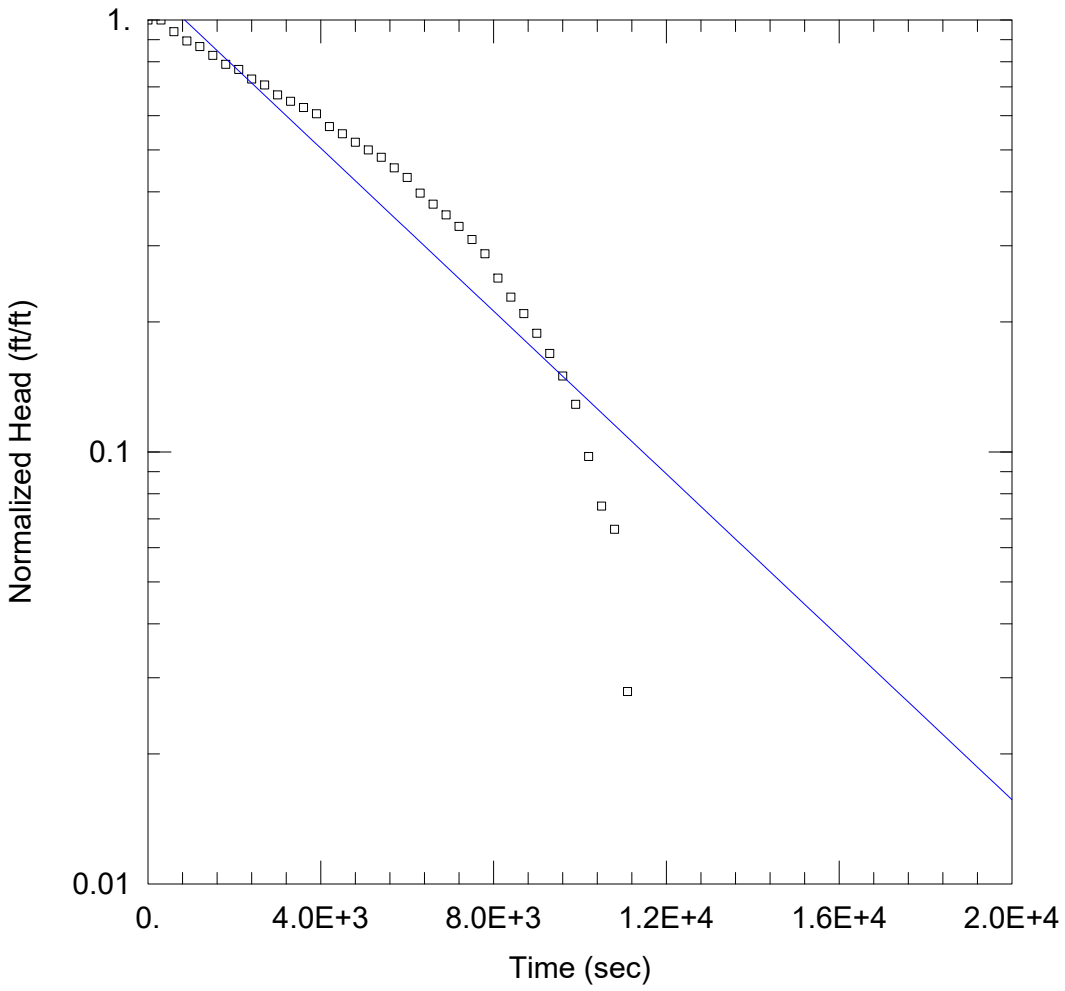
WELL DATA (MW-81S (EB-06))

Initial Displacement: 0.957 ft
Total Well Penetration Depth: 17. ft
Casing Radius: 0.083 ft
Static Water Column Height: 14.88 ft
Screen Length: 12. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.1004 ft/day
Kz/Kr = 1.
Ss = 6.72E-12 ft^{-1}



MW-81D (EB-06) SLUG TEST

Data Set: K:\...\MW-81D_EB-06.aqt
Date: 07/18/19 Time: 15:30:16

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-81D (EB-06)
Test Date: 6/13/2019

AQUIFER DATA

Saturated Thickness: 19.26 ft Anisotropy Ratio (Kz/Kr): 1.

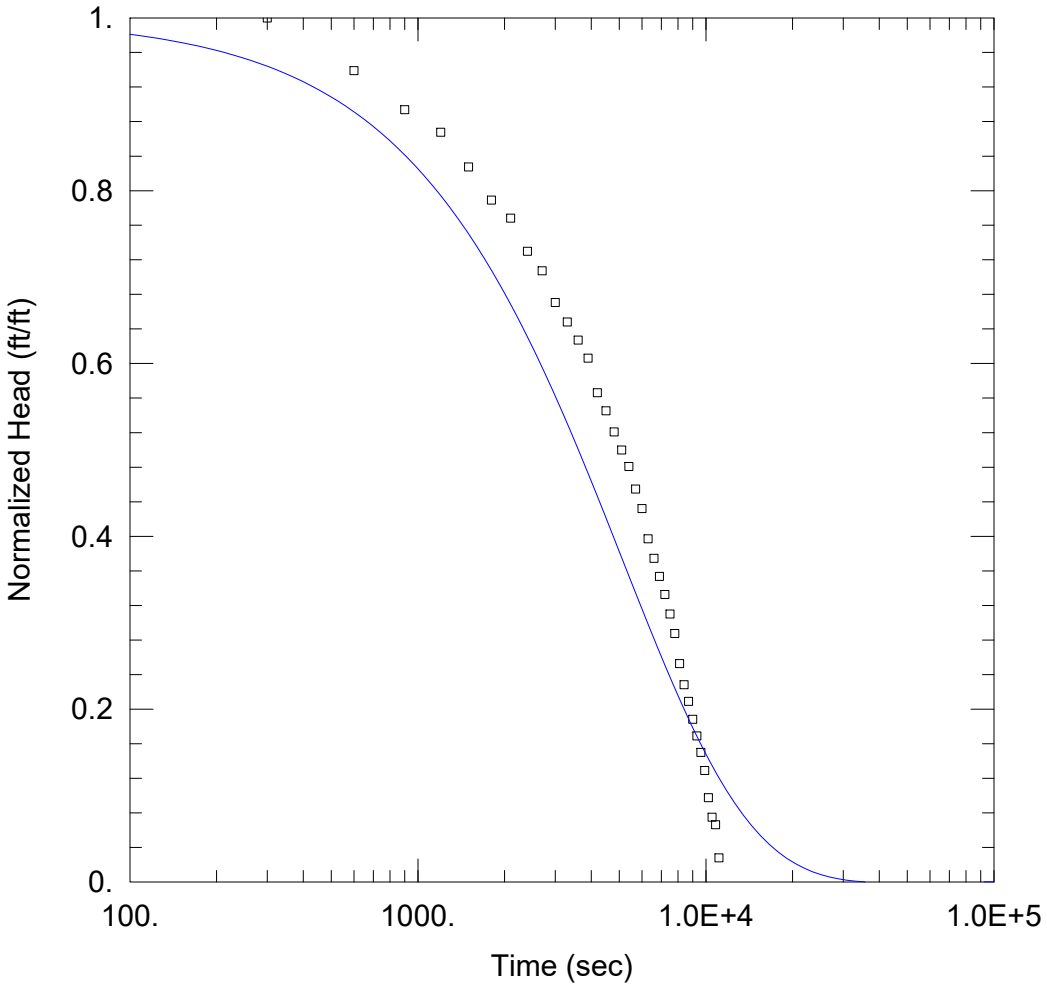
WELL DATA (MW-81D (EB-06))

Initial Displacement: 0.574 ft
Total Well Penetration Depth: 25. ft
Casing Radius: 0.083 ft
Static Water Column Height: 19.26 ft
Screen Length: 6. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.04486 ft/day y0 = 0.6901 ft



MW-81D (EB-06) SLUG TEST

Data Set: K:\...\MW-81D_EB-06.aqt
Date: 07/18/19 Time: 15:28:48

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-81D (EB-06)
Test Date: 6/13/2019

AQUIFER DATA

Saturated Thickness: 19.26 ft

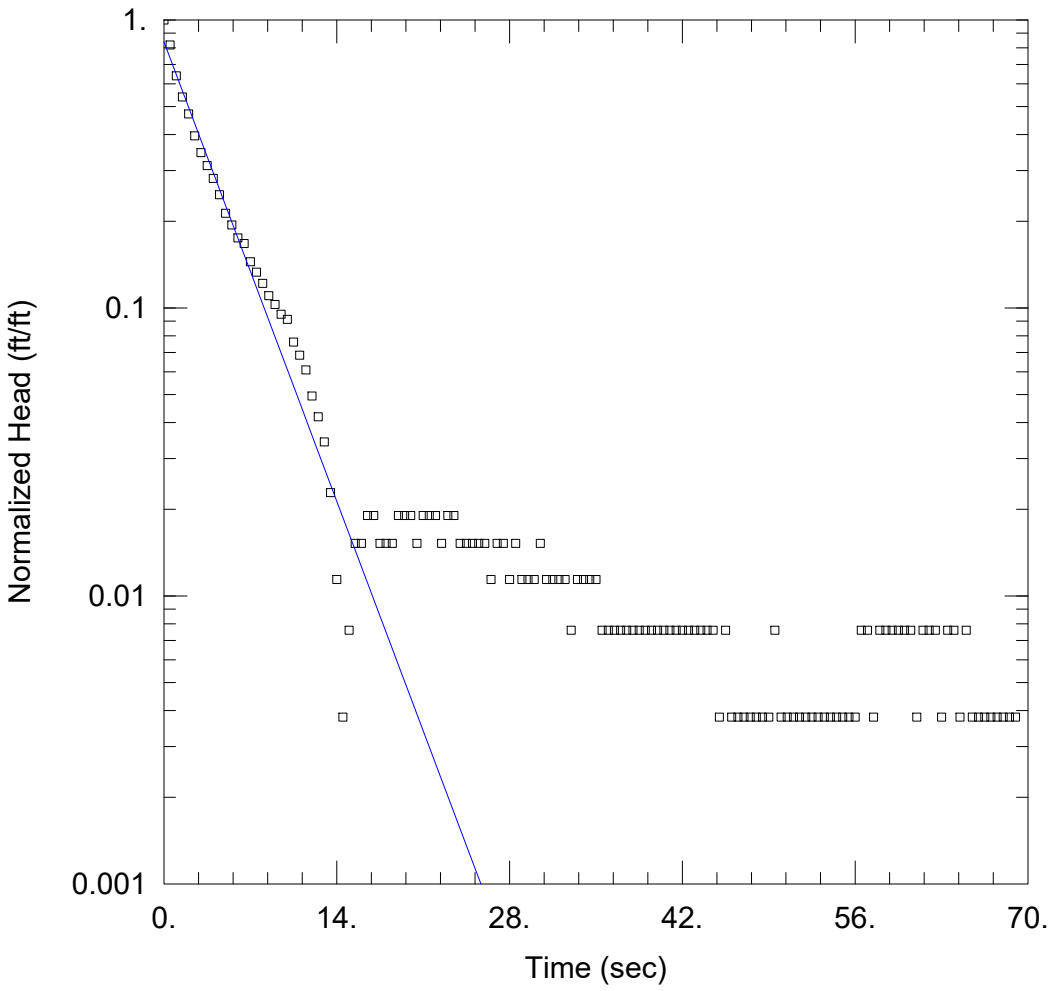
WELL DATA (MW-81D (EB-06))

Initial Displacement: 0.574 ft
Total Well Penetration Depth: 25. ft
Casing Radius: 0.083 ft
Static Water Column Height: 19.26 ft
Screen Length: 6. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.04486 ft/day
Kz/Kr = 1.
Ss = 5.192E-12 ft^{-1}



EB-07-DPT SLUG TEST

Data Set: K:\...\EB-07-DPT.aqt
Date: 07/18/19 Time: 15:33:27

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: EB-07-DPT
Test Date: 6/14/2019

AQUIFER DATA

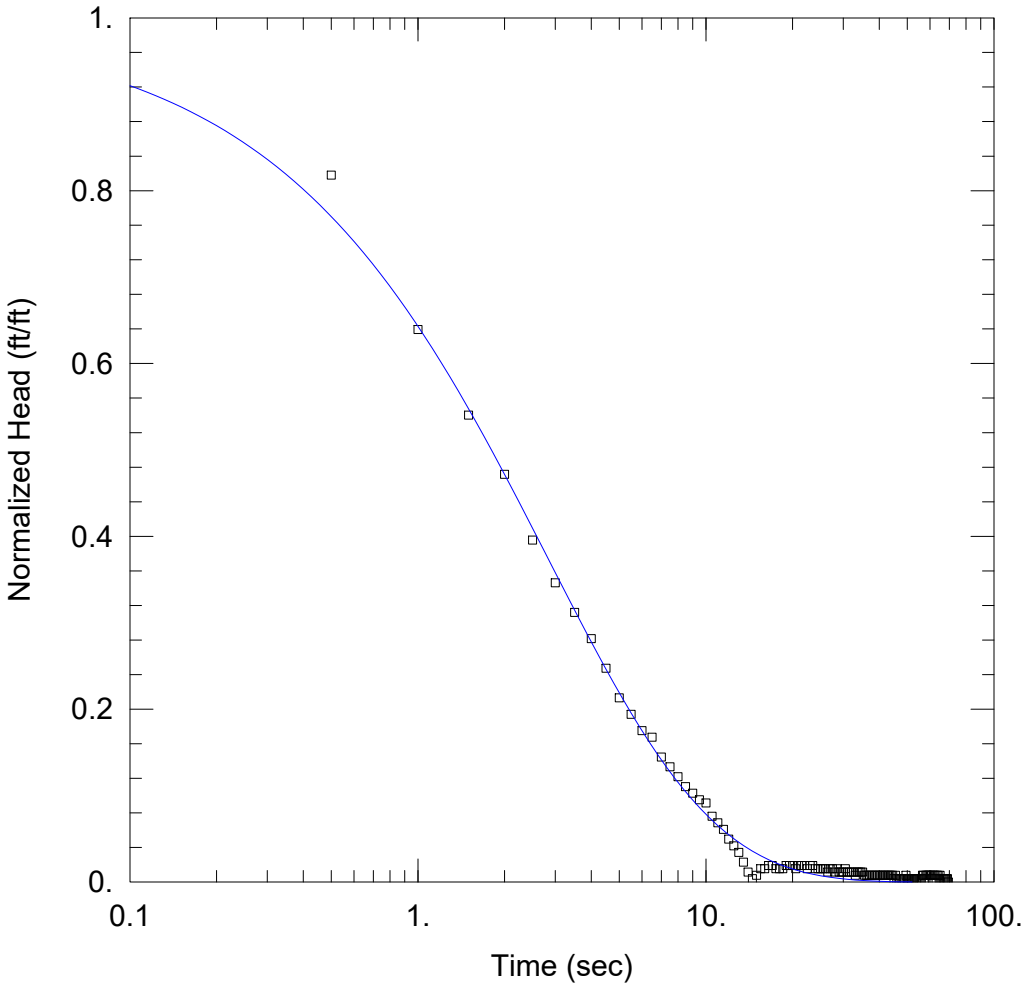
Saturated Thickness: 5.4 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EB-07-DPT)

Initial Displacement: 0.838 ft Static Water Column Height: 5.4 ft
Total Well Penetration Depth: 14. ft Screen Length: 10. ft
Casing Radius: 0.083 ft Well Radius: 0.146 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 48.08 ft/day y0 = 0.7029 ft



EB-07-DPT SLUG TEST

Data Set: K:\...\EB-07-DPT.aqt
Date: 07/18/19 Time: 15:44:10

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: EB-07-DPT
Test Date: 6/14/2019

AQUIFER DATA

Saturated Thickness: 5.4 ft

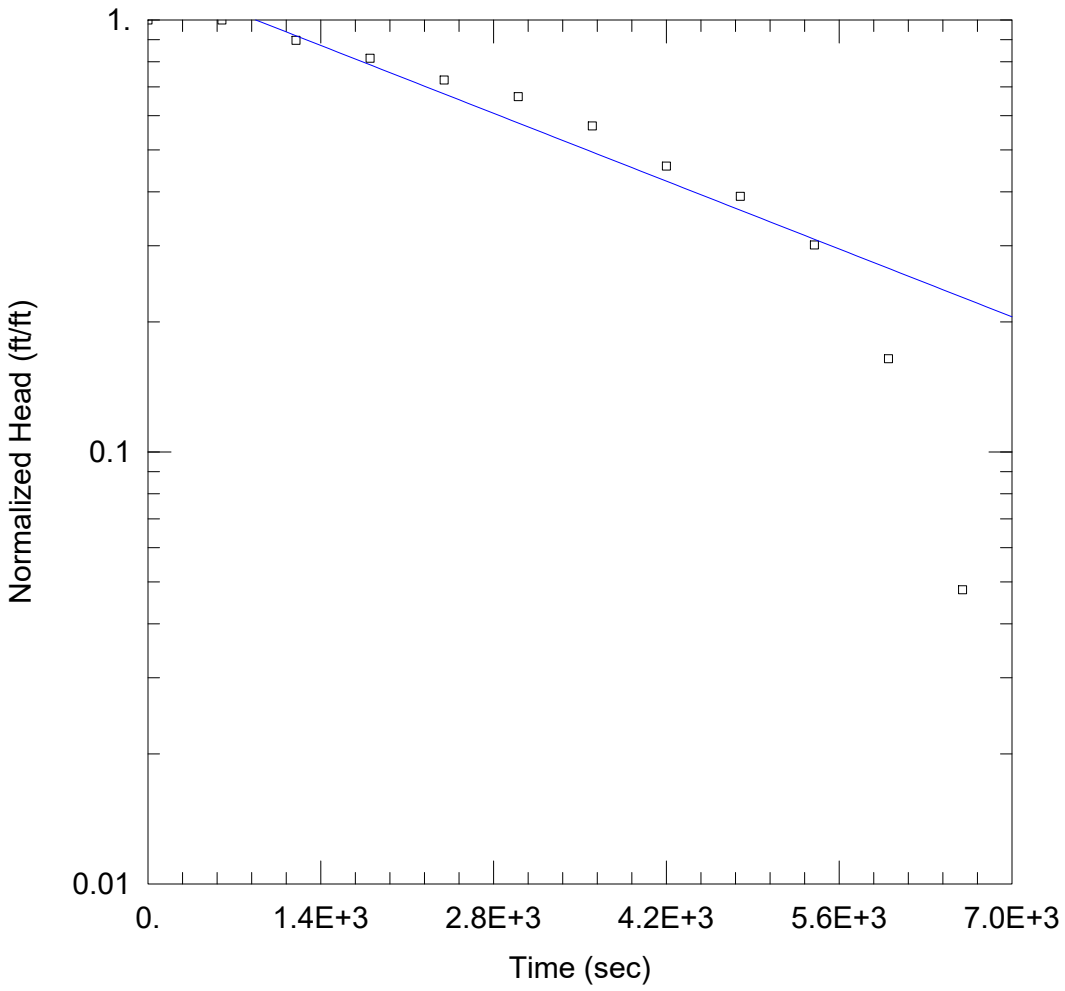
WELL DATA (EB-07-DPT)

Initial Displacement: 0.838 ft
Total Well Penetration Depth: 14. ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.4 ft
Screen Length: 10. ft
Well Radius: 0.146 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 76.19 ft/day
Kz/Kr = 1.
Ss = 0.0007943 ft^{-1}



EB-07D SLUG TEST

Data Set: K:\...\EB-07D.aqt
Date: 07/18/19 Time: 15:35:41

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: EB-07D
Test Date: 6/14/2019

AQUIFER DATA

Saturated Thickness: 12.45 ft Anisotropy Ratio (Kz/Kr): 1.

