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May 14, 2024

Ms. Denise Kirkpatrick
Hazardous Materials Section Supervisor
Montana Department of Environmental Quality
Waste Management Bureau
P.O. Box 200901
Helena, MT 59620-0901

RE: AOC-16 Interim Measure 1st Quarter 2024 Monitoring Report No. 9

Submitted via Montana File Transfer Service with Hard Copy to follow

Dear Ms. Kirkpatrick,

Please find attached Calumet Montana Refining LLC's (CMR) AOC-16 Interim Measure (IM) 1st Quarter 2024 Monitoring Report (QMR) No. 9 for review and approval. The report documents the operations, maintenance, and monitoring activities completed for the dual phase extraction (DPE) remediation system, passive treatment trench, and light non-aqueous phase liquid (LNAPL) recovery trench between January 2024 and March 2024. In addition, this report presents an evaluation of AOC-16 IM remediation system performance during this period and discusses continued system optimization and monitoring activities.

Please contact me at your earliest convenience if you have any questions.

Sincerely,

Michael Gipson

Mike Gipson
Environmental Specialist

cc: Joe Dauner – CMR
Mark Cheesman – CMR

Attachments: AOC-16 Interim Measure 1st Quarter 2024 Monitoring Report No. 9



**AOC-16 INTERIM MEASURE
1ST QUARTER 2024
MONITORING REPORT NO. 9**

**CALUMET MONTANA REFINING, LLC
GREAT FALLS, MONTANA**

May 14, 2024

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ACRONYMNS AND ABBREVIATIONS

AOC-16	Area of Concern-16
BOD	biochemical oxygen demand
BTEX	benzene, toluene, ethylbenzene, and xylene
CMR	Calumet Montana Refining, LLC
COC	constituent of concern
DEQ-7 HHS	Montana Department of Environmental Quality-7 Human Health Standards
DO	dissolved oxygen
DPE	dual-phase extraction
EPH	extractable petroleum hydrocarbon
gpm	gallons per minute
IM	Interim Measures
in-Hg	inches of mercury
LEL	lower explosive limit
LNAPL	light non-aqueous phase liquid
µg/L	microgram per liter
MDEQ	Montana Department of Environmental Quality
mg/L	milligrams per liter
mL/min	milliliters per minute
MS/MSD	matrix spike/matrix spike duplicate
mV	millivolts
NTu	nephelometric turbidity unit
OM&M	operations, maintenance, and monitoring
ORP	oxidation reduction potential
Pace	Pace Analytical Services, LLC
PID	photoionization detector
PLC	programmable logic controller
PRT	primary recovery trench
PTT	passive treatment trench
QAPP	Quality Assurance Project Plan
QA/QC	quality assurance/quality control
QMR	Quarterly Monitoring Report
RBSL	Risk-Based Screening Levels
RCRA	Resource Conservation Recovery Act
RFI	RCRA Facility Investigation
Ramboll	Ramboll Americas Engineering Solutions, Inc.
ROI	radius of influence
SCFM	standard cubic per minute
SRCO	Self-Recuperative Catalytic Oxidizer
SVOC	semi-volatile organic compound
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
VPH	volatile petroleum hydrocarbon
WWTP	wastewater treatment plant

SIGNATORY PAGE

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

Signature:



Name:

Kollin Schade

Title:

VP/Plant Manager – Calumet Montana Refining, LLC

Date:

5/14/2024

EXECUTIVE SUMMARY

Ramboll Americas Engineering Solutions, Inc. (Ramboll), on behalf of Calumet Montana Refining, LLC (CMR), has prepared this Area of Concern-16 (AOC-16) Interim Measure (IM) 1st Quarter 2024 Monitoring Report (QMR) No. 9 to summarize the operations of the AOC-16 Dual Phase Extraction (DPE) system and the Passive Treatment Trench (PTT). This QMR has been prepared in accordance with Section 6.2 of the Operations Maintenance and Monitoring (OM&M) Plan for the AOC-16 IM.

During the 1st Quarter of 2024, the DPE system operated approximately 91% of the available time. Note that Calumet has engaged a third-party OM&M contractor beginning in February 2024 to improve unplanned DPE system shutdown response time and to perform routine maintenance and monitoring of the IM's. The DPE system extracted and discharged approximately 23,242 gallons of total fluids to CMR's wastewater treatment plant (WWTP). During this reporting period the DPE system also removed approximately 6.9 pounds of petroleum vapor. It also removed 0.013 pounds of volatile organic compounds (VOCs), 0.014 pounds of semi-volatile organic compounds (SVOCs), 2.4 pounds of volatile petroleum hydrocarbons (VPH), and 48.9 pounds of extractable petroleum hydrocarbons (EPH) in the form of liquid effluent. Initial mass removal rates indicate that the DPE system is accomplishing the AOC-16 IM objectives of recovering free phase Light Non-Aqueous Phase Liquid (LNAPL) mass and reducing the LNAPL within the vadose and saturated zone soil matrix.

Quarterly groundwater sampling was conducted at the PTT performance monitoring wells on February 28, 2024. Sampling was conducted at upgradient well MW-41S, PTT well MW-106, and downgradient compliance well MW-105. Samples collected from these monitoring wells were analyzed for petroleum constituents of concern (COCs) – VOCs, SVOCs, VPH, and EPH. Samples from PTT well MW-106 was also analyzed for biodegradation parameters.

The monitoring well upgradient of the passive treatment trench (MW-41S) reported benzene concentrations exceeding the DEQ-7 Human Health Standards – Groundwater (DEQ-7 HHS) and the Risk-Based Screening Levels (RBSLs) of 5 µg/L. Benzene was not detected from monitoring well MW-106 installed within the trench. Monitoring well MW-105 installed downgradient of the passive treatment trench reported benzene at 3.91 µg/L just below the USEPA Regional Screening Levels – Residential Tapwater. Both within the trench (MW-106) and downgradient of the PTT (MW-105), VPH and C5-C8 Aliphatics were not detected. Concentrations of COCs at the downgradient well MW-105 appear decreasing with time with some seasonal variability.

OM&M of the IM will continue to document the performance of the IM's and will include periodic performance reporting to the Montana Department of Environmental Quality (MDEQ) to ensure the IM objectives are continuing to be met. Further investigation/evaluation at the AOC-16 Truck Rack Source Area will be completed as part of the upcoming Resource Conservation Recovery Act (RCRA) Facility Investigation (RFI) activities. The results from the RFI and ongoing IM performance monitoring will be evaluated in the Corrective Measures Study to determine if operational modifications are necessary or if a request to the MDEQ to cease recovery and place the DPE system in standby mode is warranted.

1. INTRODUCTION

Ramboll Americas Engineering Solutions, Inc. (Ramboll), on behalf of Calumet Montana Refining, LLC (CMR), has prepared this Area of Concern-16 (AOC-16) Interim Measure (IM) Quarterly Monitoring Report (QMR) No. 9 for the Calumet Great Falls Montana Refining facility located at 1900 10th Street NE, Great Falls, Montana to summarize the 1st Quarter of operations in 2024 (January 1 through March 31, 2024) for the AOC-16 IM remedy selected to address petroleum releases at AOC-16.