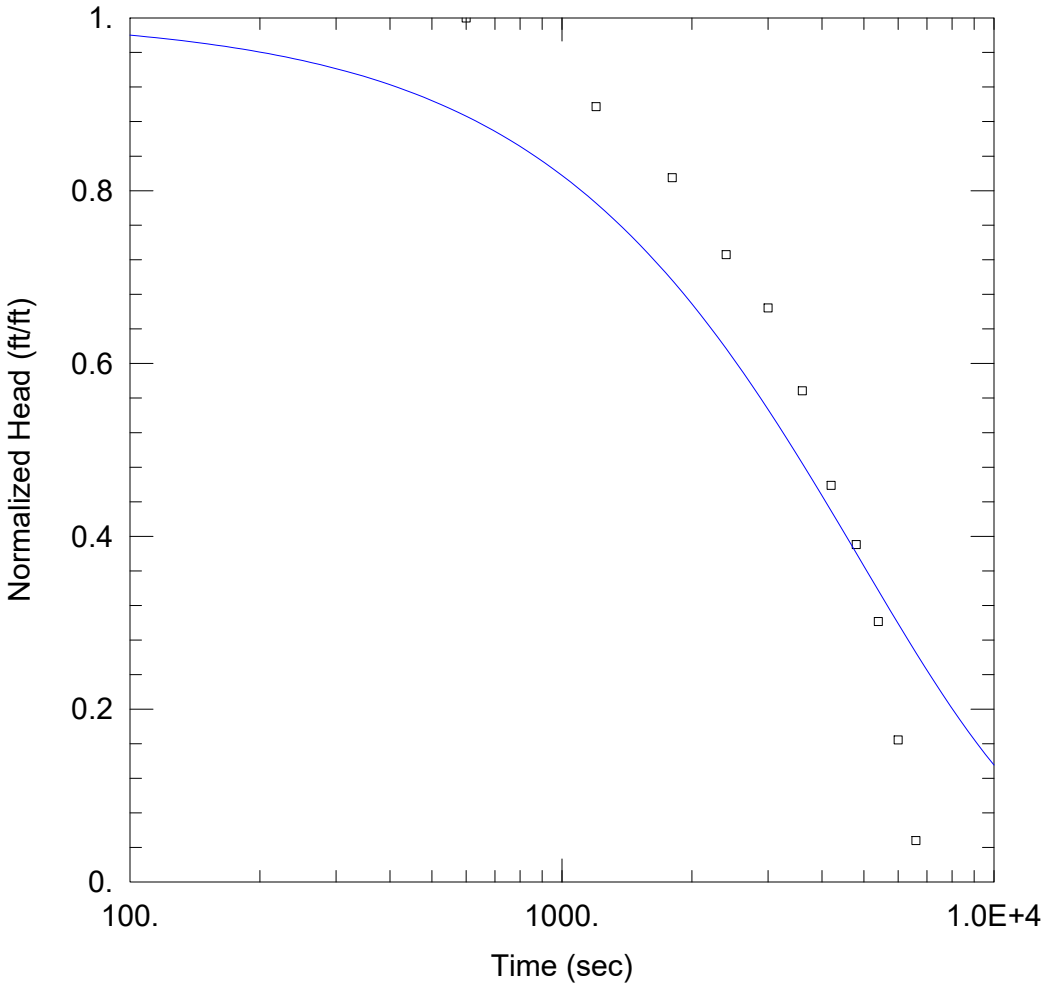
WELL DATA (EB-07D)

Initial Displacement: 0.146 ft
Total Well Penetration Depth: 29. ft
Casing Radius: 0.083 ft
Static Water Column Height: 12.45 ft
Screen Length: 10. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.02556 ft/day
y0 = 0.1829 ft



EB-07D SLUG TEST

Data Set: K:\...\EB-07D.aqt
Date: 07/18/19 Time: 15:42:52

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: EB-07D
Test Date: 6/14/2019

AQUIFER DATA

Saturated Thickness: 12.45 ft

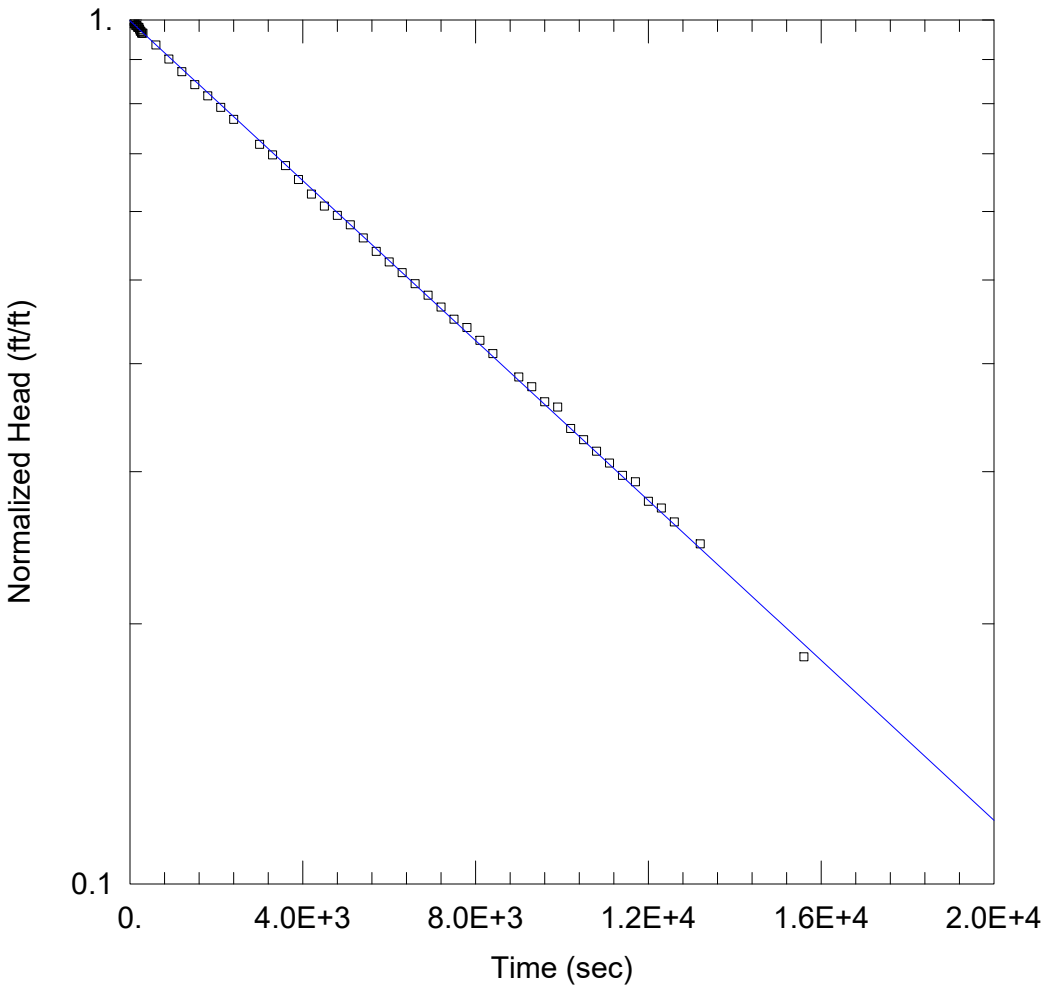
WELL DATA (EB-07D)

Initial Displacement: 0.146 ft
Total Well Penetration Depth: 29. ft
Casing Radius: 0.083 ft
Static Water Column Height: 12.45 ft
Screen Length: 10. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.001839 ft/day
Kz/Kr = 1.
Ss = 8.032E-12 ft^{-1}



EB-09 SLUG TEST

Data Set: K:\...\EB-09.aqt
Date: 07/18/19 Time: 15:46:03

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: EB-09
Test Date: 6/7/2019

AQUIFER DATA

Saturated Thickness: 16.97 ft Anisotropy Ratio (Kz/Kr): 1.

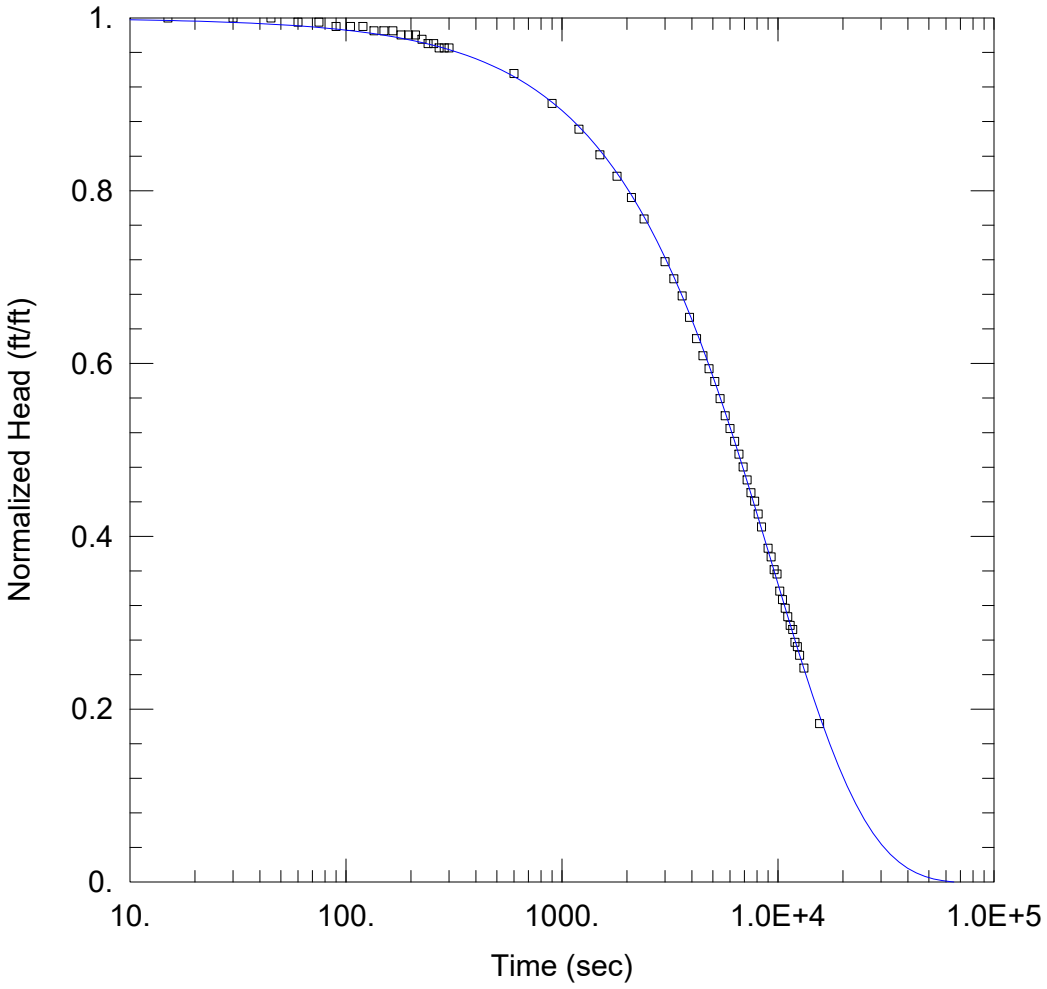
WELL DATA (EB-09)

Initial Displacement: 2.02 ft
Total Well Penetration Depth: 30. ft
Casing Radius: 0.083 ft
Static Water Column Height: 16.97 ft
Screen Length: 10. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.01061 ft/day
y0 = 2.015 ft



EB-09 SLUG TEST

Data Set: K:\...\EB-09.aqt
Date: 07/18/19 Time: 15:45:15

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: EB-09
Test Date: 6/7/2019

AQUIFER DATA

Saturated Thickness: 16.97 ft

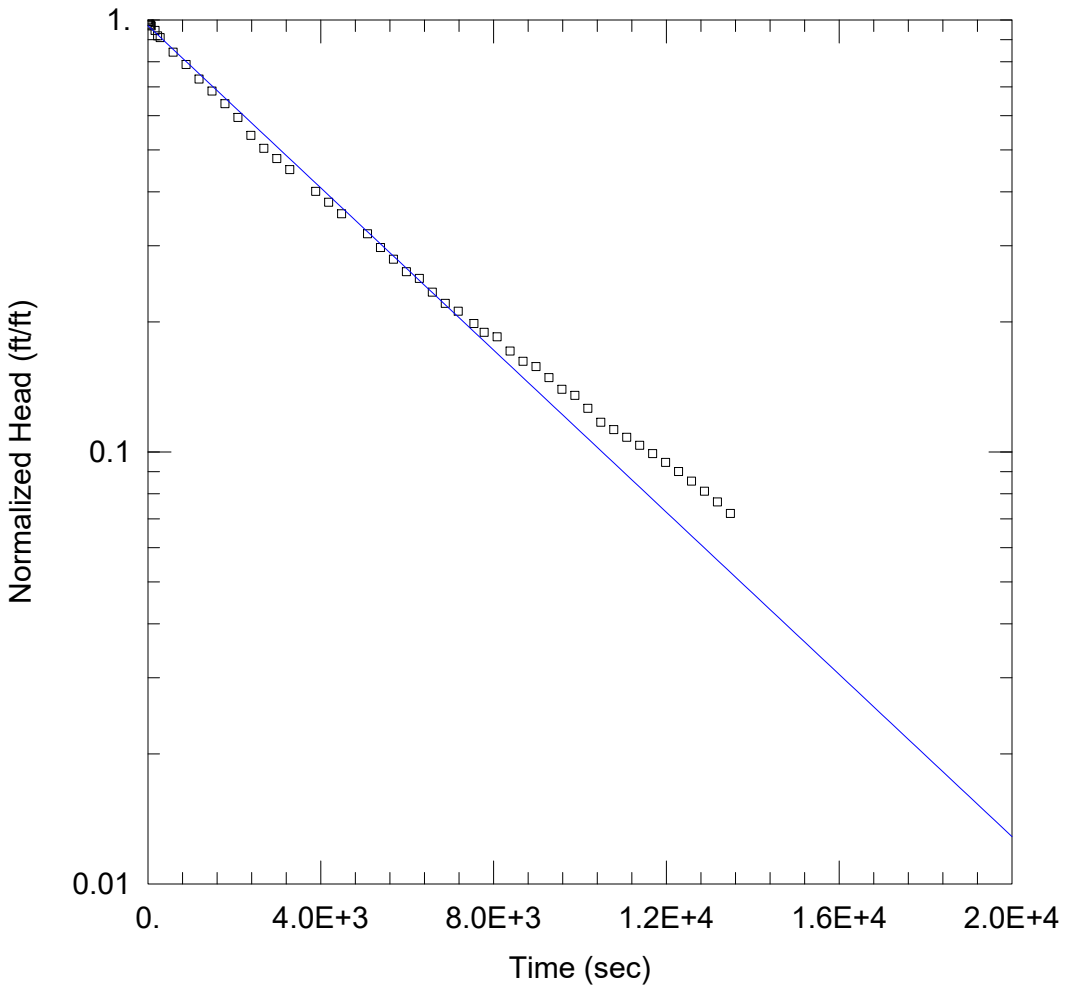
WELL DATA (EB-09)

Initial Displacement: 2.02 ft
Total Well Penetration Depth: 30. ft
Casing Radius: 0.083 ft
Static Water Column Height: 16.97 ft
Screen Length: 10. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.009849 ft/day
Kz/Kr = 1.
Ss = 7.479E-7 ft^{-1}



EB-10 SLUG TEST

Data Set: K:\...\EB-10.aqt
Date: 07/18/19 Time: 15:50:44

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: EB-10
Test Date: 6/7/2019

AQUIFER DATA

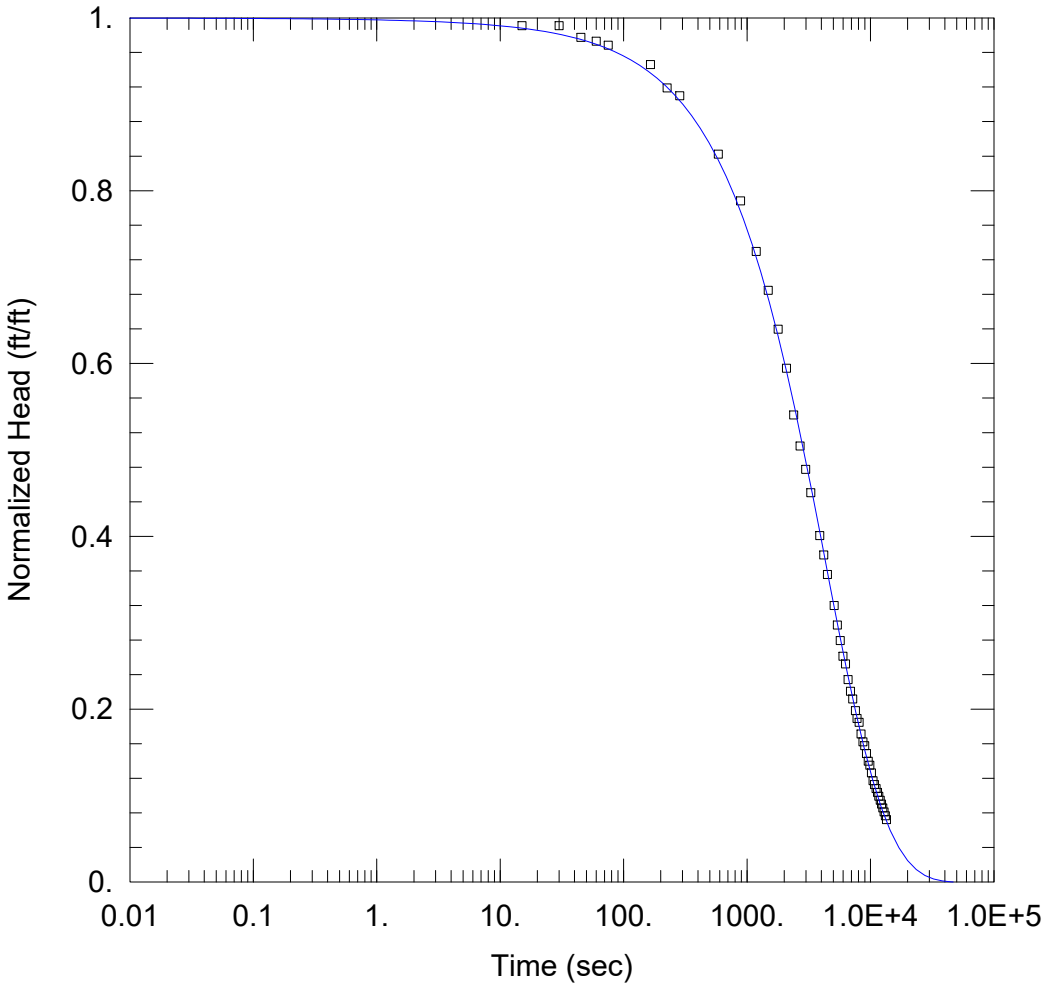
Saturated Thickness: 15.89 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EB-10)

Initial Displacement: 2.22 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 15.89 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.03655 ft/day
y0 = 2.152 ft



EB-10 SLUG TEST

Data Set: K:\...\EB-10.aqt
Date: 07/18/19 Time: 15:46:51

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: EB-10
Test Date: 6/7/2019

AQUIFER DATA

Saturated Thickness: 15.89 ft

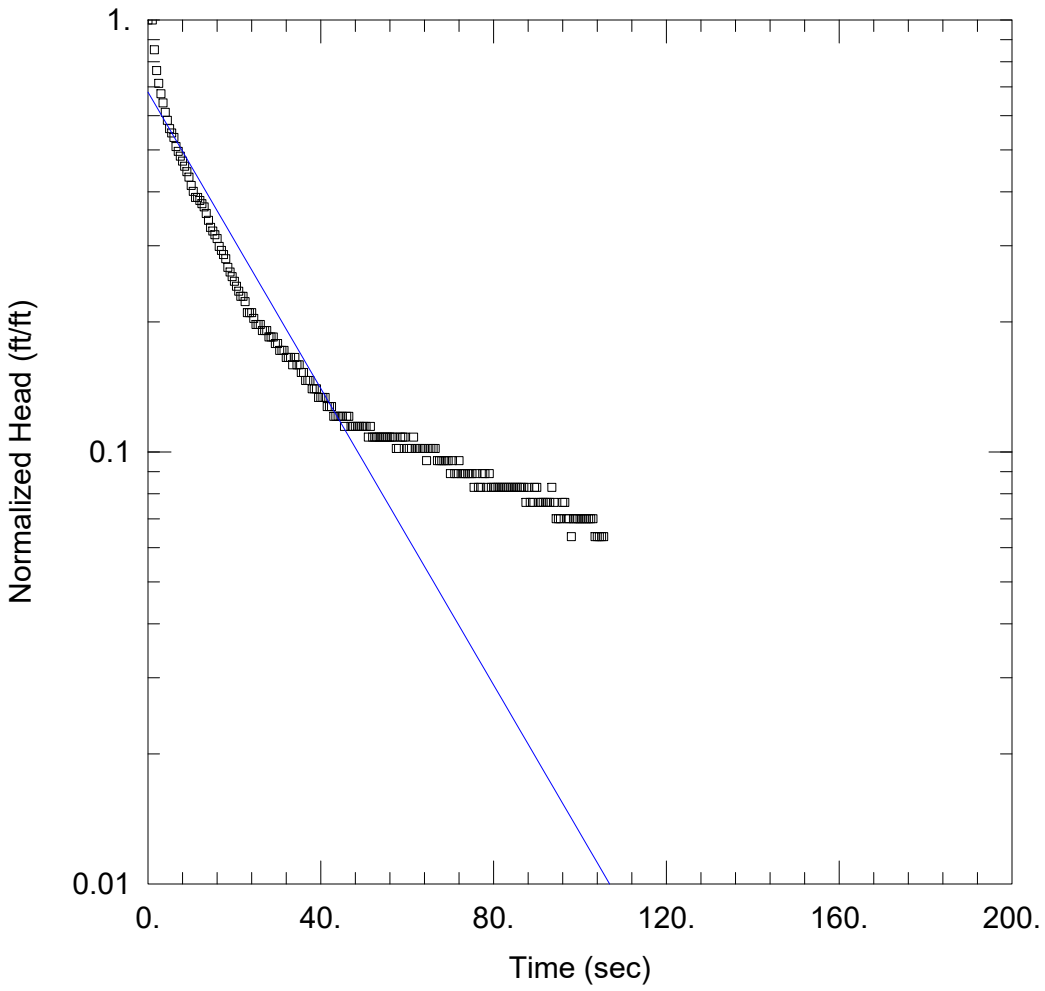
WELL DATA (EB-10)

Initial Displacement: 2.22 ft
Total Well Penetration Depth: 20. ft
Casing Radius: 0.083 ft
Static Water Column Height: 15.89 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.04873 ft/day
Kz/Kr = 1.
Ss = 5.74E-5 ft^{-1}



WELL TEST ANALYSIS

Data Set: K:\...\EB-11B.aqt
Date: 07/18/19 Time: 15:53:41

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: EB-11B
Test Date: 5/21/2019

AQUIFER DATA

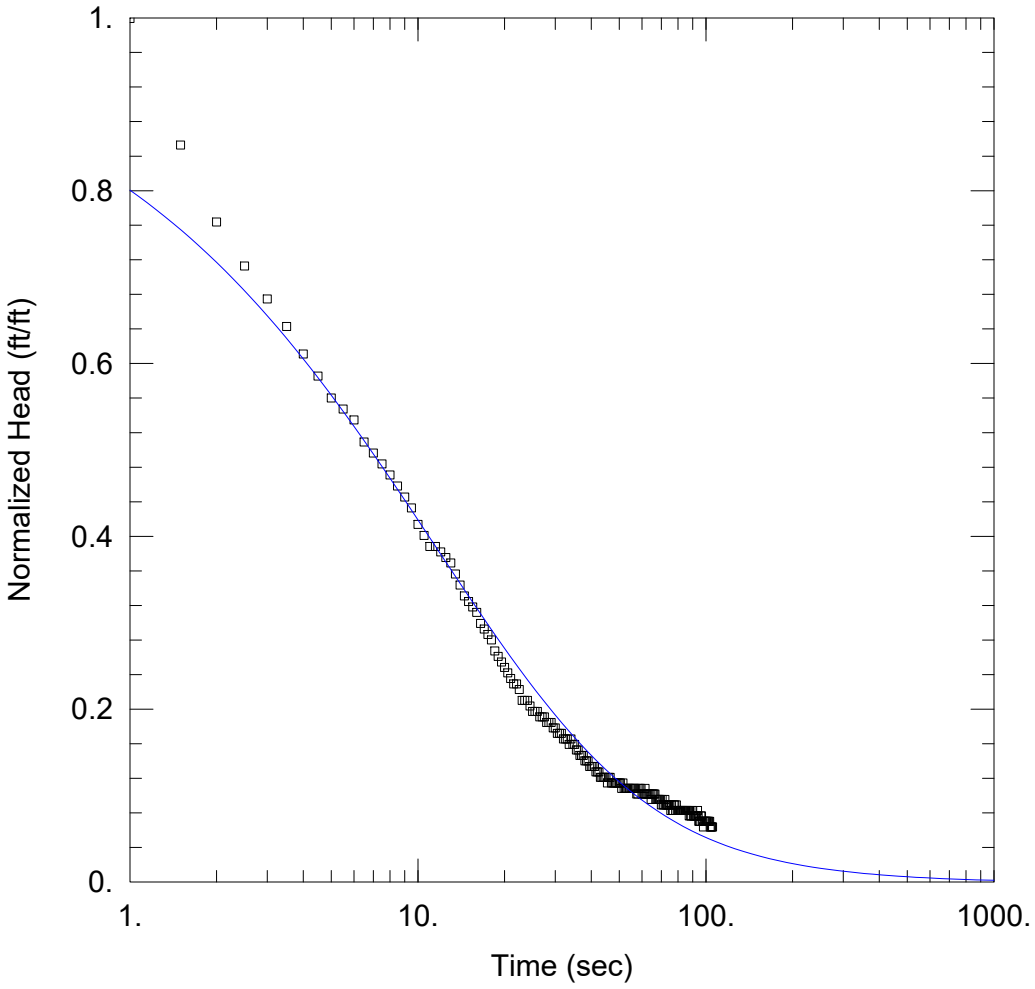
Saturated Thickness: 5.1 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (EB-11B)

Initial Displacement: 0.501 ft
Total Well Penetration Depth: 5.5 ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.1 ft
Screen Length: 4. ft
Well Radius: 0.146 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 7.899 ft/day
y0 = 0.341 ft



WELL TEST ANALYSIS

Data Set: K:\...\EB-11B.aqt
Date: 07/18/19 Time: 15:51:44

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: EB-11B
Test Date: 5/21/2019

AQUIFER DATA

Saturated Thickness: 5.1 ft

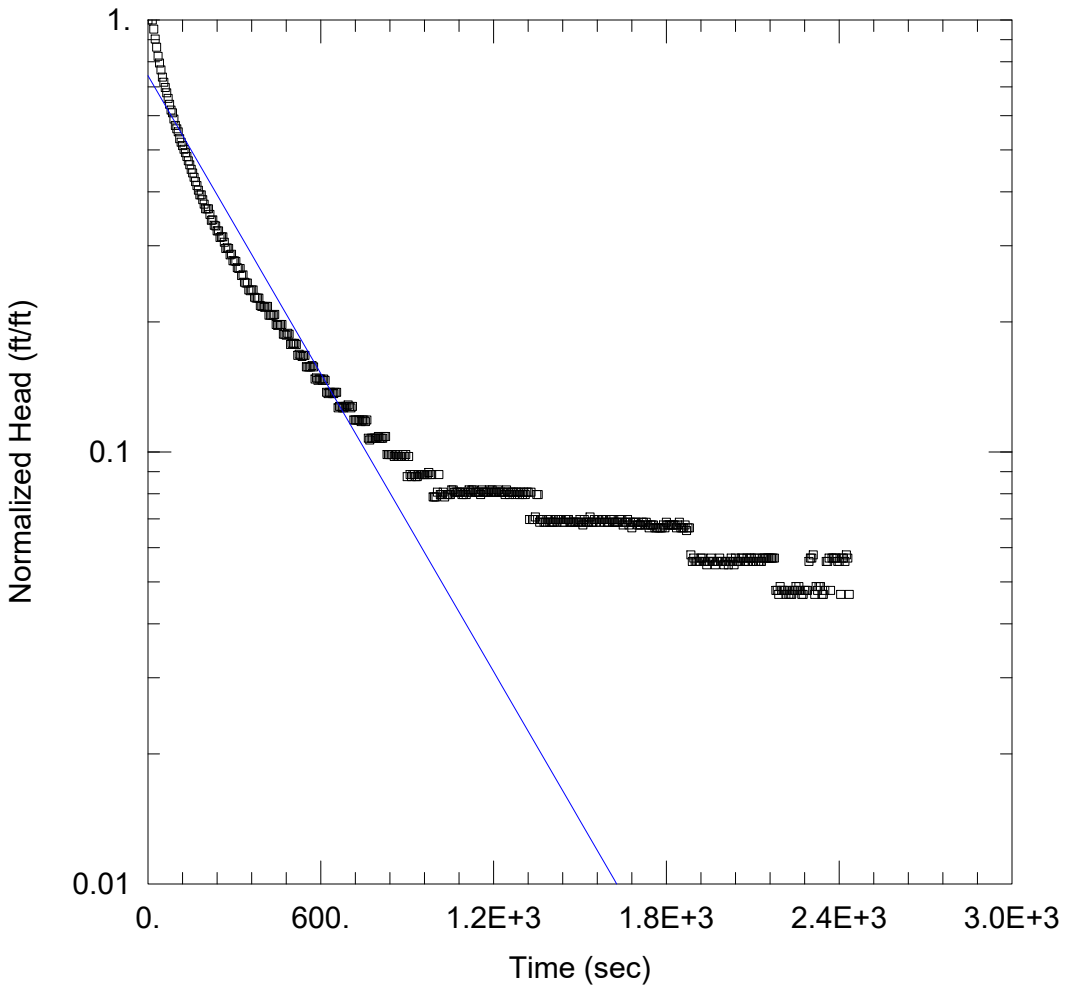
WELL DATA (EB-11B)

Initial Displacement: 0.501 ft
Total Well Penetration Depth: 5.5 ft
Casing Radius: 0.083 ft
Static Water Column Height: 5.1 ft
Screen Length: 4. ft
Well Radius: 0.146 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 9.651 ft/day
Kz/Kr = 1.
Ss = 0.01179 ft^{-1}



MW-99 (EB-15) SLUG TEST

Data Set: K:\...\MW-99_EB-15.aqt
Date: 07/18/19 Time: 16:16:43

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-99 (EB-15)
Test Date: 6/26/2019

AQUIFER DATA

Saturated Thickness: 11.18 ft Anisotropy Ratio (Kz/Kr): 1.

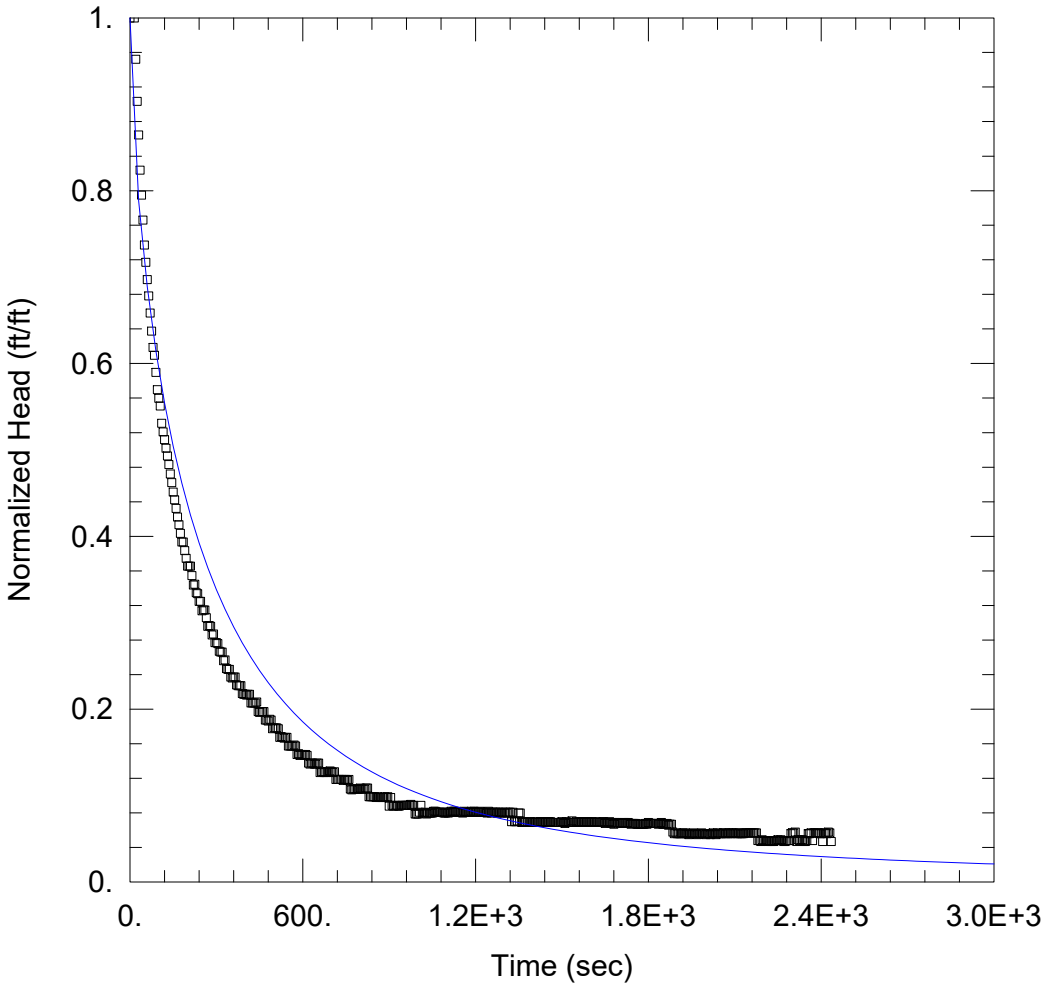
WELL DATA (MW-99 (EB-15))

Initial Displacement: 1.004 ft
Total Well Penetration Depth: 22. ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.18 ft
Screen Length: 5. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 0.6381 ft/day y0 = 0.7458 ft



MW-99 (EB-15) SLUG TEST

Data Set: K:\...\MW-99_EB-15.aqt
Date: 07/18/19 Time: 16:15:39

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-99 (EB-15)
Test Date: 6/26/2019