The CMR refinery is comprised of 82.7 acres of industrial/refinery operations and office buildings. The refinery produces gasoline, middle distillates, and asphalt for distribution in Washington, Montana, Idaho, and Alberta, Canada. AOC-16, referred to as the “Gasoline and Light Oil Loading Rack” or “truck loading rack,” is located within an approximately 7.6-acre parcel to the east of the active refinery and is owned by CMR (Figure 1).

Activities were completed in accordance with the Corrective Action Order on Consent issued to Montana Refining Company, Inc. by the Montana Department of Environmental Quality (MDEQ) to govern the performance of Resource Conservation Recovery Act (RCRA) corrective action activities at the site. In 2016, petroleum related vapors were detected in an offsite residential property along 11th Street NE. The MDEQ issued an IM letter on October 11, 2016, directing CMR to address imminent threats to human health and/or the environment stemming from petroleum release near CMR's Loading Rack (MDEQ, 2016). Immediate action consisting of relocating and filling an existing sanitary sewer to prevent migration of contaminants was undertaken. Between 2016 and 2019, in coordination with the MDEQ, investigation activities were undertaken, and alternative remedies were evaluated to address the petroleum release near the Loading Rack. Ultimately, an IM remedy approach was recommended consisting of dual-phase extraction (DPE) in the existing primary recovery trench (PRT) in the Truck Rack Area and Light non-aqueous phase liquid (LNAPL) recovery and a passive treatment trench (PTT) just north of North River Road.

Construction of the AOC-16 IM remedies commenced in July 2021 and were completed in October 2021 as documented in the *AOC-16 Interim Measures AOC-16 IM Construction Documentation Report* (CMR, 2022a). Construction activities included the installation of following IM remedies:

- DPE remediation system in the Truck Rack Area, and
- LNAPL recovery trench and PTT utilizing colloidal activated carbon at an area along North River Road.

Commissioning of the AOC-16 IM was conducted from October 2021 through December 2021 and routine operations of the DPE system commenced on January 1, 2022. A 25-foot LNAPL recovery trench extension was completed between July 25, 2022, and July 29, 2022. Documentation of the extension construction activities were provided in the *AOC-16 IM Construction Documentation Report Addendum 1* (CMR, 2022b).

Corrective action remedial goals were developed as part of the AOC-16 Interim Measures Evaluation Report (CMR, 2019) to protect human health and the environment. The AOC-16 IM goals specific to each treatment area include:

- Truck Rack Area (DPE System)
 - Recover free phase LNAPL mass present in the area south of the Truck Rack to stabilize the LNAPL plume.
 - Reduce LNAPL within the vadose and saturated zone soil matrix to stabilize the dissolved phase plume.
- North River Road Area (LNAPL recovery trench and PTT)
 - Mitigate dissolved phase groundwater impacts migrating from the Truck Rack Area towards the Missouri River.

This AOC-16 IM 1st Quarter 2024 Monitoring Report No. 9 summarizes the sampling results, operations, and performance monitoring data that were gathered for the AOC-16 IM from January 1, 2024 through March 31, 2024, and presents: 1) system runtime for the DPE System; 2) DPE system operational data; 3) identification of operational problems, the length of any shutdowns, and a summary of actions taken to rectify or prevent these problems; 4) influent vapor and liquid sampling results and estimated contaminant mass removal rates for the DPE system; and 5) groundwater concentrations of constituents of concern (COC) in the PTT point of compliance well (MW-105) and PTT well (MW-106). The activities outlined in this report were performed in accordance with the Operations, Maintenance, and Monitoring (OM&M) Plan (CMR, 2021b).

2. DPE SYSTEM OPERATIONS SUMMARY

2.1 System Runtime

During the period of January 1, 2024, through March 31, 2024, the DPE system was in operation approximately 91% of the time and extracted and discharged approximately 23,242 gallons of total fluids to CMR's wastewater treatment plan (WWTP). Table 1 provides a summary of operations during this reporting period. A summary of the routine and non-routine system shutdowns is discussed below.

2.1.1 Planned Shutdowns for Routine and Corrective Maintenance

Brief shutdowns of the DPE system were performed to conduct maintenance activities, including filter replacement and level switch cleaning, monthly preventative maintenance, and inspection of equipment.

2.1.2 Non-Routine/Unplanned Shutdowns

Between February 3, and February 6, 2023, the system was shut down due to a low-flow alarm likely caused by clogged filters and air intake screens on the blowers. The filters and blower screens were subsequently cleaned.

2.2 System Operation and Monitoring

DPE system performance monitoring and sampling were conducted in accordance with the OM&M Plan (CMR, 2021b and CMR, 2021c) to document system operation effectiveness. It included monitoring of operations data, periodic vapor and effluent sampling to document contaminant mass recovery, monitoring well gauging, and sub-surface vacuum measurements. These parameters are discussed in the following sections. Note that Calumet has engaged a third-party OM&M contractor beginning in February 2024 to improve unplanned DPE system shutdown response time and to perform routine maintenance and monitoring of the IM's.

2.2.1 DPE Influent and Effluent Sampling Results

Monitoring of contaminant mass removal is the primary metric for optimizing DPE system performance and gauging the AOC-16 IM objective of free-phase LNAPL mass recovery and LNAPL plume stabilization.

Vapor

Vapor/air extraction flow rates were continuously monitored and recorded by the system programmable logic controller (PLC) and influent vapor sampling was periodically conducted to evaluate mass removal.

The concentrations of volatile organic compound (VOCs) in the vapor phase were measured periodically on each DPE influent line (DPE-1 through DPE-8) using a photoionization detector (PID) to measure relative vapor concentrations from each DPE well. PID measurements were also collected from sample port SP-301 on the inlet side of the blowers. PID measurements from the DPE wells and SP-301 port are summarized on Figures 2A and 2B. The highest PID reading during the reporting period was recorded at DPE-6 (313 ppm) on February 8, 2024. Excluding the elevated PID readings at DPE-6 in February 2024, all wells have dropped from greater than 400 parts per million (ppm) upon startup in October 2021 to less than 120 ppm in the 1st Quarter of 2024.

Vapor samples were collected in January, February, and March 2024 from SP-301. The samples were submitted to Pace National Laboratory located in Mount Juliet, Tennessee. The samples were analyzed for VOCs by the United States Environmental Protection Agency (USEPA) Method TO-15. Analytical results for detected compounds from the influent vapor samples are summarized in Table 2. Laboratory reports are included in Appendix A1. Historical analytical results and mass removal are included in Appendix B.