AQUIFER DATA

Saturated Thickness: 11.18 ft

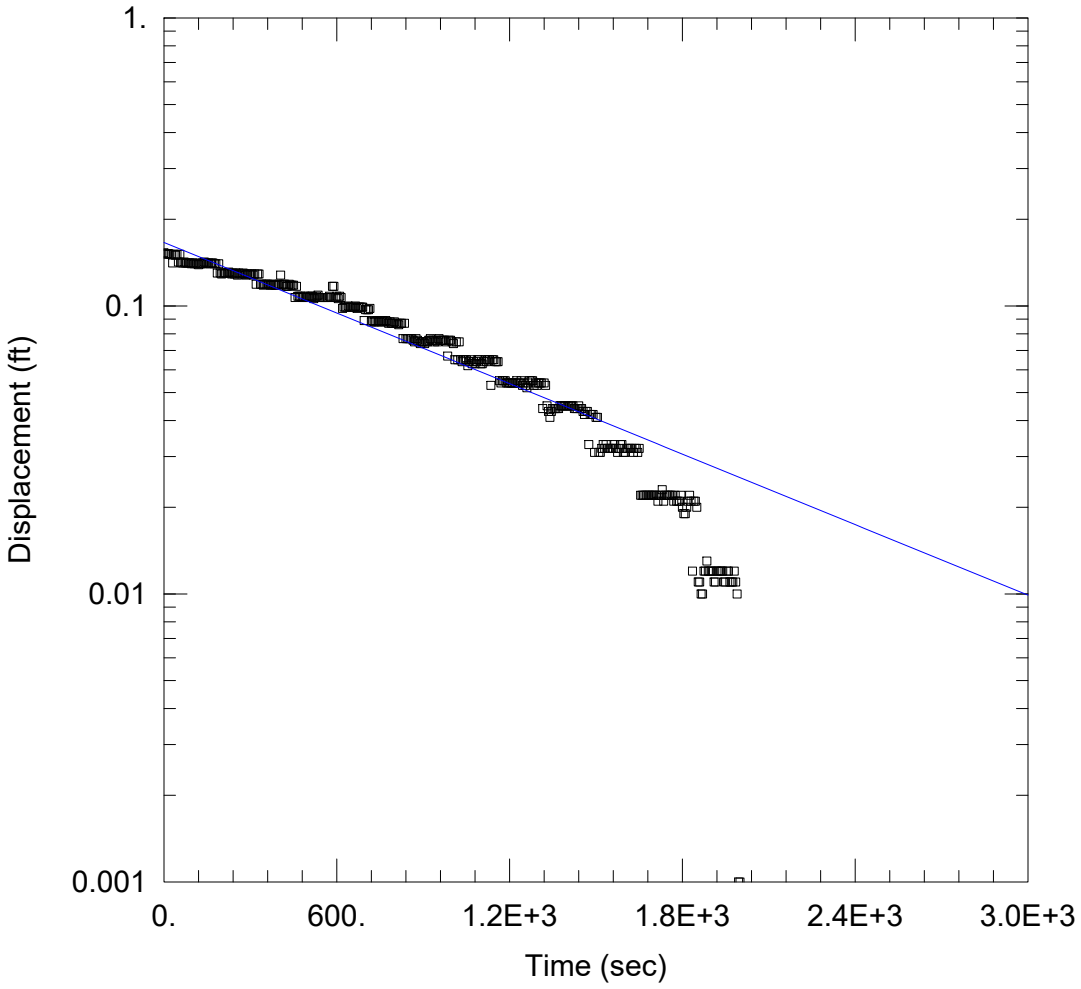
WELL DATA (MW-99 (EB-15))

Initial Displacement: 1.004 ft
Total Well Penetration Depth: 22. ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.18 ft
Screen Length: 5. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.4256 ft/day
Kz/Kr = 1.
Ss = 0.008945 ft^{-1}



WB-03D SLUG TEST

Data Set: K:\...\WB-03D.aqt
Date: 07/18/19 Time: 16:41:06

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: WB-03D
Test Date: 6/24/2019

AQUIFER DATA

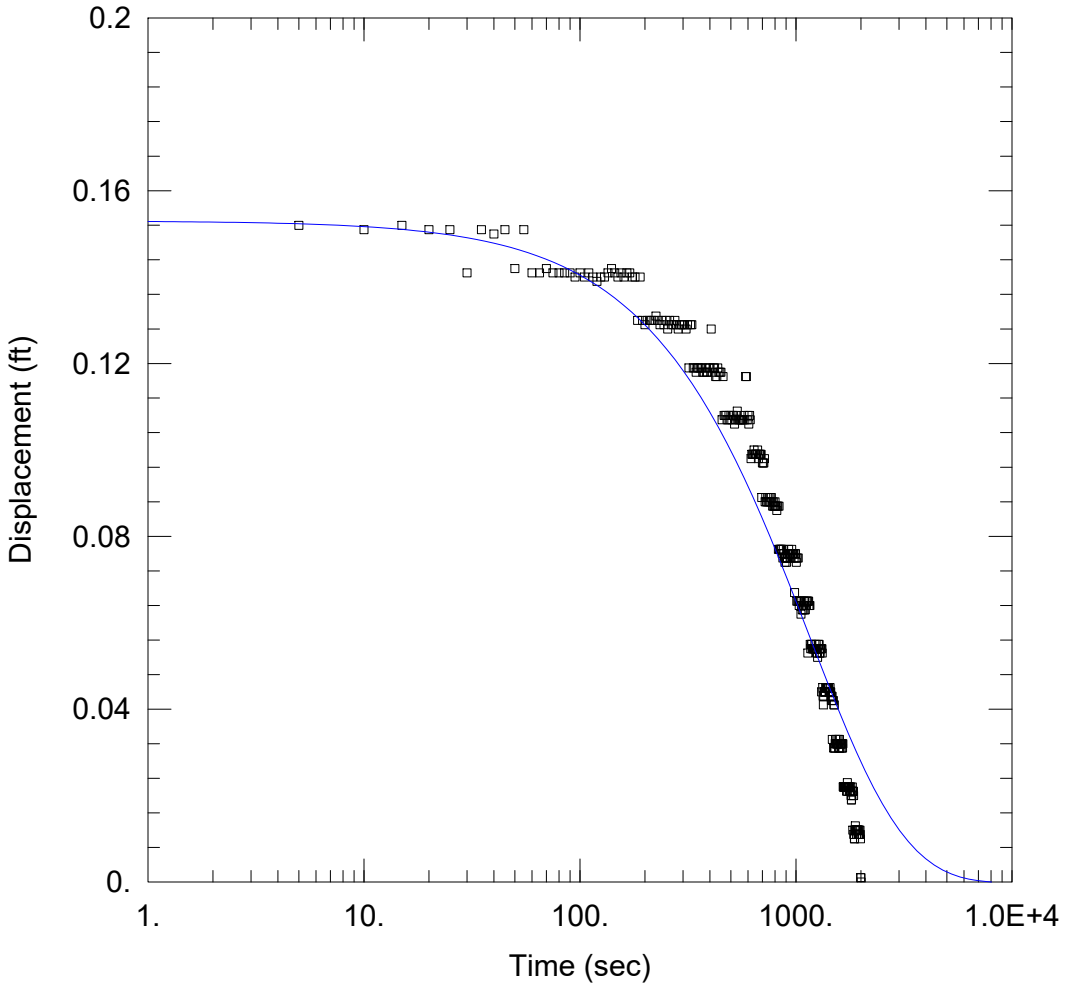
Saturated Thickness: 25.29 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WB-03D)

Initial Displacement: 0.153 ft
Total Well Penetration Depth: 35. ft
Casing Radius: 0.083 ft
Static Water Column Height: 25.29 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.174 ft/day
y0 = 0.1661 ft



WB-03D SLUG TEST

Data Set: K:\...\WB-03D.aqt
Date: 07/18/19 Time: 16:42:07

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: WB-03D
Test Date: 6/24/2019

AQUIFER DATA

Saturated Thickness: 25.29 ft

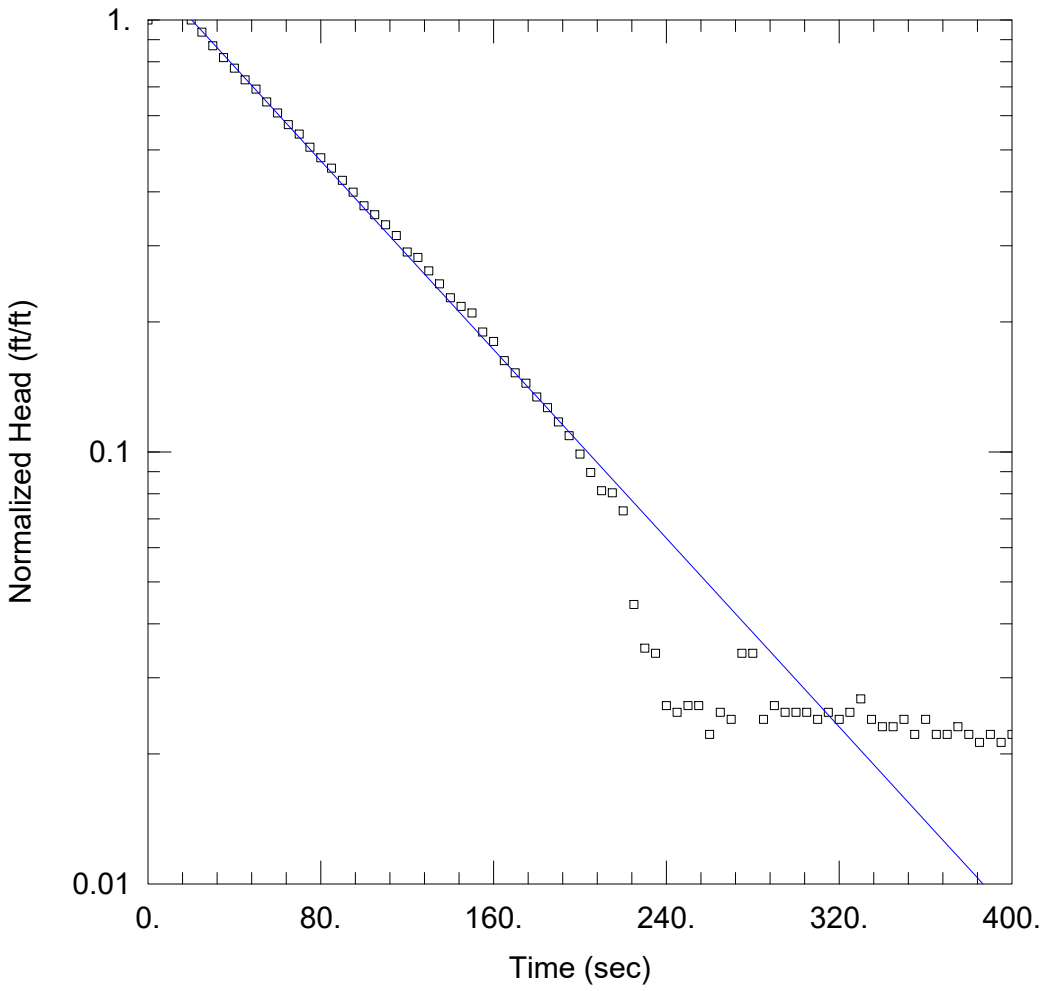
WELL DATA (WB-03D)

Initial Displacement: 0.153 ft
Total Well Penetration Depth: 35. ft
Casing Radius: 0.083 ft
Static Water Column Height: 25.29 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.1362 ft/day
Kz/Kr = 1.
Ss = 3.954E-12 ft^{-1}



WB-07 SLUG TEST

Data Set: K:\...\WB-07.aqt
Date: 07/18/19 Time: 16:42:52

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: WB-07
Test Date: 6/20/2019

AQUIFER DATA

Saturated Thickness: 2.03 ft Anisotropy Ratio (Kz/Kr): 1.

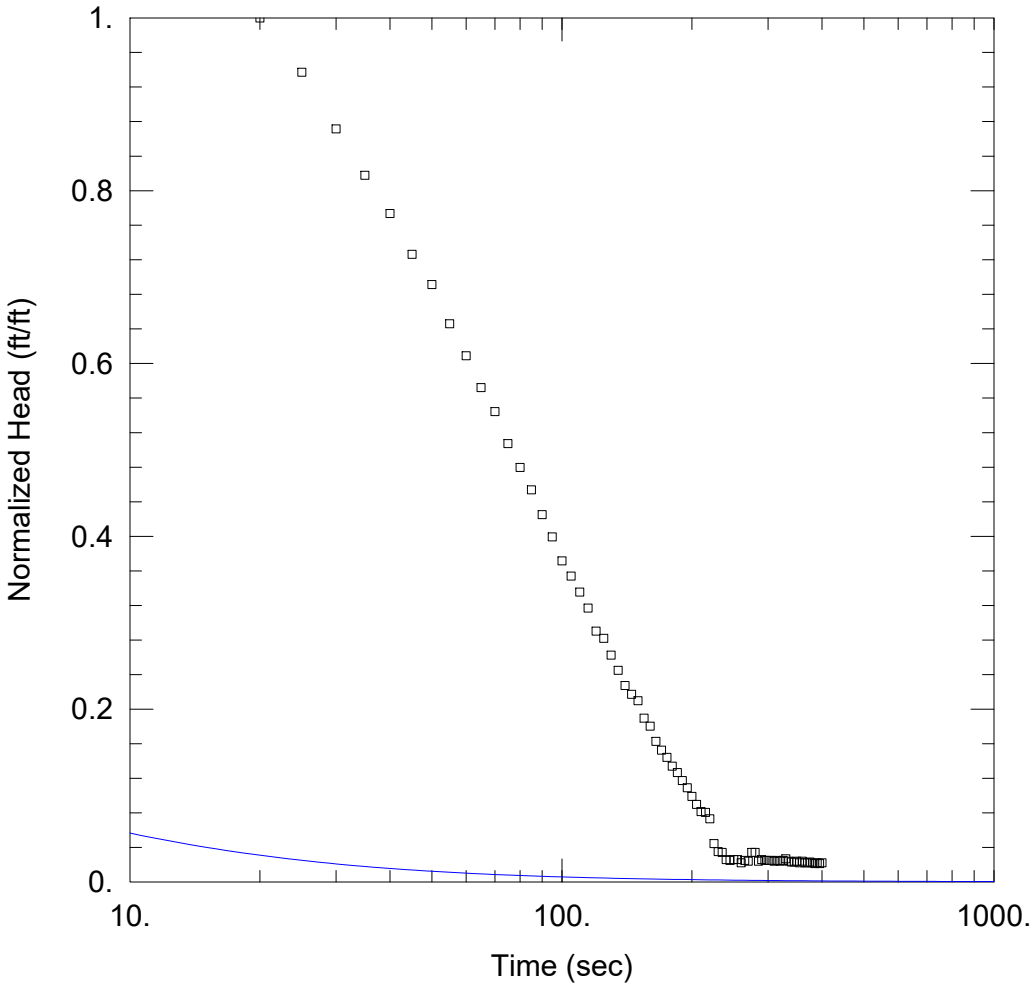
WELL DATA (WB-07)

Initial Displacement: 1.082 ft
Total Well Penetration Depth: 8. ft
Casing Radius: 0.083 ft
Static Water Column Height: 2.03 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 3.789 ft/day
y0 = 1.395 ft



WB-07 SLUG TEST

Data Set: K:\...\WB-07.aqt
Date: 07/18/19 Time: 16:44:10

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: WB-07
Test Date: 6/20/2019

AQUIFER DATA

Saturated Thickness: 2.03 ft

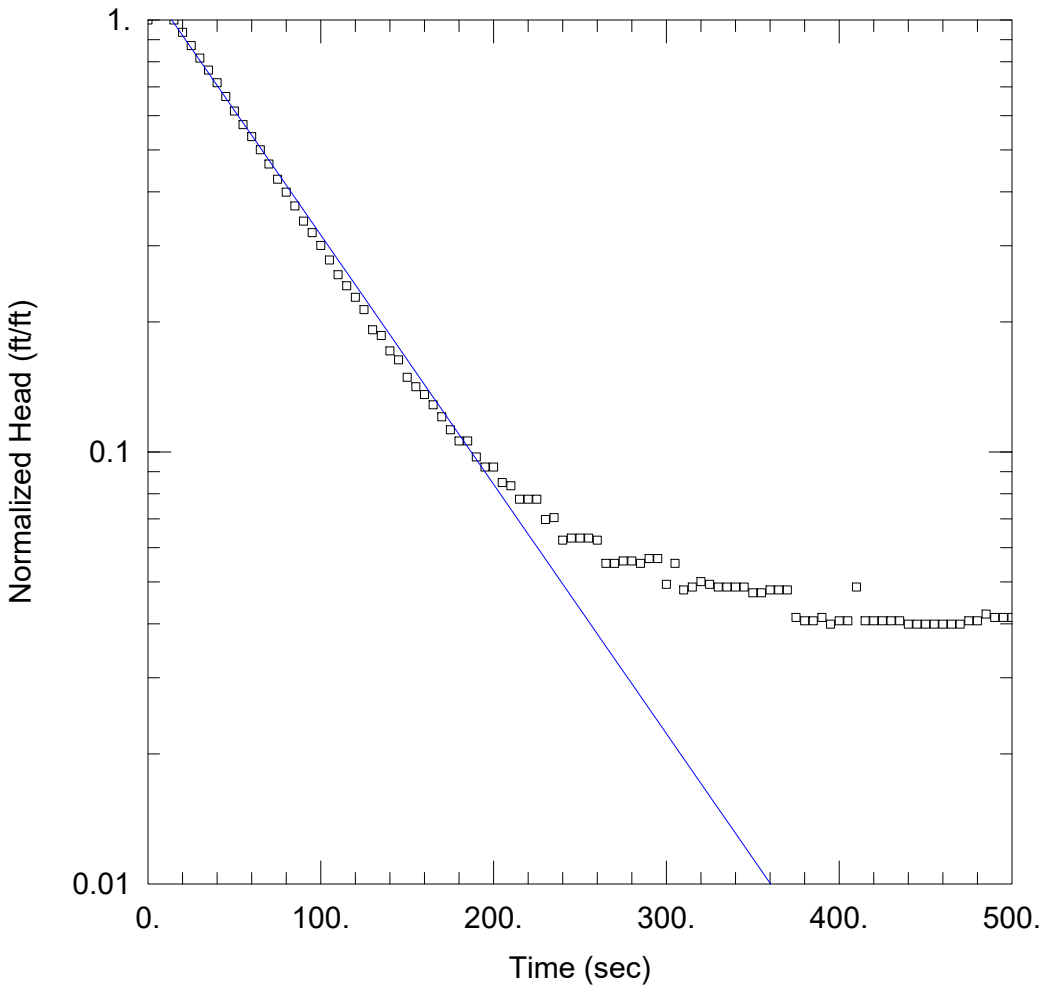
WELL DATA (WB-07)

Initial Displacement: 1.082 ft
Total Well Penetration Depth: 8. ft
Casing Radius: 0.083 ft
Static Water Column Height: 2.03 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.4256 ft/day
Kz/Kr = 1.
Ss = 0.04926 ft^{-1}



WB-09S SLUG TEST

Data Set: K:\...\WB-09S.aqt
Date: 07/18/19 Time: 16:45:55

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: WB-09S
Test Date: 6/19/2019

AQUIFER DATA

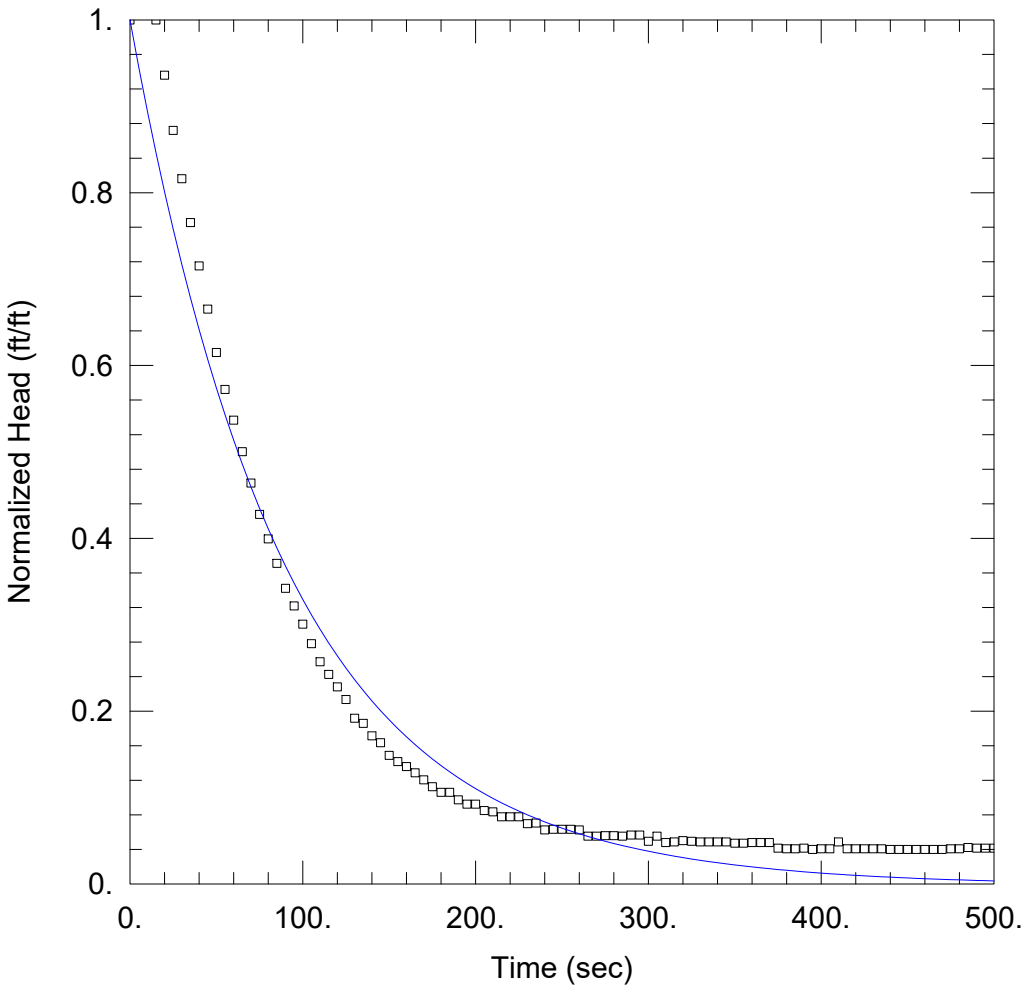
Saturated Thickness: 4.18 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WB-09S)

Initial Displacement: 1.377 ft
Total Well Penetration Depth: 8. ft
Casing Radius: 0.083 ft
Static Water Column Height: 4.18 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.174 ft/day
y0 = 1.653 ft



WB-09S SLUG TEST

Data Set: K:\...\WB-09S.aqt
Date: 07/18/19 Time: 16:45:26

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: WB-09S
Test Date: 6/19/2019

AQUIFER DATA

Saturated Thickness: 4.18 ft

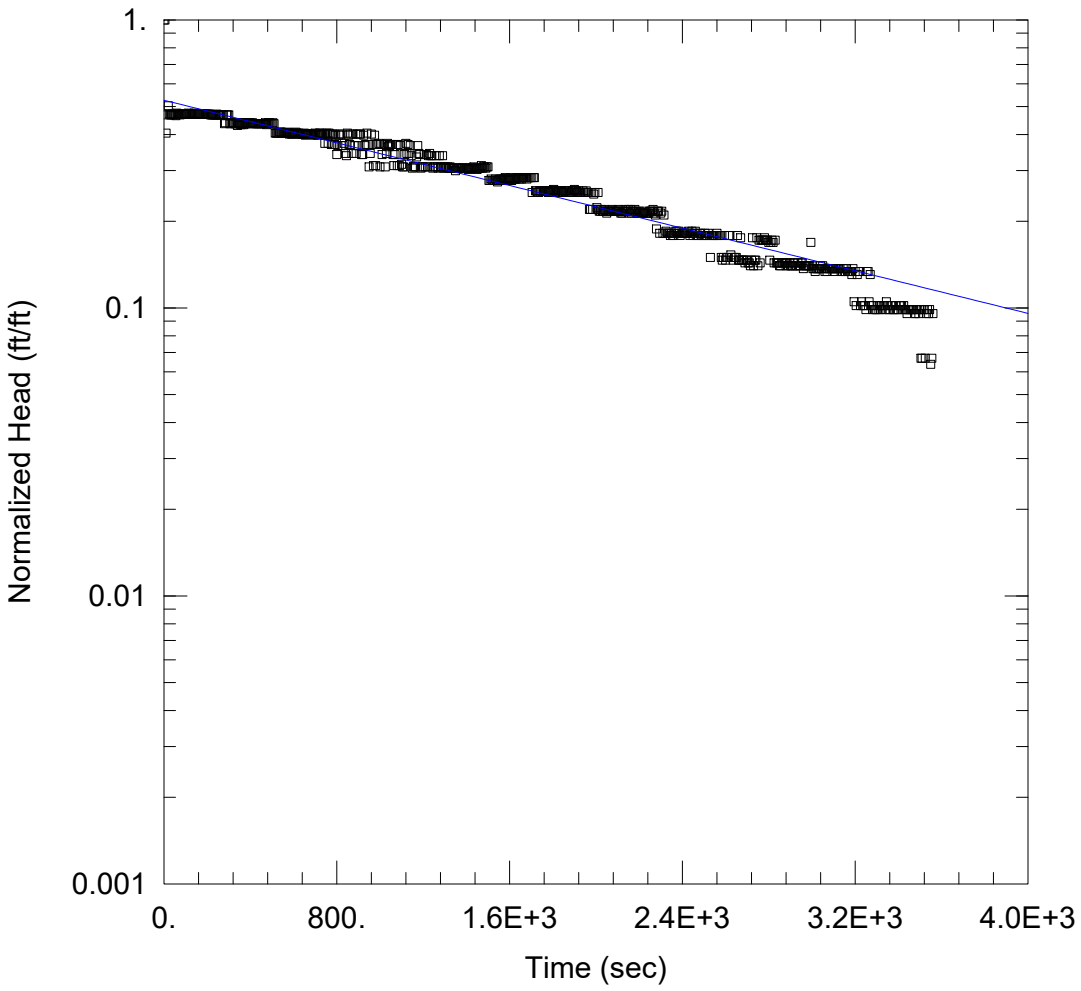
WELL DATA (WB-09S)

Initial Displacement: 1.377 ft
Total Well Penetration Depth: 8. ft
Casing Radius: 0.083 ft
Static Water Column Height: 4.18 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 2.788 ft/day
Kz/Kr = 1.
Ss = 2.392E-11 ft^{-1}



WB-11D SLUG TEST

Data Set: K:\...\WB-11D.aqt
Date: 07/18/19 Time: 16:47:09

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: WB-11D
Test Date: 6/21/2019

AQUIFER DATA

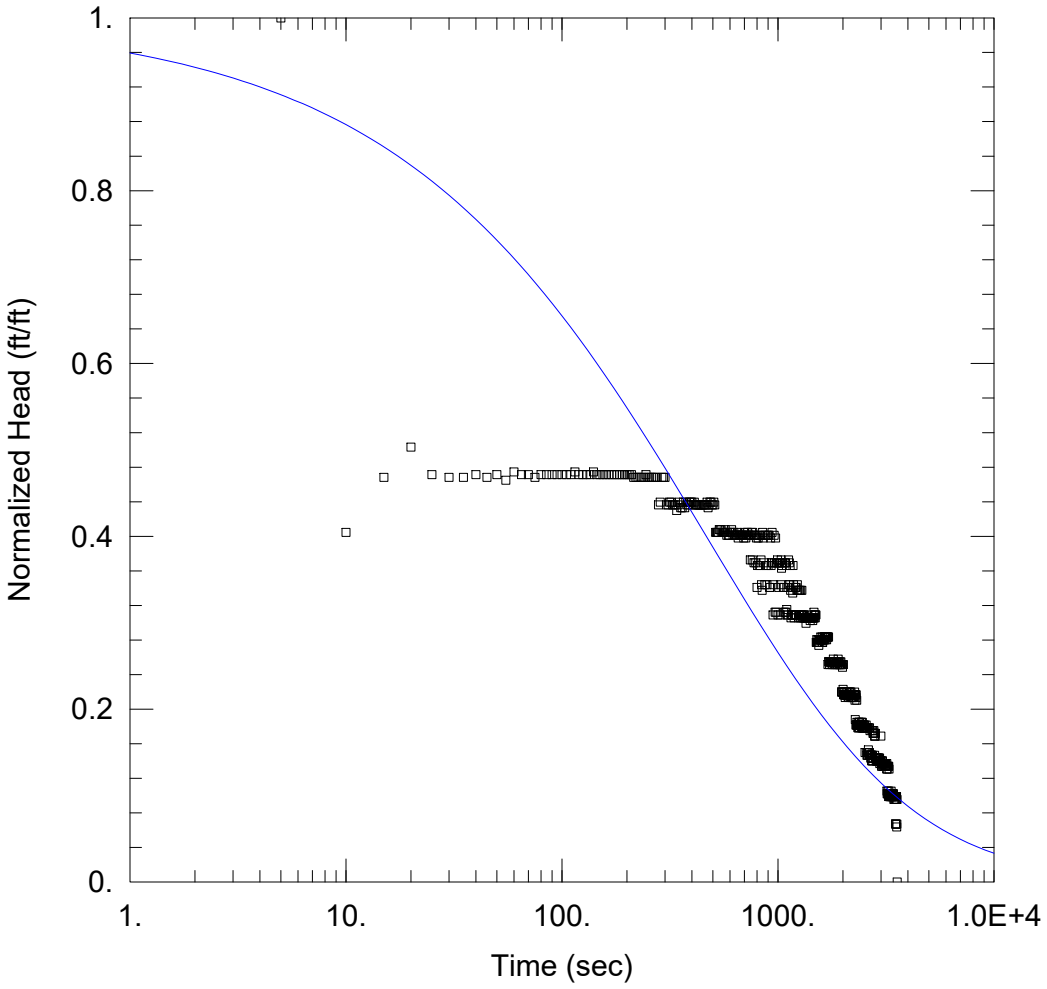
Saturated Thickness: 11.66 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WB-11D)

Initial Displacement: 0.314 ft
Total Well Penetration Depth: 30. ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.66 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.07701 ft/day
y0 = 0.1652 ft



WB-11D SLUG TEST

Data Set: K:\...\WB-11D.aqt
Date: 07/18/19 Time: 16:48:00

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: WB-11D
Test Date: 6/21/2019

AQUIFER DATA

Saturated Thickness: 11.66 ft

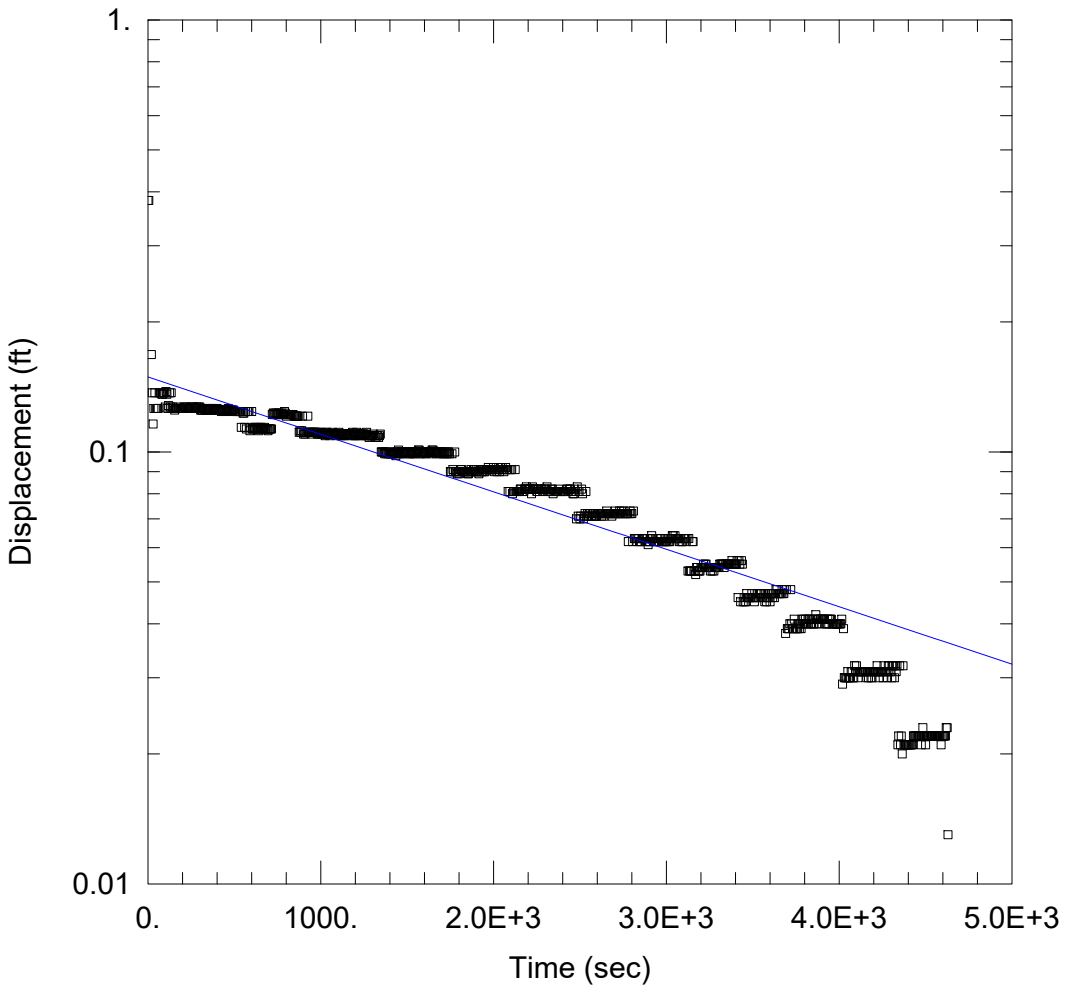
WELL DATA (WB-11D)

Initial Displacement: 0.314 ft
Total Well Penetration Depth: 30. ft
Casing Radius: 0.083 ft
Static Water Column Height: 11.66 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0741 ft/day
Kz/Kr = 1.
Ss = 0.008576 ft^{-1}



WB-13D SLUG TEST

Data Set: K:\...\WB-13D.aqt
Date: 07/18/19 Time: 16:48:56

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: WB-13D
Test Date: 6/21/2019

AQUIFER DATA

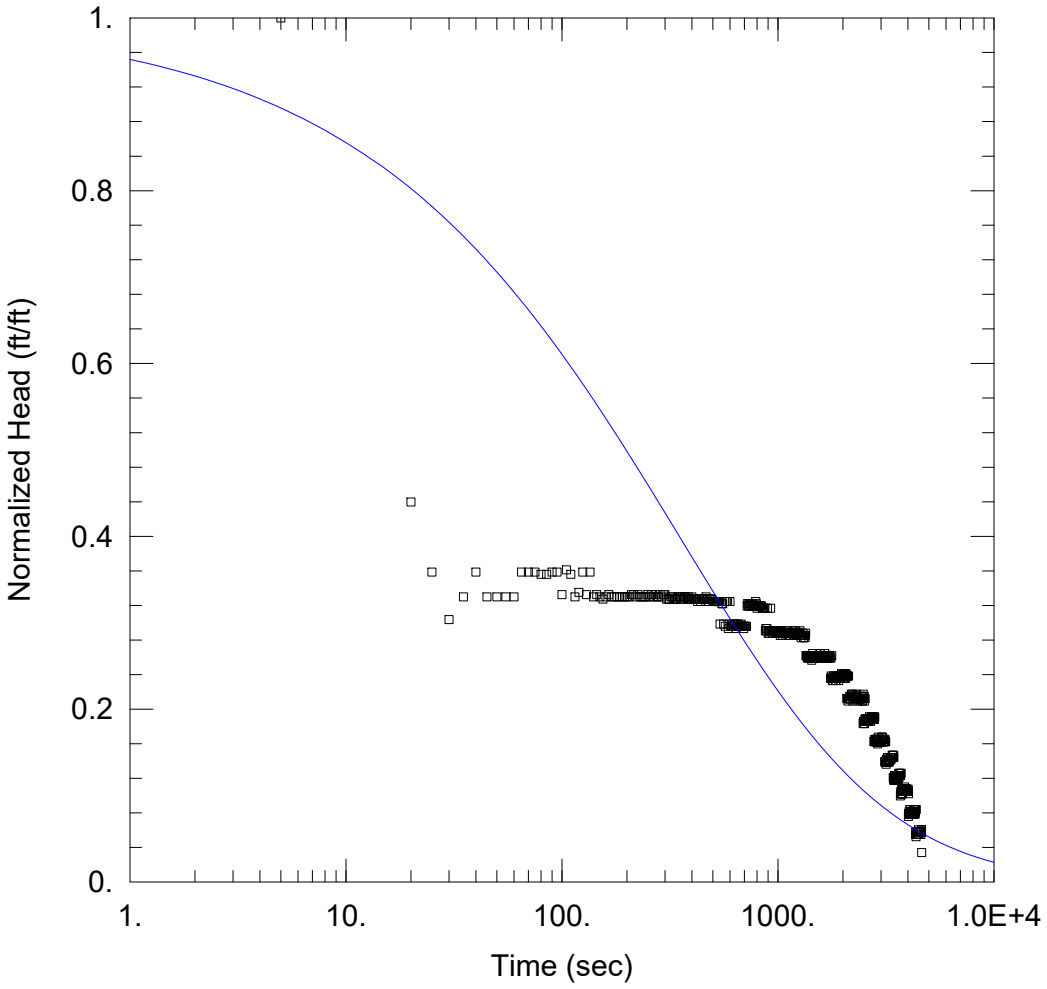
Saturated Thickness: 16.02 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (WB-13D)