Concentrations of benzene, toluene, ethylbenzene, and xylene (BTEX), n-hexane, and n-heptane in influent vapor over time are shown on Figure 3. These compounds were selected to evaluate vapor influent concentration trends as their concentrations were the highest as compared to other VOCs during the start-up sampling. Concentrations during the 1st quarter of 2024 of BTEX, n-hexane, and n-heptane are approximately four to five orders of magnitude less than the concentrations at startup in October 2021. For example, benzene concentrations decreased from 2,850,000 $\mu\text{g}/\text{m}^3$ in October 2021 to 2 $\mu\text{g}/\text{m}^3$ in January 2024. Concentrations in the 1st Quarter of 2024 have ranged from 2 $\mu\text{g}/\text{m}^3$ in March 2024 to a high of 810 $\mu\text{g}/\text{m}^3$ in February 2024. Similarly, n-hexane concentrations have decreased from 7,840,000 $\mu\text{g}/\text{m}^3$ in October 2021 to 4 $\mu\text{g}/\text{m}^3$ in January 2024. In the 1st Quarter of 2024, n-hexane values varied between a high of 2,000 $\mu\text{g}/\text{m}^3$ in February 2024 and a low of 4 $\mu\text{g}/\text{m}^3$ in January 2024. Concentrations of BTEX, n-hexane, and n-heptane have also decreased from the previous sampling round conducted during the 4th quarter of 2023.

The variability in contaminant recovery in the vapor phase during this reporting period is likely attributed to the time of sample collection. For example, the January sampling event occurred three days after system start up when the system was predominantly extracting liquid and the well screens and drop tubes were still submerged. The amount of dilution air was also relatively high as the system dilution air was being slowly dialed back to confirm safe operation following the December 2023 startup after issues with liquid carryover as described in the previous quarterly monitoring report (CMR, 2024). As noted below in the discussion of liquid recovery, the concentrations of VOCs in groundwater extracted by the system during current operation is low. When the system is extracting predominantly liquid, limited VOCs are present in the vapor phase. The February sampling event occurred after a longer period of operation with less dilution air when the water table had been lowered and more well screens were exposed resulting in higher vapor phase contaminant recovery.

On March 14, 2024, all the DPE wells were gauged. It was determined that the drop tubes and well screens at DPE-1 through DPE-4 were fully submerged below the water table while the drop tubes and well screens at DPE-5 through DPE-8 were above the water table. To dewater wells DPE-1 through 4 and rebalance flow, DPE-5 through DPE-8 were iteratively closed to increase vacuum at the manifold and extract additional water from DPE-1 through DPE-4 to expose the drops tubes and contaminant smear zone. When the March sample was collected, the system was once again predominantly extracting liquid only from DPE-1 through DPE-4 reducing the overall mass recovery in the vapor phase.

More frequent gauging of DPE fluid levels and flow balancing is recommended to maximize contaminant recovery. Optimal vapor contaminant mass recovery will occur with the drawdown is maximized throughout the trench exposing the maximum amount of the smear zone.

The combination of vapor flow rates, system runtime, and vapor VOC concentrations were used to calculate the mass of contaminants removed. During the reporting period, the DPE system removed approximately 6.9 pounds of VOCs in the vapor phase as shown on Figure 4. As noted above, influent vapor concentrations (Table 2 and Figure 3) have dropped four to five orders of magnitude between

the 4th quarter of 2022 and the 1st quarter of 2024. As noted above, the reductions are likely due to both overall reductions in volatile compounds in the subsurface and due to saturated well screens and non-optimal operation.

The post-catalyst outlet temperature on the Self-Recuperative Catalytic Oxidizer (SRCO) unit also serves as a continuous relative indicator of contaminant mass with higher temperatures corresponding to relatively greater contaminant mass (Figure 7). Prior to January 2023 as shown in previous Quarterly Monitoring Reports, the post-catalyst process air temperature consistently exceeded 800 degrees F. During the 1st Quarter of 2024, the SRCO post-catalyst outlet temperature has remained at slightly below 650 degrees F while in operation thereby indicating reduced mass and/or shift from average lighter end to average heavier end hydrocarbon loading to the SRCO unit. This result corroborates the analytical data collected; however as noted above, reductions are likely due to both overall reductions in volatile compounds in the subsurface and due to saturated well screens and non-optimal recovery.

Influent VOC concentrations as measured through vapor VOC sampling, PID readings at individual wells, and post-catalyst outlet temperature have decreased with time. Flow balancing and reduction of dilution air is recommended to maximize drawdown throughout the trench to influence the residual contamination in the zone of water table fluctuation.

Liquid

Effluent samples of groundwater were collected from the discharge side of the transfer pump in January, February and March 2024 and submitted to the Pace National Laboratory located in Mount Juliet, Tennessee for analysis of VOCs, semi-volatile organic compounds (SVOCs), volatile petroleum hydrocarbons (VPH), and extractable petroleum hydrocarbons (EPHs). Analytical results from the effluent sampling are summarized in Table 3. Laboratory reports are included in Appendix A2. Historical analytical results and mass removal estimates are included in Appendix C.

The combination of fluid recoveries and contaminant concentrations were used to calculate the mass of contaminants removed in the dissolved phase. In the dissolved phase during the reporting period, the DPE system removed 0.013 pounds of VOCs, 0.014 pounds of SVOCs, 2.4 pounds of VPH, and 48.9 pounds of EPH. Mass recovery of all compounds were similar across each month. Concentration trends indicate that liquid recovery is shifting to heavier end compounds (i.e. EPH) as compared to more volatile compounds (i.e. VOCs). This phenomenon also explains the low VOC recovery in the vapor phase when the well screens and drop tubes are submerged and the system is predominantly extracting liquids.

Separate phase LNAPL recovery is not quantified. Total fluids (combined LNAPL and water) in the effluent are pumped to the refinery's on-site WWTP where oil-water separation occurs. However, visual observations of LNAPL in the DPE system knockout tank (T-23100) sight glass serve as a qualitative indicator of LNAPL recovery. Limited to no LNAPL was observed within the knock-out tank sight glass. Qualitatively, the amount of LNAPL observed in the sight glass is lower than in previous quarters.

As shown on Figure 4, total VOC, SVOC, VPH, and EPH mass removed in the vapor and dissolved phase since DPE system startup in October 2021 and through March 31, 2024, is calculated to be approximately 2,910 pounds, 13.8 pounds, 217 pounds, and 2,764 pounds, respectively.

2.2.2 Groundwater Elevations

Monitoring wells in AOC-16 area (MW-22, MW-41S, MW-41D, MW-53, MW-57, MW-59S, MW-59D, MW-63, MW-64, MW-102, MW-103, MW-104, MW-105, and MW-106) were gauged in February and March 2024. The depth to water and if observed, separate-phase LNAPL thickness measurements, were recorded. These measurements are presented in Table 4. In February 2024, approximately half of the wells were not accessible due to snow, so a groundwater contour map has not been generated. Groundwater contours for March 2024 are provided on Figure 5.

2.2.3 Overall System Performance and Optimization

This section compares the primary design parameters to the observed/measured values during the reporting period to evaluate the system performance. These parameters are discussed in detail in following sections and summarized in Table 1.

Liquid Extraction Rate

The average design flow rate for the DPE system is between 0.25 gallons per minute (gpm) during steady-state operation and 21 gpm during rainfall events. The combination of fluid recoveries and system run time was used to calculate liquid flow rate during the reporting period. The DPE system extracted fluids at an average rate of 0.20 gpm which is just below the low end of the design flow rates.