Initial Displacement: 0.382 ft Static Water Column Height: 16.02 ft
Total Well Penetration Depth: 33. ft Screen Length: 5. ft
Casing Radius: 0.083 ft Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
K = 0.05617 ft/day y0 = 0.1491 ft



WB-13D SLUG TEST

Data Set: K:\...\WB-13D.aqt
Date: 07/18/19 Time: 16:50:04

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: WB-13D
Test Date: 6/21/2019

AQUIFER DATA

Saturated Thickness: 16.02 ft

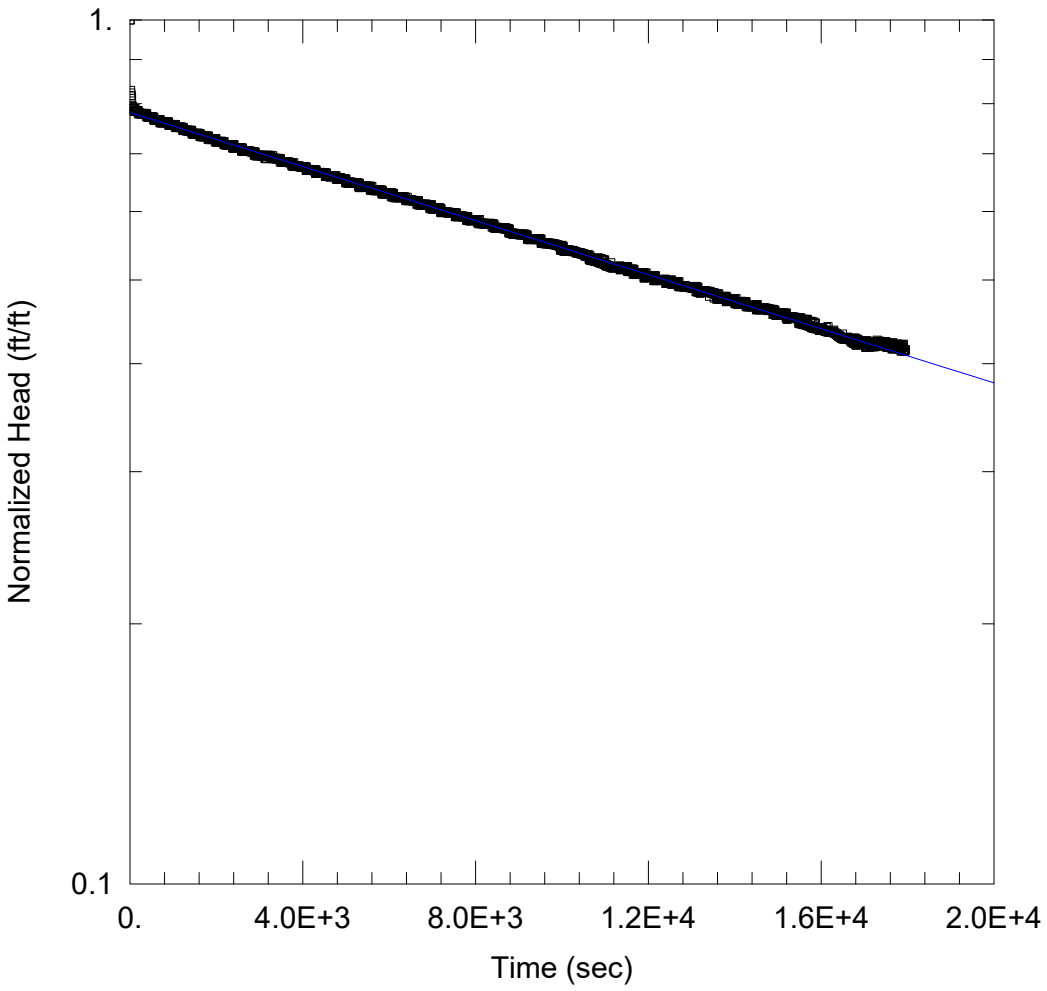
WELL DATA (WB-13D)

Initial Displacement: 0.382 ft
Total Well Penetration Depth: 33. ft
Casing Radius: 0.083 ft
Static Water Column Height: 16.02 ft
Screen Length: 5. ft
Well Radius: 0.292 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.05393 ft/day
Kz/Kr = 1.
Ss = 0.006242 ft^{-1}



MW-11 SLUG TEST

Data Set: K:\...\MW-11.aqt
Date: 07/18/19 Time: 16:18:51

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-11
Test Date: 6/28/2019

AQUIFER DATA

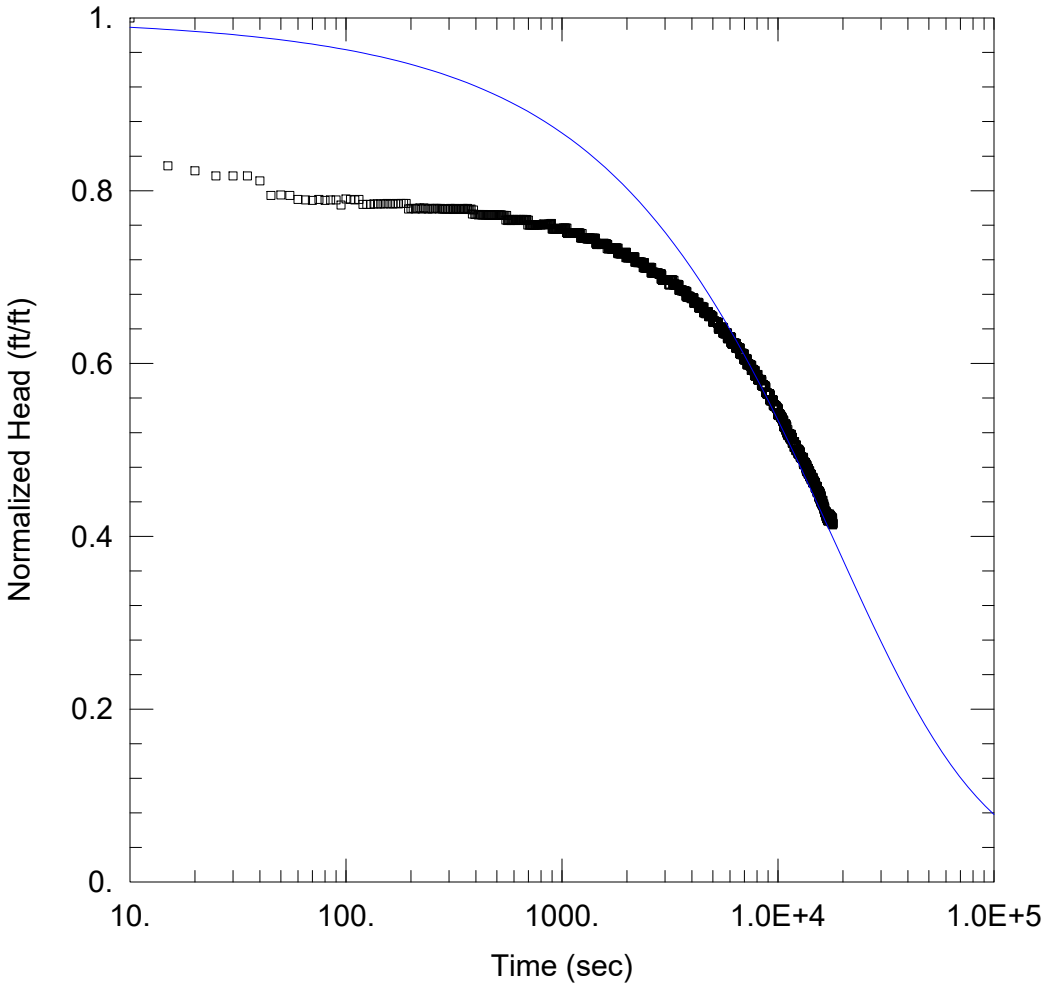
Saturated Thickness: 9.74 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-11)

Initial Displacement: 1.723 ft
Total Well Penetration Depth: 13. ft
Casing Radius: 0.083 ft
Static Water Column Height: 9.74 ft
Screen Length: 8. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.005127 ft/day
y0 = 1.346 ft



MW-11 SLUG TEST

Data Set: K:\...\MW-11.aqt
Date: 07/18/19 Time: 16:19:55

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-11
Test Date: 6/28/2019

AQUIFER DATA

Saturated Thickness: 9.74 ft

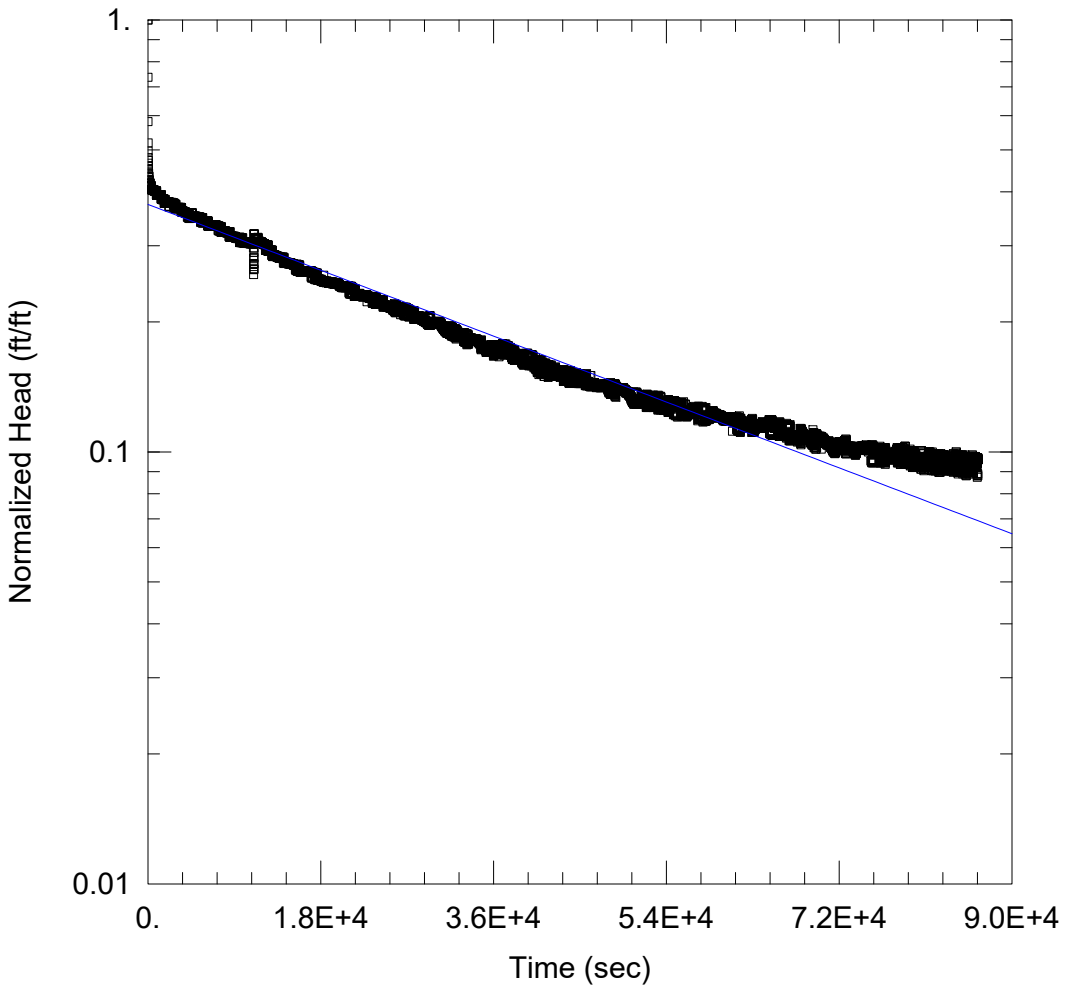
WELL DATA (MW-11)

Initial Displacement: 1.723 ft
Total Well Penetration Depth: 13. ft
Casing Radius: 0.083 ft
Static Water Column Height: 9.74 ft
Screen Length: 8. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.006449 ft/day
Kz/Kr = 1.
Ss = 0.01027 ft^{-1}



WELL TEST ANALYSIS

Data Set: K:\...\MW-91.aqt
Date: 07/18/19 Time: 16:28:12

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-91
Test Date: 6/26/2019

AQUIFER DATA

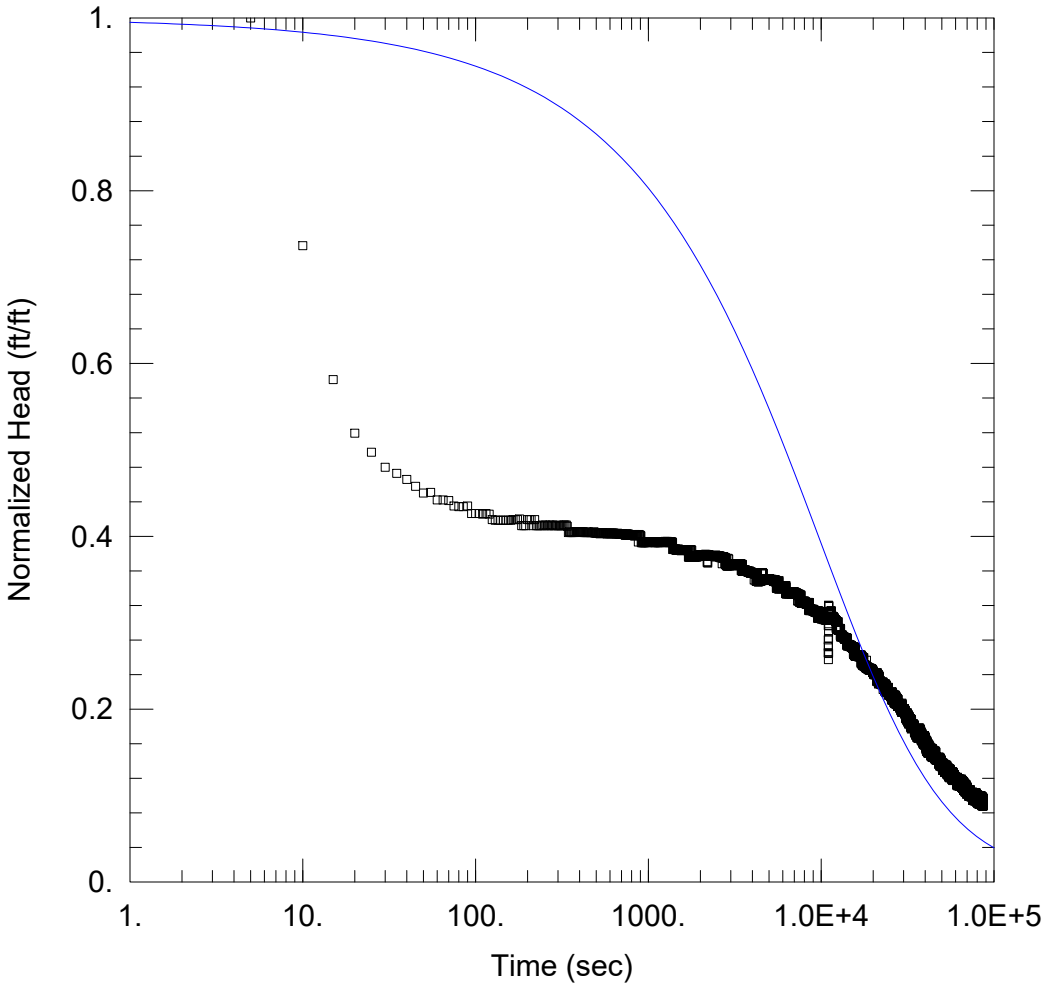
Saturated Thickness: 10.01 ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW-91)

Initial Displacement: 1.271 ft
Total Well Penetration Depth: 22. ft
Casing Radius: 0.083 ft
Static Water Column Height: 10.01 ft
Screen Length: 15. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.002434 ft/day
y0 = 0.4754 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-91.aqt
Date: 07/18/19 Time: 16:31:50

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-91
Test Date: 6/26/2019

AQUIFER DATA

Saturated Thickness: 10.01 ft

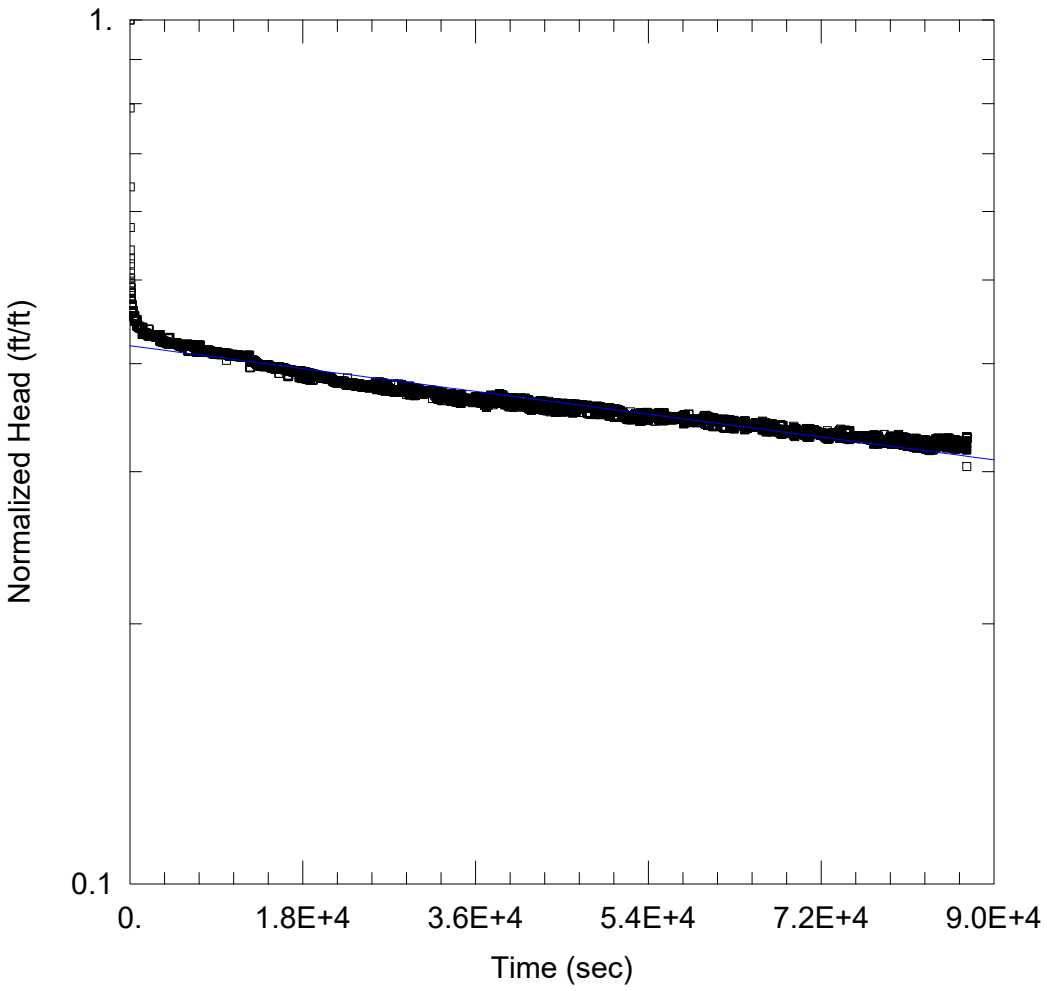
WELL DATA (MW-91)

Initial Displacement: 1.271 ft
Total Well Penetration Depth: 22. ft
Casing Radius: 0.083 ft
Static Water Column Height: 10.01 ft
Screen Length: 15. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.007618 ft/day
Kz/Kr = 1.
Ss = 0.00999 ft^{-1}



MW-97 SLUG TEST

Data Set: K:\...\MW-97.aqt
Date: 07/18/19 Time: 16:33:03

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-97
Test Date: 6/26/2019

AQUIFER DATA

Saturated Thickness: 6.87 ft Anisotropy Ratio (Kz/Kr): 1.

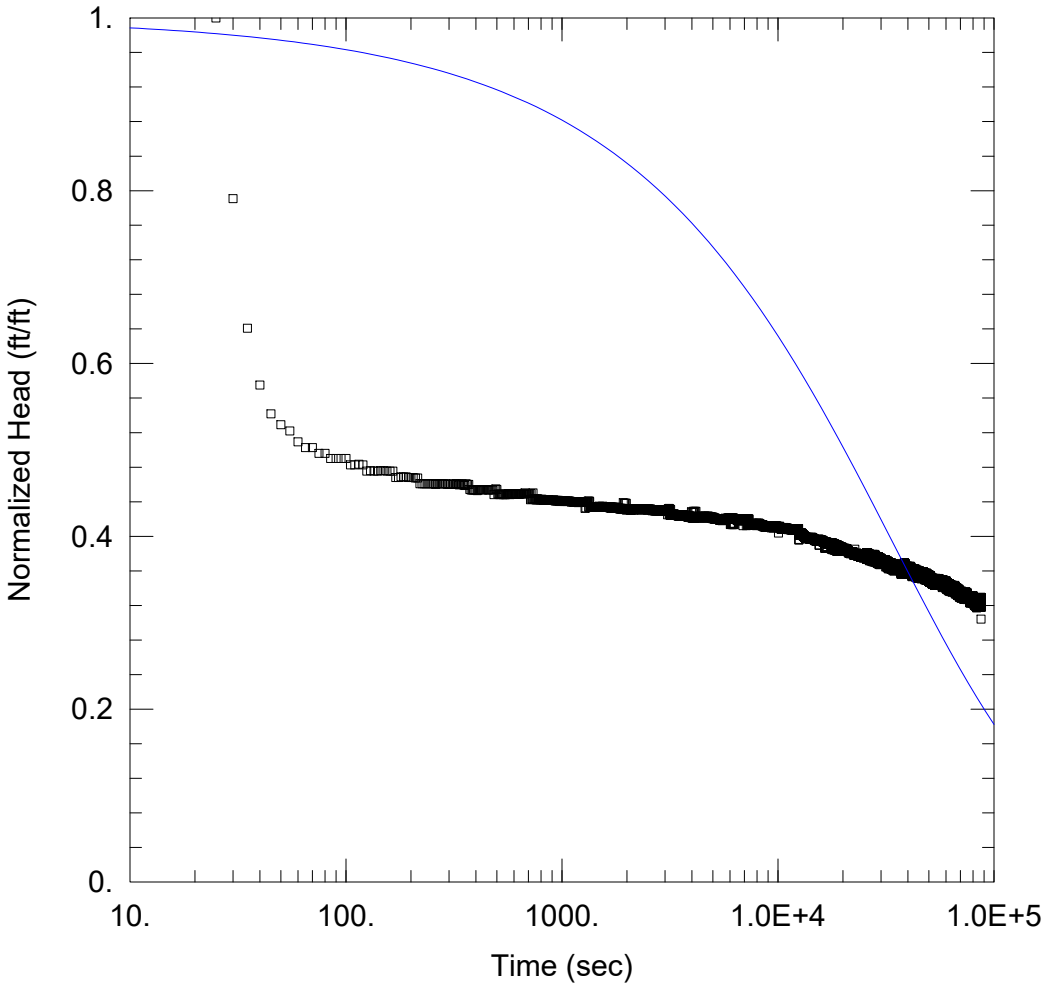
WELL DATA (MW-97)

Initial Displacement: 1.506 ft
Total Well Penetration Depth: 18. ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.87 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0005852 ft/day
y0 = 0.632 ft



MW-97 SLUG TEST

Data Set: K:\...\MW-97.aqt
Date: 07/18/19 Time: 16:35:00

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-97
Test Date: 6/26/2019

AQUIFER DATA

Saturated Thickness: 6.87 ft

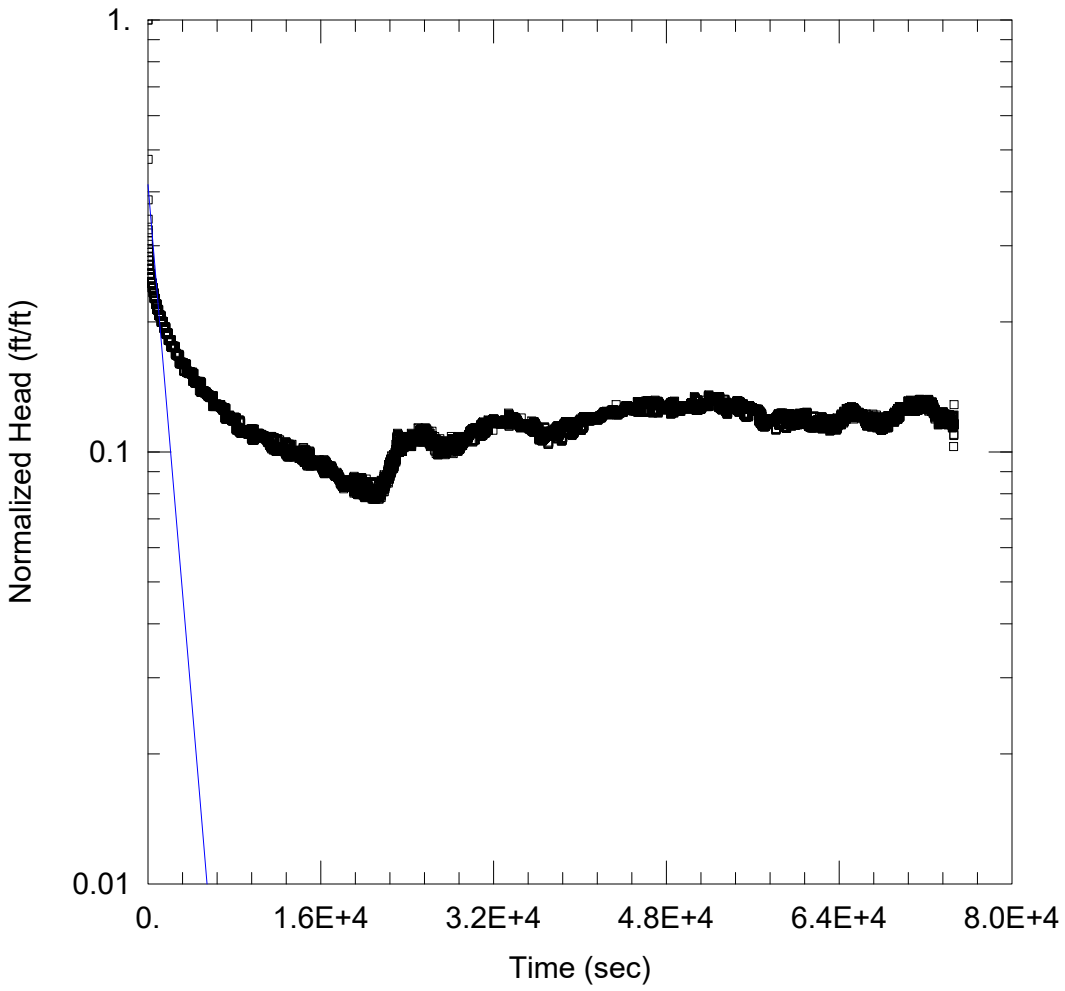
WELL DATA (MW-97)

Initial Displacement: 1.506 ft
Total Well Penetration Depth: 18. ft
Casing Radius: 0.083 ft
Static Water Column Height: 6.87 ft
Screen Length: 10. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0009811 ft/day
Kz/Kr = 1.
Ss = 0.01456 ft^{-1}



WELL TEST ANALYSIS

Data Set: K:\...\MW-98.aqt
Date: 07/18/19 Time: 16:37:43

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-98
Test Date: 6/27/2019

AQUIFER DATA

Saturated Thickness: 9.54 ft Anisotropy Ratio (Kz/Kr): 1.

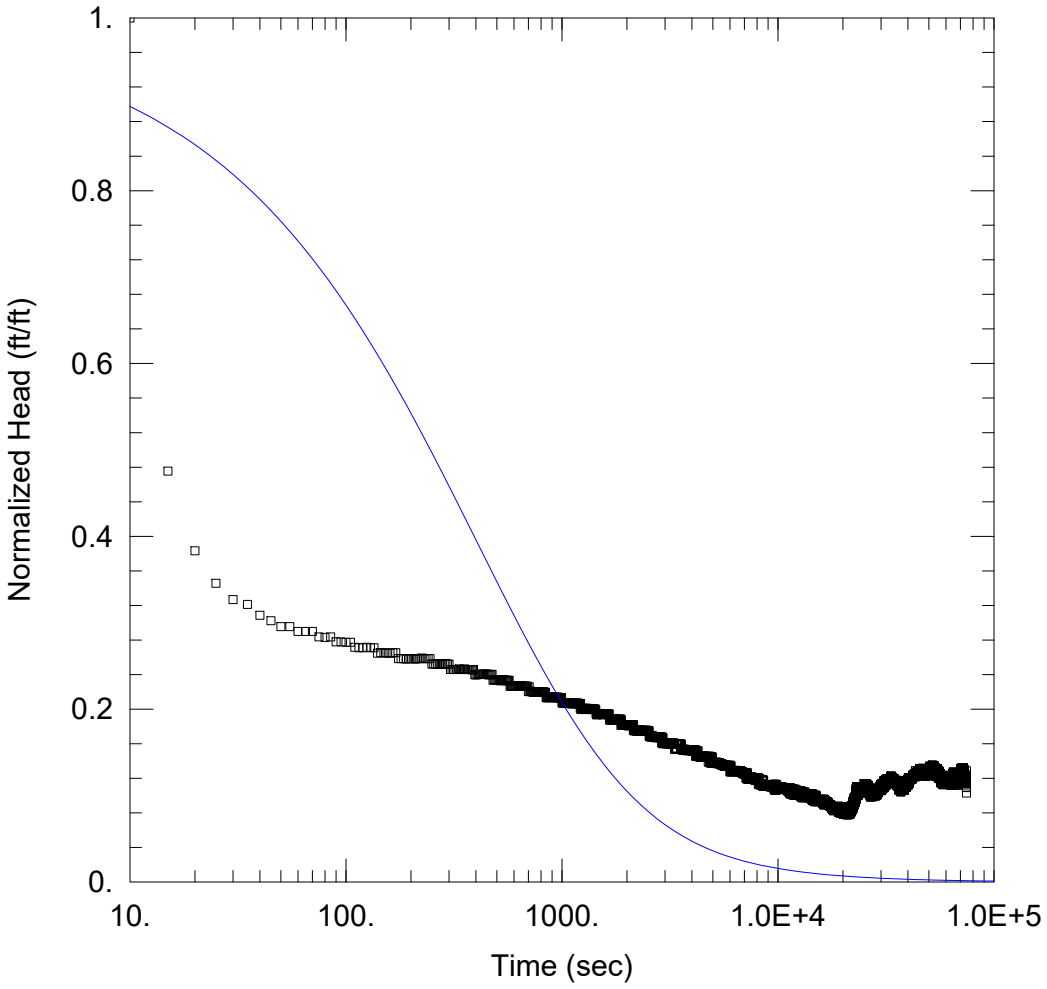
WELL DATA (MW-98)

Initial Displacement: 1.594 ft
Total Well Penetration Depth: 25. ft
Casing Radius: 0.083 ft
Static Water Column Height: 9.54 ft
Screen Length: 15. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.09057 ft/day
y0 = 0.6623 ft



WELL TEST ANALYSIS

Data Set: K:\...\MW-98.aqt
Date: 07/18/19 Time: 16:36:50

PROJECT INFORMATION

Company: Ramboll
Client: CMR
Project: 1690012344-003
Location: Great Falls, MT
Test Well: MW-98
Test Date: 6/27/2019

AQUIFER DATA

Saturated Thickness: 9.54 ft

WELL DATA (MW-98)

Initial Displacement: 1.594 ft
Total Well Penetration Depth: 25. ft
Casing Radius: 0.083 ft
Static Water Column Height: 9.54 ft
Screen Length: 15. ft
Well Radius: 0.083 ft

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.09057 ft/day
Kz/Kr = 1.
Ss = 0.01048 ft^{-1}

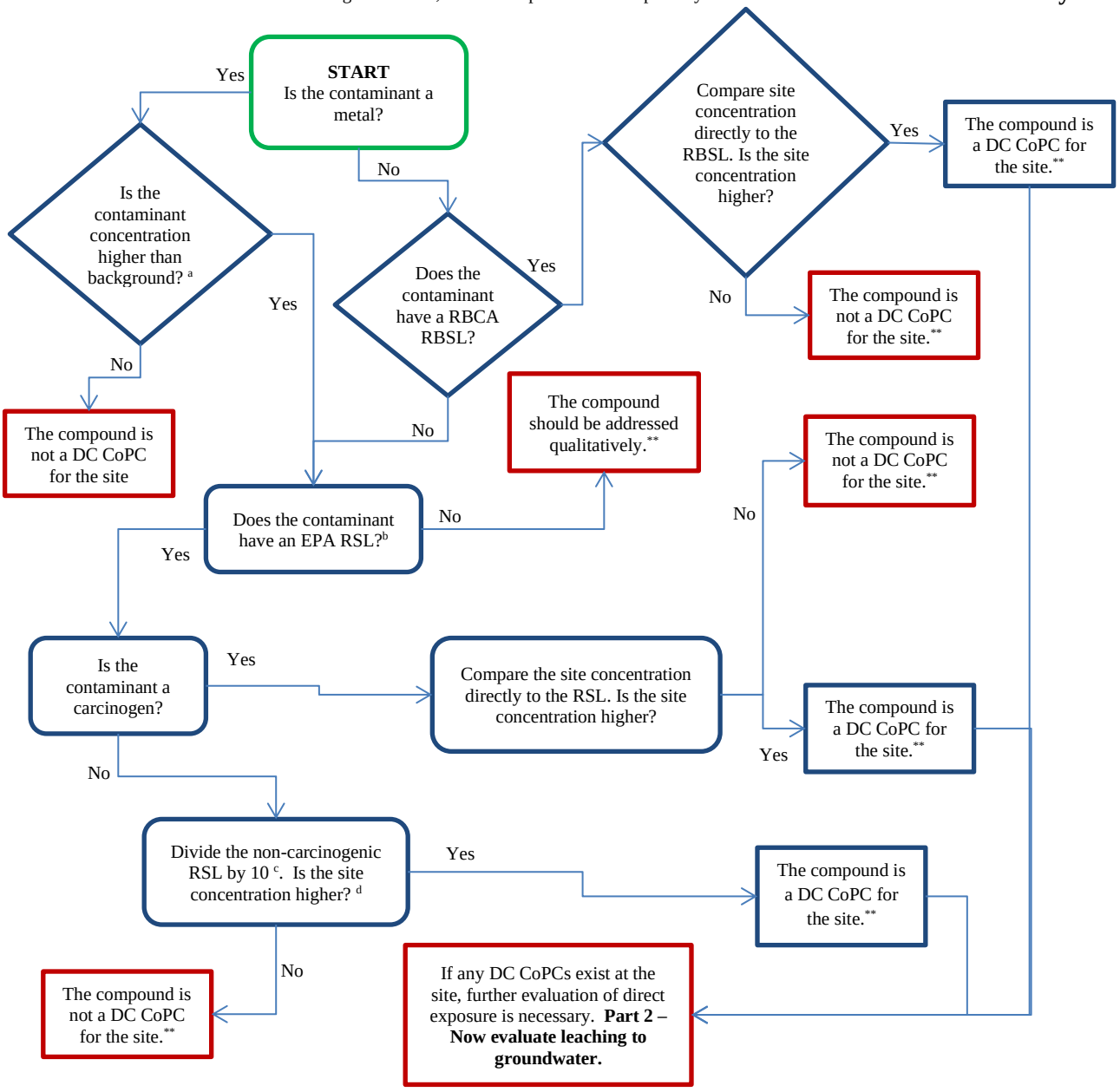
APPENDIX G

MDEQ's Soil Screening Flowchart

Surface and Subsurface Soil Screening Flowchart
Part 1 – Direct Exposure

Note: For volatile contaminants in soil or groundwater, evaluate vapor intrusion separately.