Vapor Influent Flow Rate and Applied Vacuum

The design vapor influent flow rate and applied vacuum are 200 standard cubic per minute (SCFM) and 17 inches of mercury (in-Hg), respectively. System flow rate and system vacuum at the header during the reporting period are shown on Figure 7. The vacuum averaged 4.7 in-Hg in January, 7.4 in-Hg and 7.5 in-Hg in March below the design vacuum of 17 in-Hg. Flows in January 2024 averaged 46 SCFM, flows in February 2024 averaged 143 SCFM and flows in March averaged 116 SCFM. The system vacuum operates towards the higher end of the design flow when the wells are submerged, and the vacuum reduces when the well screens and drop tubes become exposed and the system switches from predominantly liquid to vapor flow. Similarly, the vapor air flow rate is higher during lower vacuum periods when more well screens are exposed as compared to periods when the system is predominantly extracting vapor. For example, during most of February and early March, the well screens at DPE-4 through DPE-8 were exposed and the system flow was approaching the design flow rate, but the vacuum was lower than maximum design. Valves were closed in late March to attempt to dewater the DPE-1 through DPE-4 well screens and the overall system vacuum increased, and the flow rates decreased. As noted above, additional optimization to maximize drawdown throughout the trench to expose the maximum amount of the smear zone is recommended.

SRCO Performance Monitoring

The SRCO has a design destruction efficiency of 99% per manufacturer's specifications. To show compliance with the air permit, the SRCO pre- and post-catalyst process air temperature is monitored. The pre-catalyst process air temperature must be greater than 650°F to ensure a destruction efficiency of 99%. The SRCO temperature monitoring results during the reporting period is shown on Figure 7. As shown on Figure 7, the pre-catalyst process air temperature at least 650°F while the system was in operation.

During operation, the system was determined to be functioning appropriately given the adjustments to the influent dilution air that were made to bring the system back to its optimal operating range in a

safe and effective manner. DPE system optimization will continue, as needed, based on DPE well vapor concentrations, mass removal, and liquid extraction rates.

3. LNAPL RECOVERY TRENCH AND PTT

3.1 LNAPL Monitoring and Passive LNAPL Recovery

The 11 original LNAPL collection wells located in the LNAPL recovery trench and 6 additional LNAPL trench extension collection wells were gauged periodically throughout this reporting period (Figure 1). Fluid levels collected from the LNAPL wells are summarized in Table 5 and on Figure 8. Measurable LNAPL was not identified at any well during the reporting period, although sheens were observed in all LNAPL wells excluding LNAPL-9 at least once during the reporting period.

Passive skimmers are deployed in eight of the wells –LNAPL-2, LNAPL-4, LNAPL-5, LNAPL-6, LNAPL-7, LNAPL-8, LNAPL-10, and LNAPL-11. As no measurable LNAPL was observed in the wells during the reporting period, no LNAPL was recovered via the passive skimmers.

It is recommended that LNAPL thickness be monitored on a bi-weekly (every other) basis through the second quarter. If measurable LNAPL is not observed, reduced monitoring frequency and/or removal of passive recovery devices may be recommended.

3.2 Groundwater Monitoring

The primary goal of the PTT is to mitigate dissolved phase groundwater impacts from migrating towards the Missouri River. Quarterly groundwater sampling was conducted on February 28, 2024, at upgradient well MW-41S, PTT well MW-106, and compliance well MW-105 (Figure 1).

3.2.1 Monitoring Well Sampling

The monitoring wells were sampled using low-flow techniques on February 28, 2024. During the purging of each well, field measurements were collected for water quality parameters, including dissolved oxygen (DO), pH, specific conductance, temperature, and oxidation reduction potential (ORP). The field measurements were recorded every 5 minutes during well purging. The physical and chemical field measurements collected when purging the monitoring wells are summarized in the groundwater sampling logs in Appendix D.

After all the samples were collected, they were sealed, labeled, and placed on ice, pending delivery under chain-of-custody procedures to Pace located in Mount Juliet, Tennessee. The groundwater samples were analyzed for VOCs (via USEPA Method SW8260D), SVOCs (via USEPA Method SW 8270D), MDEQ VPH (via Method MDEQ VPH), and MDEQ EPH (via Method MDEQ EPH)..

The wells did not yield enough volume to facilitate the collection of field duplicate samples or a matrix spike/matrix spike duplicate (MS/MSD) sample. One trip blank was submitted along with each laboratory cooler for quality assurance/quality control (QA/QC) purposes. Methods and procedures for collecting, handling, and analyzing samples are provided in the Quality Assurance Project Plan (QAPP) (CMR, 2018). Treatment and disposal of purge water generated during monitoring well sampling was handled consistent with existing project procedures.

3.2.2 Groundwater Analytical Results – February 2024

The groundwater analytical results for detected compounds from the February 2024 sampling event are provided in Table 6. Previous quarterly groundwater sampling results from October 2021 through December 2023 are also provided in Table 6 for comparison purposes. Analytical compounds that met or exceeded the respective MDEQ -7 HHS (May 2017) and/or MDEQ Tier 1 Groundwater Risk-Based

Screening Levels (RBSLs) are bolded and/or underlined, respectively, for reference. Laboratory reports are included in Appendix A3.

The following subsections provide a summary of the analytical parameters detected in the monitoring wells in February 2024 and compare those detections to the DEQ-7 HHS in groundwater and RBSLs.

VOCs

Of the VOCs detected during the February 2024 groundwater sampling event at AOC-16, only benzene was detected above its respective groundwater screening standard.¹

The monitoring well upgradient of the passive treatment trench (MW-41S) reported benzene at 199 micrograms per liter (µg/L) exceeding the DEQ-7 HHS and RBSL of 5 µg/L. Benzene was not detected from the location (MW-106) installed within the trench. The monitoring well (MW-105) installed downgradient of the passive treatment trench reported benzene at 3.91 µg/L just below the DEQ-7 HHS and RBSL of 5 µg/L.

SVOCs

In February 2024, no SVOCs were detected at concentrations exceeding the DEQ-7 HHS or the RBSLs.

TPH, VPH, and EPH

The upgradient monitoring well (MW-41S) had detectable concentrations of volatile petroleum hydrocarbons (VPH) via method MTDEQ VPH of 3,740 µg/L with a C5-C8 Aliphatic concentration (adjusted) of 582 µg/L which does not exceed the RBSL of 650 µg/L. Within the trench (MW-106), VPH and C5-C8 Aliphatics were not detected. Downgradient of the PTT (MW-105), VPH and C5-C8 Aliphatics were also not detected.

3.2.3 Evaluation of Concentration Trends Over Time

To evaluate concentration trends over time, the concentrations of benzene and VPH were plotted for each of the three passive treatment trench monitoring wells. Baseline sampling data from June 2020 through October 2021 are included on Figures 9A through 9C along with post-remediation data. This historical data was previously reported in the *2020/2021 Annual Groundwater Sampling Summary Report* (CMR, 2021a) and Construction Documentation Report (CMR, 2022a). Benzene and C5-C8 Aliphatics (adjusted) were selected as indicator compounds because they were the two compounds that exceed DEQ-7 HHSs and/or RBSLs during the baseline sampling event in October 2021. While there are no DEQ-7 HHSs and RBSLs for VPH, VPH represents a range of hydrocarbons and serves as an overall indicator of contaminant loading to the PTT.

The benzene, C5-C8 Aliphatics and VPH sampling results at upgradient well MW-41S showed the following changes between October 2021 and February 2024:

- Benzene decreased from 1,900 µg/L in October 2021 to 199 µg/L in February 2024.
- VPH has remained relatively consistent with some variability between sampling events with a maximum value of 9,800 µg/L in June 2022 and a minimum value of 3,100 µg/L in March 2022.
- C5-C8 Aliphatics have remained relatively consistent between sampling events with a minimum value of 582 µg/L in February 2024 and a maximum value of 3,090 µg/L in March 2023. There appears to be some seasonal variability in the C5-C8 Aliphatic concentrations with lower

¹ All VOC results reported in this section are from USEPA Method 8260B.

concentrations observed in the spring and summer months and higher concentrations observed in the fall and winter.

The benzene, C5-C8 Aliphatics and VPH sampling results at well MW-106 located in the PTT showed the following changes between October 2021 and February 2024:

- Benzene has not been detected during any sampling events.
- VPH had not been detected between October 2021 and June 2022, but was detected at concentration of 189 µg/L in August 2022, 108 µg/L in December 2022, 85.9 µg/L in June 2023, and 533 µg/L in September 2023, and 67.1 µg/L in December 2023. VPH was not detected in February 2024; however, the detection limit for VPH was elevated due to an elevated laboratory dilution factor.
- C5-C8 Aliphatics had not been detected between October 2021 and June 2022, but was detected in August 2022 a concentration of 153 µg/L, in December 2022 at a concentration of 80 µg/L, in June 2023 at a concentration of 85.9 µg/L, in September 2023 at a concentration of 495 µg/L, and in December 2023 at a concentration of 67.1 µg/L. C5-C8 Aliphatics was not detected in February 2024; however, the detection limit for C5-C8 Aliphatics was elevated due to an elevated laboratory dilution factor. Detected results and the detection limit remain less than the RBSL of 650 µg/L and no trend is apparent at this time.

The benzene, C5-C8 Aliphatics, and VPH sampling results at well MW-105 located downgradient of the PTT showed the following changes between October 2021 and February 2024:

- Benzene has decreased from 250 µg/L in October 2021 to 3.91 µg/L in February 2024. Trends generally are decreasing with time since the installation of the PTT with some variability between sampling events. Trends appear to indicate that concentrations are higher in spring/summer months than in winter months.
- VPH appears variable with a maximum concentration of 1,900 µg/L in October 2021 and a minimum concentration 146 µg/L in December 2022. Trends appear to indicate that concentrations are higher in spring/summer months than in winter months.
- C5-C8 Aliphatics appear variable with a maximum concentration of 1,800 µg/L in February 2021 and a minimum concentration 63.9 µg/L December 2022. Trends appear to indicate that concentrations are higher in spring/summer months than in winter months.

Analytical results from groundwater samples collected from monitoring wells located up-gradient, down-gradient and from within the PTT indicate that the concentration of dissolved phase petroleum COCs decreased across the PTT initially meeting the goal of the PTT to mitigate the dissolved phase groundwater impacts from migrating from the Truck Rack to the Missouri River. Concentrations of COCs appear to be fluctuating with time at the down-gradient compliance point. Initial trends indicate that there is seasonable variability in concentrations at downgradient well MW-105.

Biodegradation Parameters

Field parameters including pH, conductivity, turbidity, ORP, and dissolved oxygen are provided in Table 7. The PTT is designed to reduce adsorbed COCs. Low dissolved oxygen (generally less than 0.5 mg/L) and low or negative ORP values serve as indicators of the presence of reducing conditions. The lower the ORP and DO, the greater the potential for a reducing and anaerobic environment.

Field parameters including pH, conductivity, turbidity, ORP, and dissolved oxygen are provided in Table 7. During the last three sampling events, at the PTT well (MW-106), ORP was negative and DO was less than 0.5 mg/L indicative of reducing conditions.

4. CONCLUSION AND RECOMMENDATIONS

During this reporting period from January 1, 2024, through March 31, 2024, the DPE system operated approximately 91% of the available time. Calumet has engaged a third-party OM&M contractor beginning in February 2024 to improve unplanned DPE system shutdown response time and to perform routine maintenance and monitoring of the IM's. During this reporting period, the DPE system extracted and discharged approximately 23,242 gallons of total fluids to CMR's WWTP while in operation.

DPE System Performance

Initial mass removal rates indicate that the DPE system in the Truck Rack Area is meeting the AOC-16 IM goals of recovering free phase LNAPL mass and reducing the LNAPL within the vadose and saturated zone soil matrix.

During the reporting period, the DPE system removed approximately 6.9 pounds of VOCs in the vapor phase, and 0.013 pounds of VOCs, 0.014 pounds of SVOCs, 2.4 pounds of VPH, and 48.9 pounds of EPH in the liquid phase. Total VOC, SVOC, VPH, and EPH mass removed in the vapor and dissolved phase since DPE system startup in October 2021 and through December 31, 2023, is calculated to be approximately 2,910 pounds, 13.8 pounds, 217 pounds, and 2,764 pounds, respectively. Total influent vapor VOC concentrations were approximately 4 orders of magnitude lower than during startup during this quarter. Reductions in contaminant mass recovery is due to a combination of submerged DPE well screens and drop pipes from an increased water table elevation, and reduced contaminant mass present.

The pre-catalyst SRCO temperature remained greater than 650°F while in operation indicating at least 99% destruction efficiency of the extracted petroleum vapors prior to being discharged to the atmosphere.

During operation, maintenance activities will be performed and documented to ensure optimal performance of the system. DPE system optimization will be performed based on trench liquid elevations, DPE well vapor concentrations, mass removal, and liquid extraction rates.

PTT Performance

Analytical results from groundwater samples collected from monitoring wells located up-gradient, down-gradient and from within the PTT indicate that the concentration of dissolved phase petroleum COCs decreased across the PTT meeting the goal of mitigating the dissolved phase groundwater impacts from migrating from the Truck Rack to the Missouri River. Concentration trends are decreasing at downgradient performance monitoring well MW-105 with some seasonable variability.

OM&M of the interim measures will continue to document the performance of the IM's and will include periodic performance reporting to the MDEQ to ensure the IM objectives are being met. Further investigation/evaluation of the petroleum impacts at the AOC-16 Truck Rack Area will be completed as part of the upcoming RCRA RFI activities. The results from the RFI and ongoing IM performance monitoring will be evaluated to determine if operational modifications are necessary or if a request to the MDEQ to cease recovery and place the DPE system in standby mode is warranted.