Revised July 2021



**Now Evaluate Leaching to Groundwater (Part 2) for complete screening

a = 2013 MT DEQ Inorganic Background Study Background Threshold Values (BTVs) Table 4-4 applies to both surface and subsurface soil

b = Use residential EPA RSLs for screening of both surface and subsurface soils (where RBSLs do not exist) to ensure adequate protection of construction workers (commercial/industrial numbers are not adequately protective in many cases due to soil ingestion assumptions).

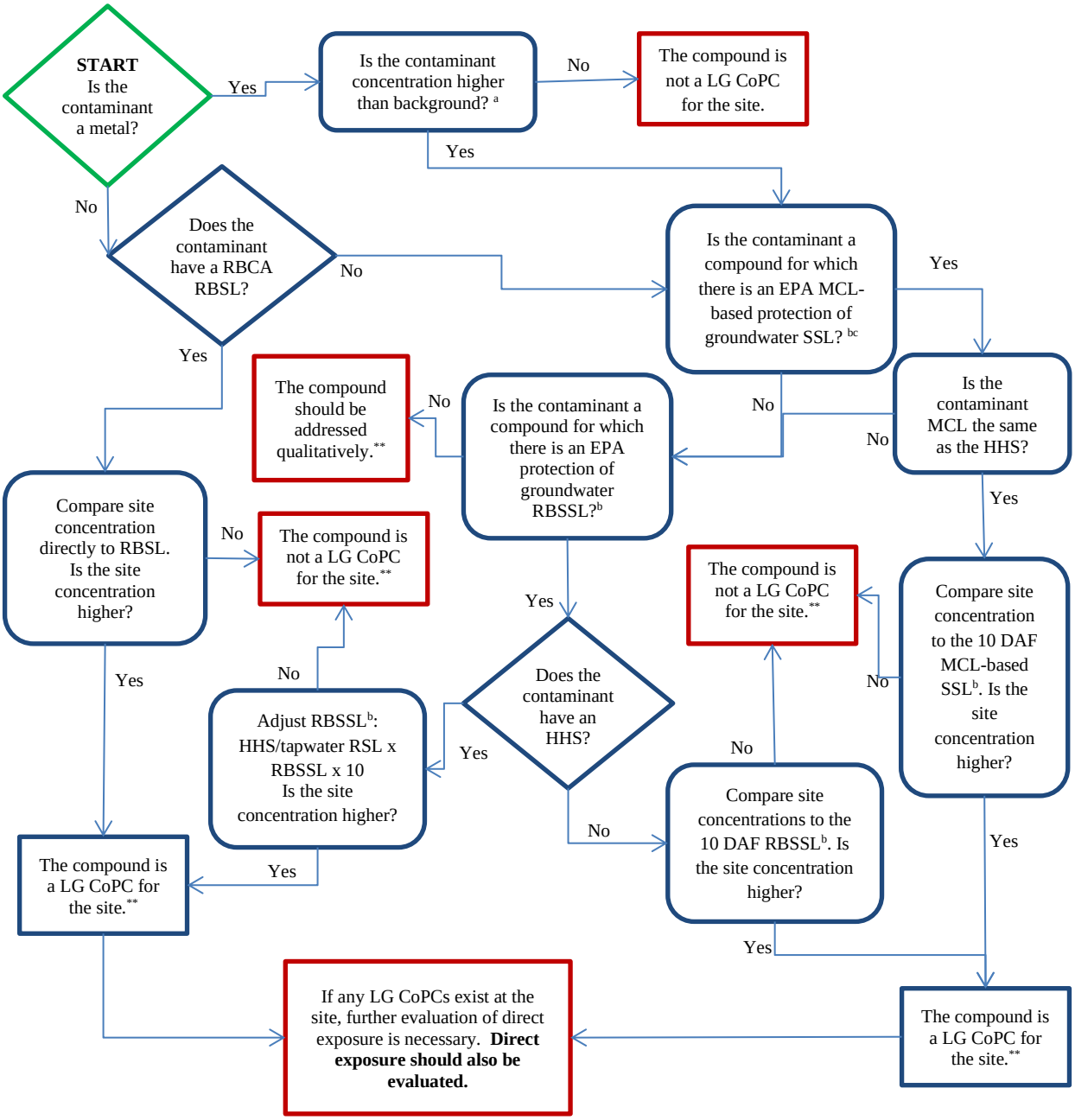
c = Assumes use of the HQ=1 version of the RSL Summary table and should be performed for all non-carcinogenic compounds except for lead (see footnote d). Pay attention to the "**" footnote in the RSL table, as it requires you to also look at the HQ=0.1 table; use the RSL that is the lesser value of the two tables. If using the HQ=0.1 RSL table for initial screening, do not divide non-carcinogenic compounds by 10.

d = For lead do not use the RSL: DEQ uses a 5 µg/dL blood lead level endpoint for the IEUBK model. For residential soil use 200 mg/kg, and for commercial/industrial and construction scenarios use 696 mg/kg.

CoPC = contaminant of potential concern
DC = Direct contact (i.e., ingestion, inhalation, and dermal exposure)
EPA = Environmental Protection Agency
RBCA = Montana Risk-Based Corrective Action Guidance for Petroleum Releases
RBSL = Most current risk-based screening level from Table 4 (Master Table)
RSL = Most current EPA regional screening level for residential soil

References:
https://deq.mt.gov/Files/Land/StateSuperFund/Documents/FAQ/Table_4-4.pdf
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables
https://deq.mt.gov/Files/Land/StateSuperFund/Documents/rbca/rbca_table_4.pdf?ver=2018-05-14-160913-830
https://deq.mt.gov/Files/Land/StateSuperFund/Documents/2021LeadScreeningMemo.pdf

Surface and Subsurface Soil Screening Flowchart
Part 2 – Leaching to Groundwater



Note: For volatile contaminants in soil or groundwater, evaluate vapor intrusion separately.

Revised July 2021

****Direct exposure (Part 1) should also be evaluated for complete screening**

a = 2013 MT DEQ Inorganic Background Study Background Threshold Values (BTVs) Table 4-4 applies to both surface and subsurface soil

b = Assumes use of the HQ=1 version of the RSL Summary table; use of HQ=0.1 RSL table will result in incorrect leaching values for non-carcinogenic compounds.

c = For PCBs the total concentration of PCBs for each sample is compared to the most current 10 DAF MCL-based SSL.

CoPC = contaminant of potential concern
DAF = dilution attenuation factor
EPA = Environmental Protection Agency
HHS = Most current DEQ-7 human health standard for groundwater
LG = leaching to groundwater
MCL – EPA maximum contaminant level
RBCA = Montana Risk-Based Corrective Action Guidance for Petroleum Releases
RBSL = Most current risk-based screening level from the Table 4 (Master Table)
RBSSL = Most current EPA risk-based soil screening level (HQ=1 RSL table)
RSL = Most current EPA regional screening level (HQ=1 RSL table)
SSL = Most current EPA soil screening level (HQ=1 RSL table)

References:
https://deq.mt.gov/Files/Land/StateSuperFund/Documents/FAQ/Table_4-4.pdf
https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables
https://deq.mt.gov/Files/Land/StateSuperFund/Documents/rbca/rbca_table_4.pdf?ver=2018-05-14-160913-830
https://deq.mt.gov/Files/Land/StateSuperFund/Documents/DEQ-7_June2019_Final.pdf?ver=2019-07-16-085110-630

APPENDIX H
LNAPL Baildown Test Data

Generalized Bouwer and Rice (1976)

Well Designation: MW-101 (EB-03S)
Date: 3-Jul-19

$$T_n = \frac{r_e^{\,2}\ln(R/r_e)\ln(s_n(t_1)/s_n(t))}{2(-J)(t-t_1)}$$

Enter early time cut-off for least-squares model fit

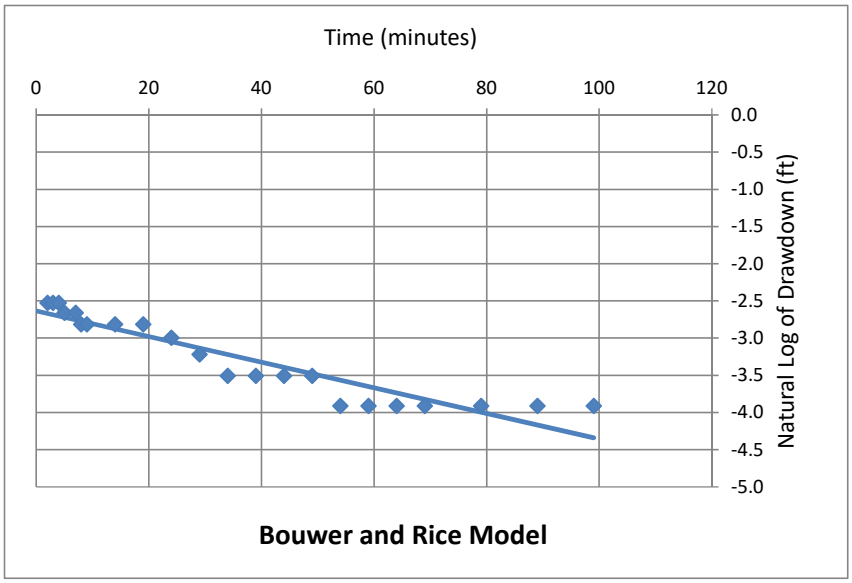
$Time_{cut}$	0	<- Enter or change value here

Model Results: T_n (ft^2/d) = 1.93 +/- 0.16 ft^2/d

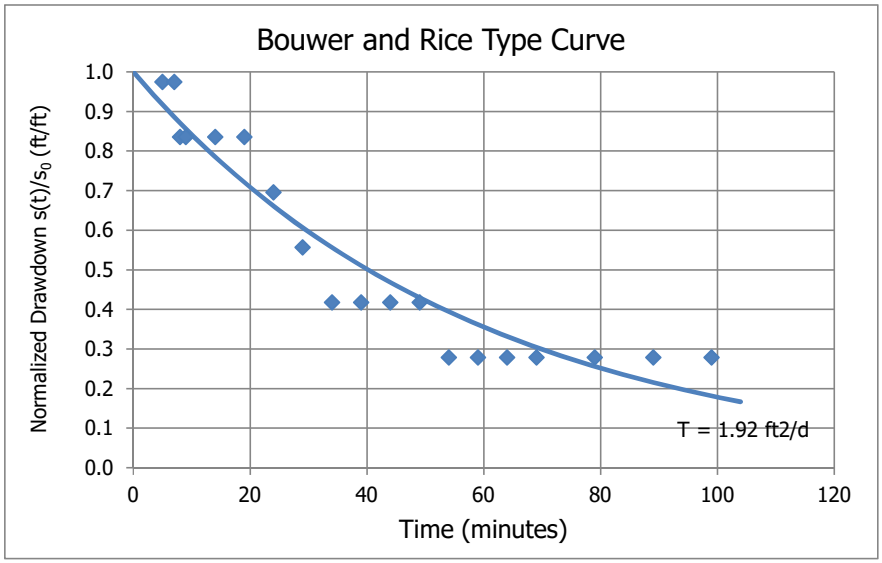
L_e/r_e
5.0
C
0.99
R/r_e
3.12

J-Ratio
-0.151

Coef. Of Variation
0.08



C coefficient calculated from Eq. 6.5(c) of Butler, The Design, Performance, and Analysis of Slug Tests, CRC Press, 2000.



Cooper and Jacob (1946)

Well Designation: MW-101 (EB-03S)
Date: 3-Jul-19

$$V_n(t_i) = \sum_j^i \frac{4\pi T_n s_j}{\ln\left(\frac{2.25 T_n t_j}{r_e^2 S_n}\right)} \Delta t_j$$

Enter early time cut-off for least-squares model fit

$Time_{cut}$ (min):	20	<- Enter or change values here
Time Adjustment (min):	12	

Trial S_n: d <-- Enter d for default or enter S_n value

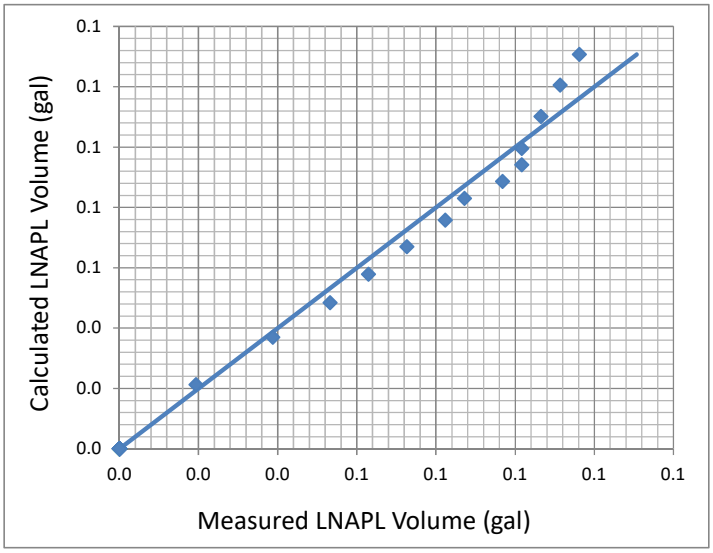
Root-Mean-Square Error: 0.024 <-- Minimize this using "Solver"

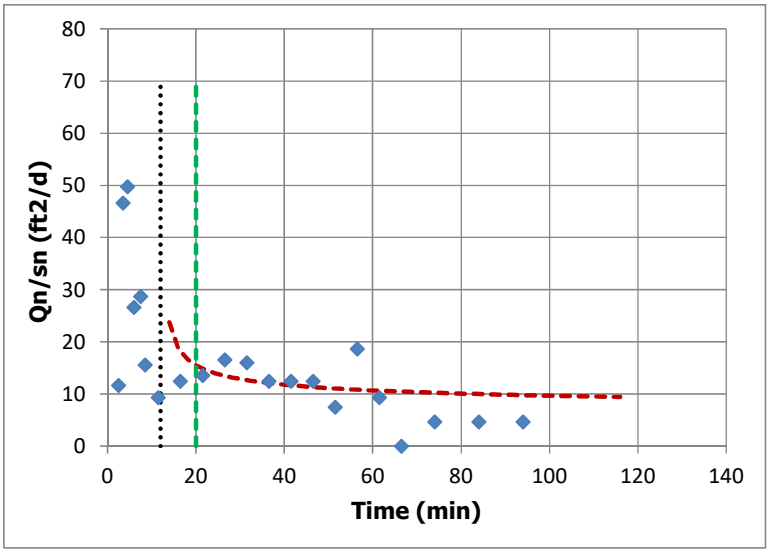
0.055 <-- Working S_n

Trial T_n (ft^2/d): 4.908 <-- By changing T_n through "Solver"

Add constraint T_n > 0.00001

Model Result: T_n (ft^2/d) = **4.91**





Height
70

Table 1
Product Drawdown and Recovery Test (MW-101)
Calumet Montana Refining, LLC - Great Falls, Montana

Date	Time	DTLNAPL (ft bTOC)	DTW (ft bTOC)	LNAPL Thickness (ft)	Comments
3-Jul	10:23	3.43	4.15	0.72	Before test.
3-Jul	10:30	3.43	4.15	0.72	Start pump. Lower pump intake to 5.5 feet (clear water with some black debris).
3-Jul	10:34	3.43	4.15	0.72	Stop pump.
3-Jul	10:43	3.43	4.15	0.72	Start pump. Raise intake to top of product to begin drawdown test.
3-Jul	10:47	3.46	3.96	0.50	Black to dark brown product. Purge rate approx 100 ml/min.
3-Jul	10:48	3.47	3.96	0.49	
3-Jul	10:49	3.47	4.00	0.53	
3-Jul	10:51	3.48	4.02	0.54	
3-Jul	10:54	3.50	3.95	0.45	Increased flow rate to 150-200 ml/min.
3-Jul	10:56	---	---	---	Lowered intake. No product or water coming out of tubing.
3-Jul	10:58	3.51	4.01	0.50	
3-Jul	11:02	---	---	---	Increased flow rate to 400-500 ml/min.
3-Jul	11:03	3.51	4.02	0.51	
3-Jul	11:04	3.54	3.90	0.36	
3-Jul	11:05	3.55	3.81	0.26	
3-Jul	11:07	3.56	3.66	0.10	
3-Jul	11:08	3.58	3.66	0.08	Purge mixture of product and water. Adjusted intake depth.
3-Jul	11:09	3.65	3.71	0.06	Purge mixture of product and water. Adjusted intake depth.
3-Jul	11:10	3.58	3.65	0.07	Purge mixture of product and water. Adjusted intake depth.
3-Jul	11:11	3.60	3.63	0.03	Stop pump. Recovery begins.
3-Jul	11:13	3.51	3.68	0.17	
3-Jul	11:14	3.51	3.69	0.18	
3-Jul	11:15	3.51	3.73	0.22	
3-Jul	11:16	3.50	3.76	0.26	
3-Jul	11:18	3.50	3.80	0.30	
3-Jul	11:19	3.49	3.81	0.32	
3-Jul	11:20	3.49	3.82	0.33	
3-Jul	11:25	3.49	3.85	0.36	
3-Jul	11:30	3.49	3.89	0.40	
3-Jul	11:35	3.48	3.92	0.44	
3-Jul	11:40	3.47	3.95	0.48	
3-Jul	11:45	3.46	3.97	0.51	
3-Jul	11:50	3.46	3.99	0.53	
3-Jul	11:55	3.46	4.01	0.55	
3-Jul	12:00	3.46	4.03	0.57	
3-Jul	12:05	3.45	4.03	0.58	
3-Jul	12:10	3.45	4.05	0.60	
3-Jul	12:15	3.45	4.06	0.61	
3-Jul	12:20	3.45	4.06	0.61	
3-Jul	12:30	3.45	4.07	0.62	
3-Jul	12:40	3.45	4.08	0.63	
3-Jul	12:50	3.45	4.09	0.64	
3-Jul	12:25	3.45	4.10	0.65	
3-Jul	15:25	3.43	4.11	0.68	
3-Jul	16:15	3.43	4.11	0.68	

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