5. REFERENCES

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- CMR. 2021b. AOC-16 Interim Measure Operations, Maintenance, and Monitoring Plan. October.
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FIGURES

- Figure 1: AOC-16 Site Layout
 - Figure 2A-B: DPE System Influent Vapor PID Readings
 - Figure 3: DPE System Influent Vapor Concentration Trend
 - Figure 4: Vapor and Liquid Effluent Mass Removal
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 - Figure 8: Maximum LNAPL Thickness
 - Figure 9A-C: Groundwater Concentration Trend Graphs
-



- LNAPL Recovery Well - Installed 2022

LNAPL Recovery Well - Installed 2021

DPE Recovery Well - Installed 2021

Abandoned Well

Piezometer

Monitoring Well

DPE Fence

Property Line

Corrective Action

Passive Recovery Trench

Primary Recovery Trench

DPE - CATOX Unit

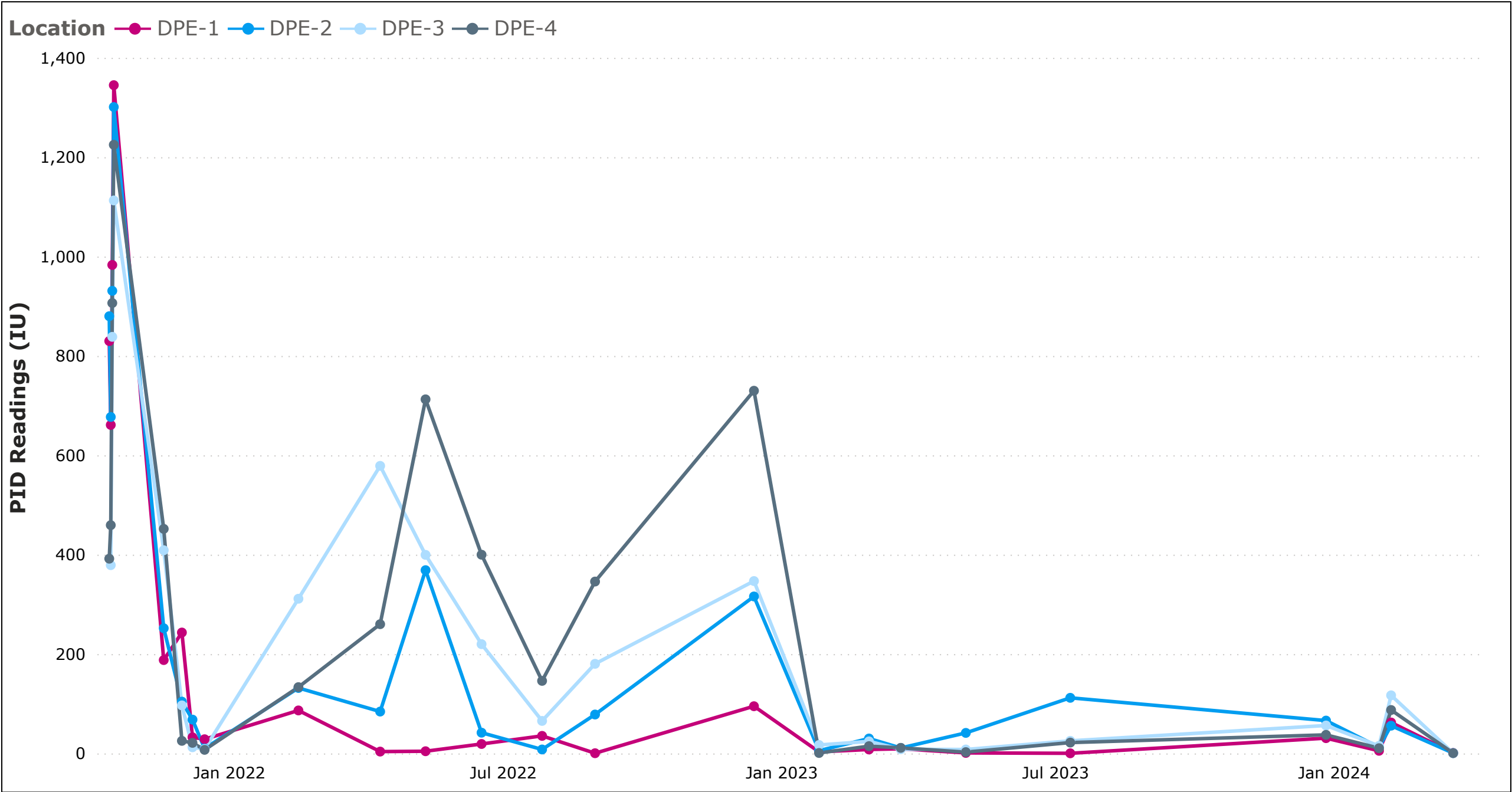
DPE Transformer

AOC

AOC 16 SITE LAYOUT

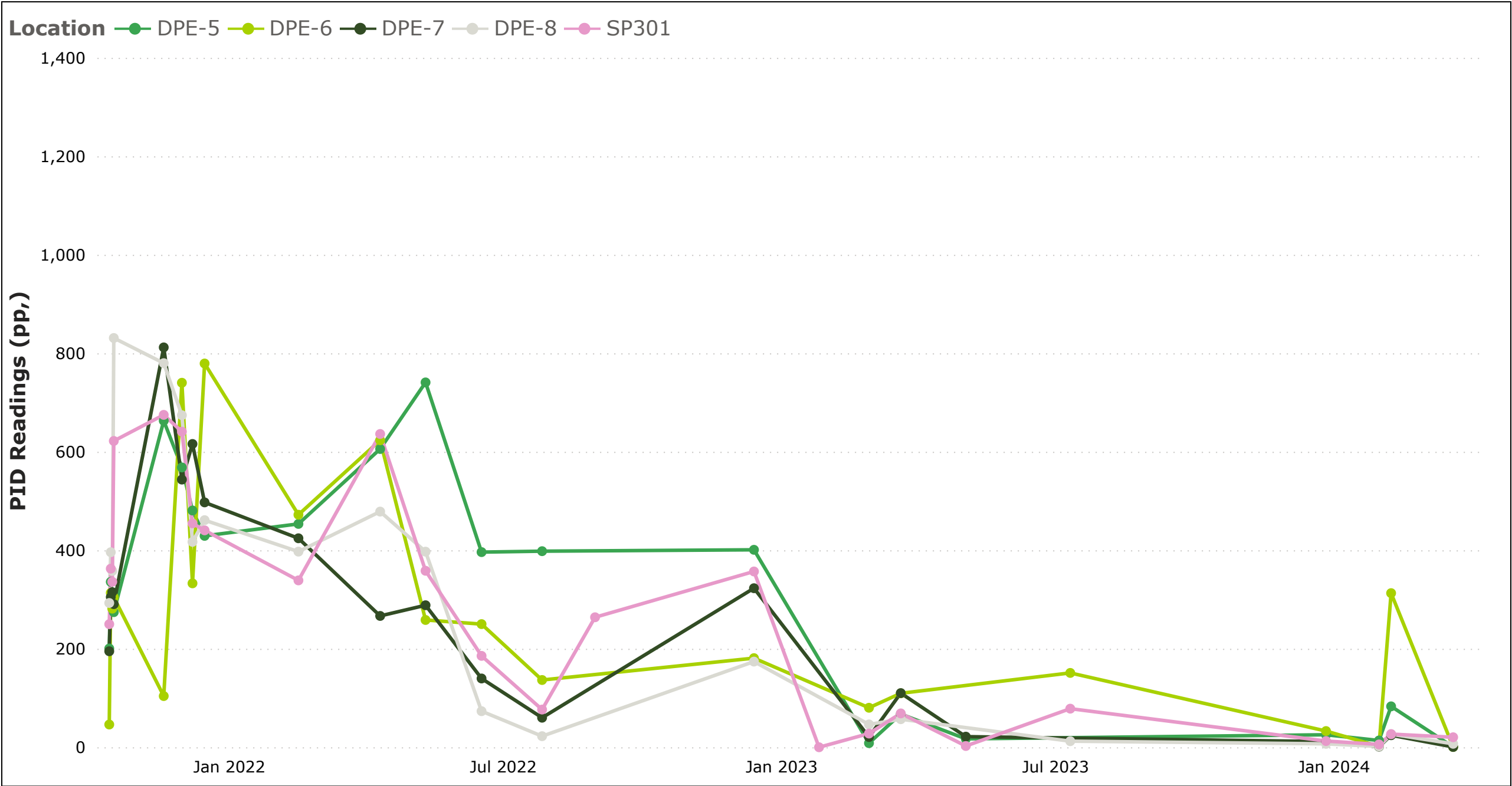
FIGURE 01

Figure 2A: DPE system Influent Vapor PID Readings
(DPE-1 through DPE-4)



Notes:
IU: Instrument Units
PID: photoionization detector

Figure 2B: DPE system Influent Vapor PID Readings
(DPE-5 through DPE-8 and SP-301)



Notes:
ppm: parts per million
PID: photoionization detector

Figure 3: DPE System Influent Vapor Concentration Trend

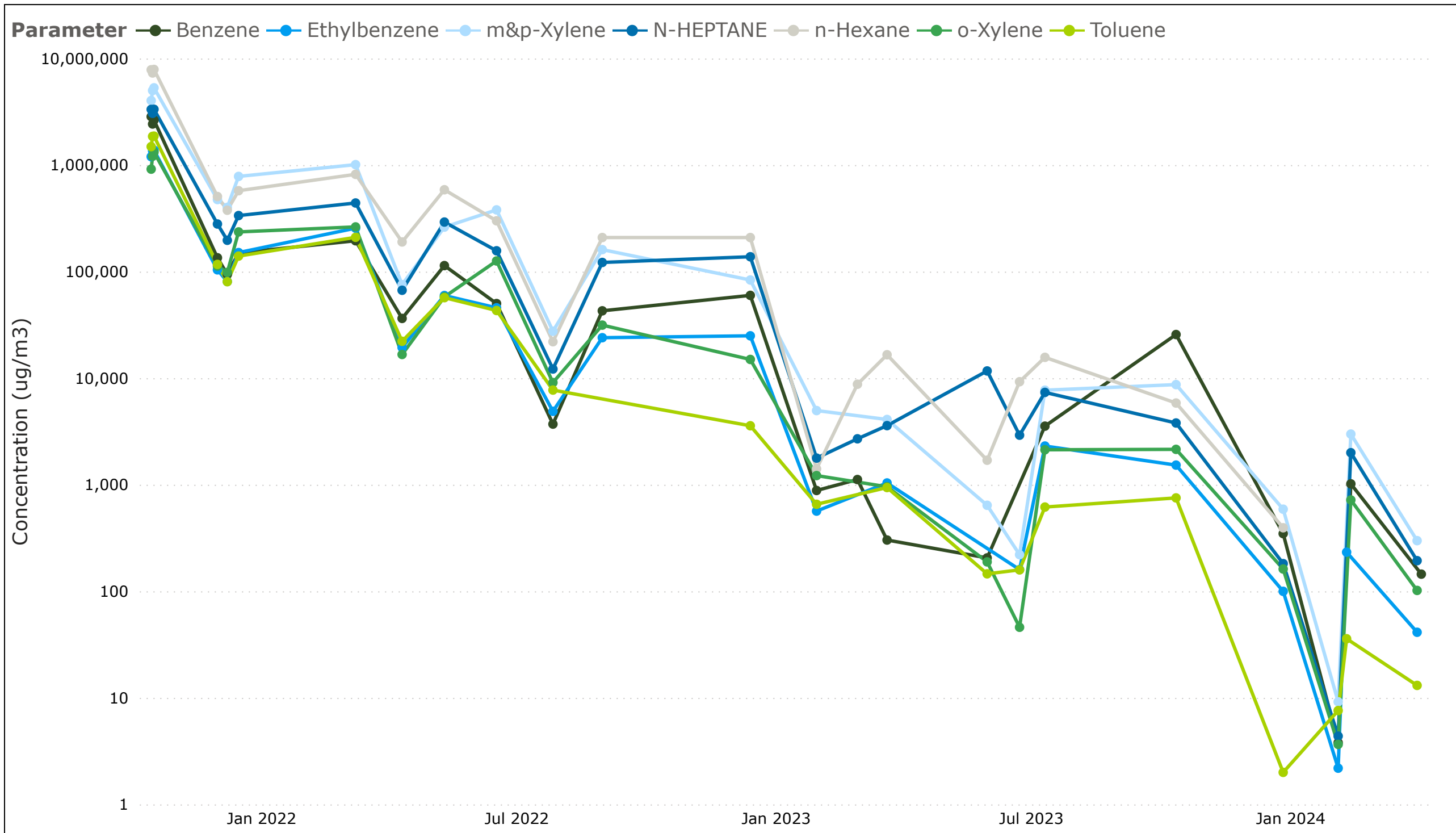
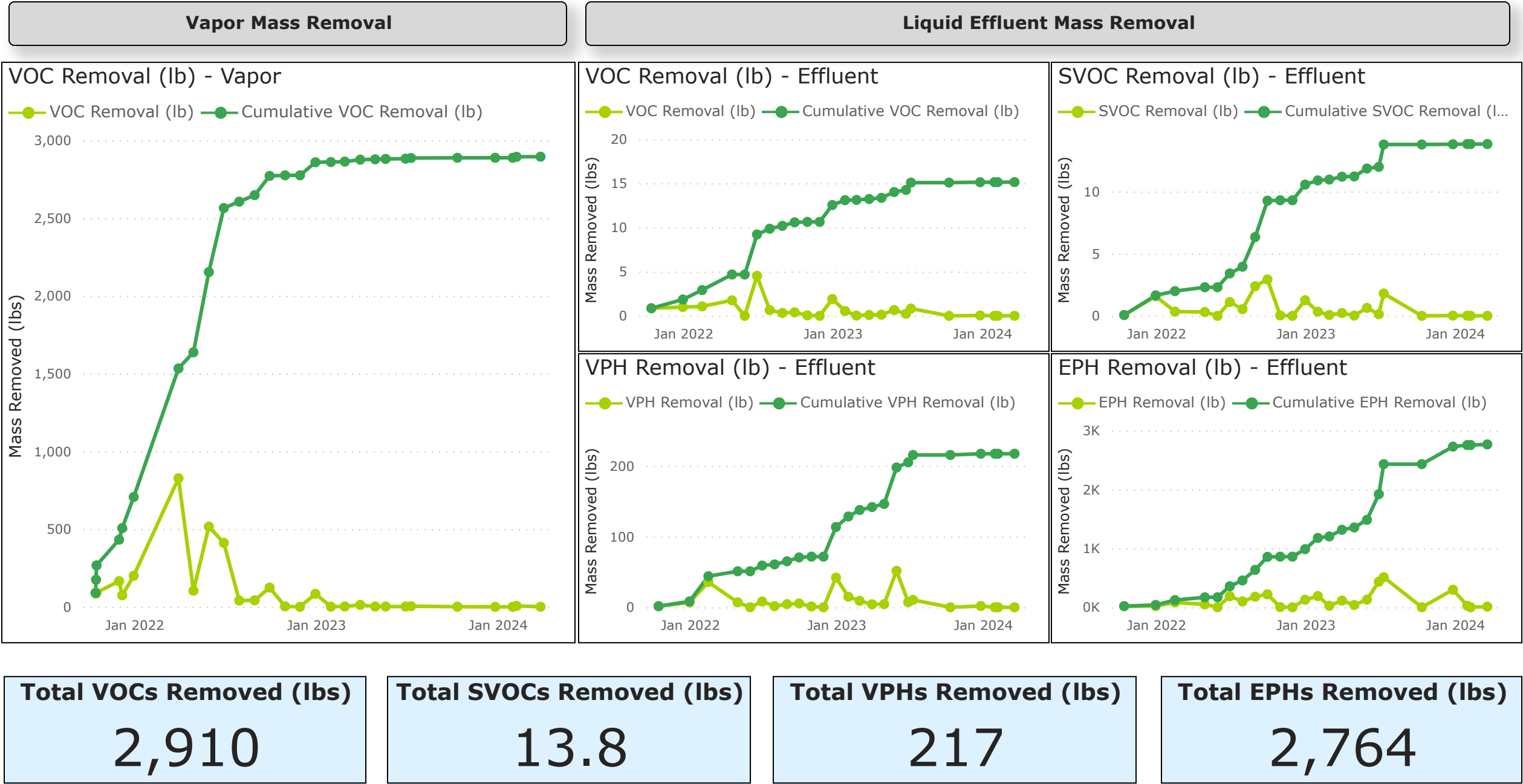


Figure 4: Vapor and Liquid Effluent Mass Removal



Notes:

- Vapor samples were collected from SP-301. The combination of vapor flow rates, system runtime, and vapor VOC concentrations were used to calculate the mass of contaminants removed.
- Liquid effluent samples were collected from the discharge side of the transfer pump (SP-200). The combination of fluid recoveries and contaminant concentrations were used to calculate the mass of contaminants removed.

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GROUNDWATER CONTOURS - MARCH 2024

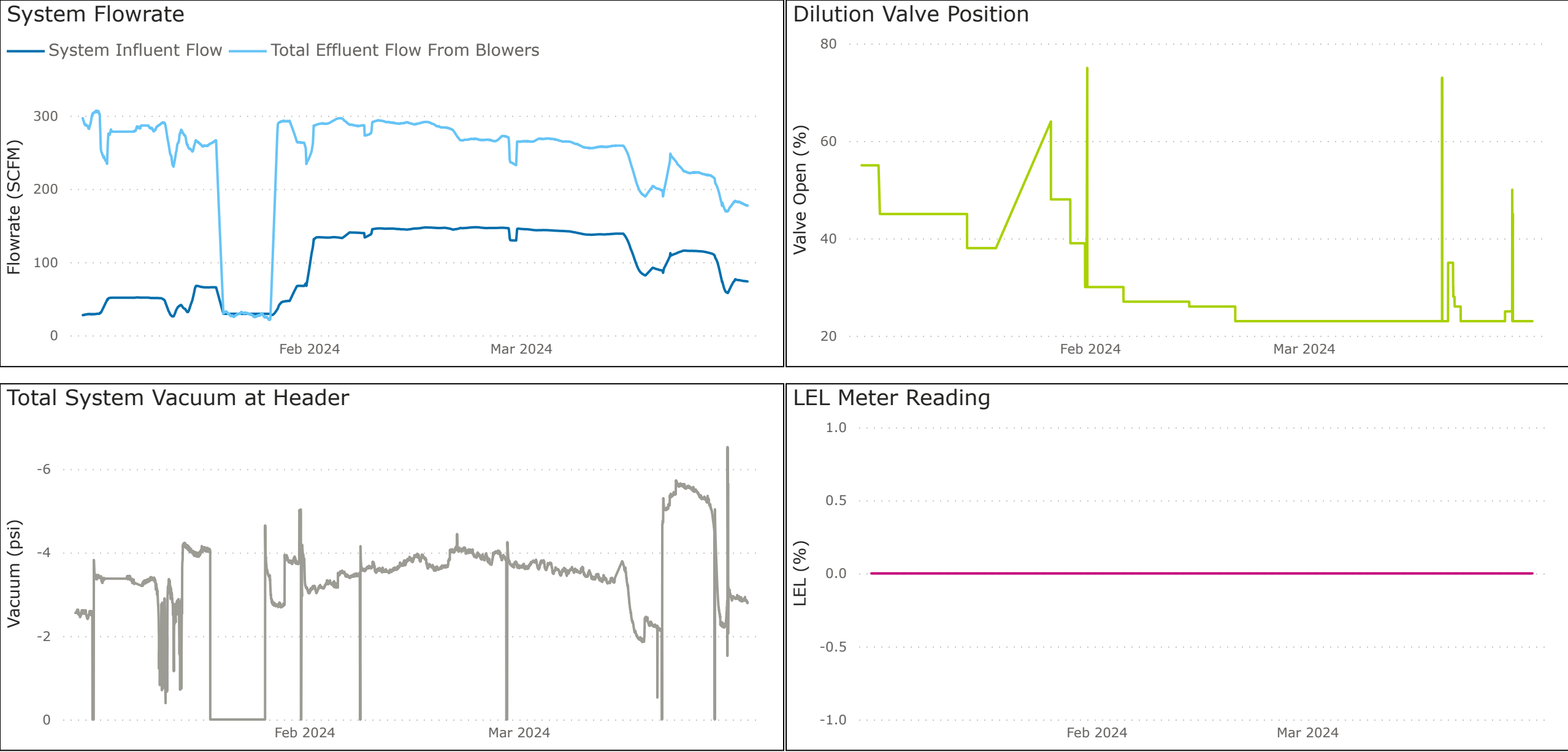
Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

FIGURE 05

RAMBOLL US CORPORATION
A RAMBOLL COMPANY



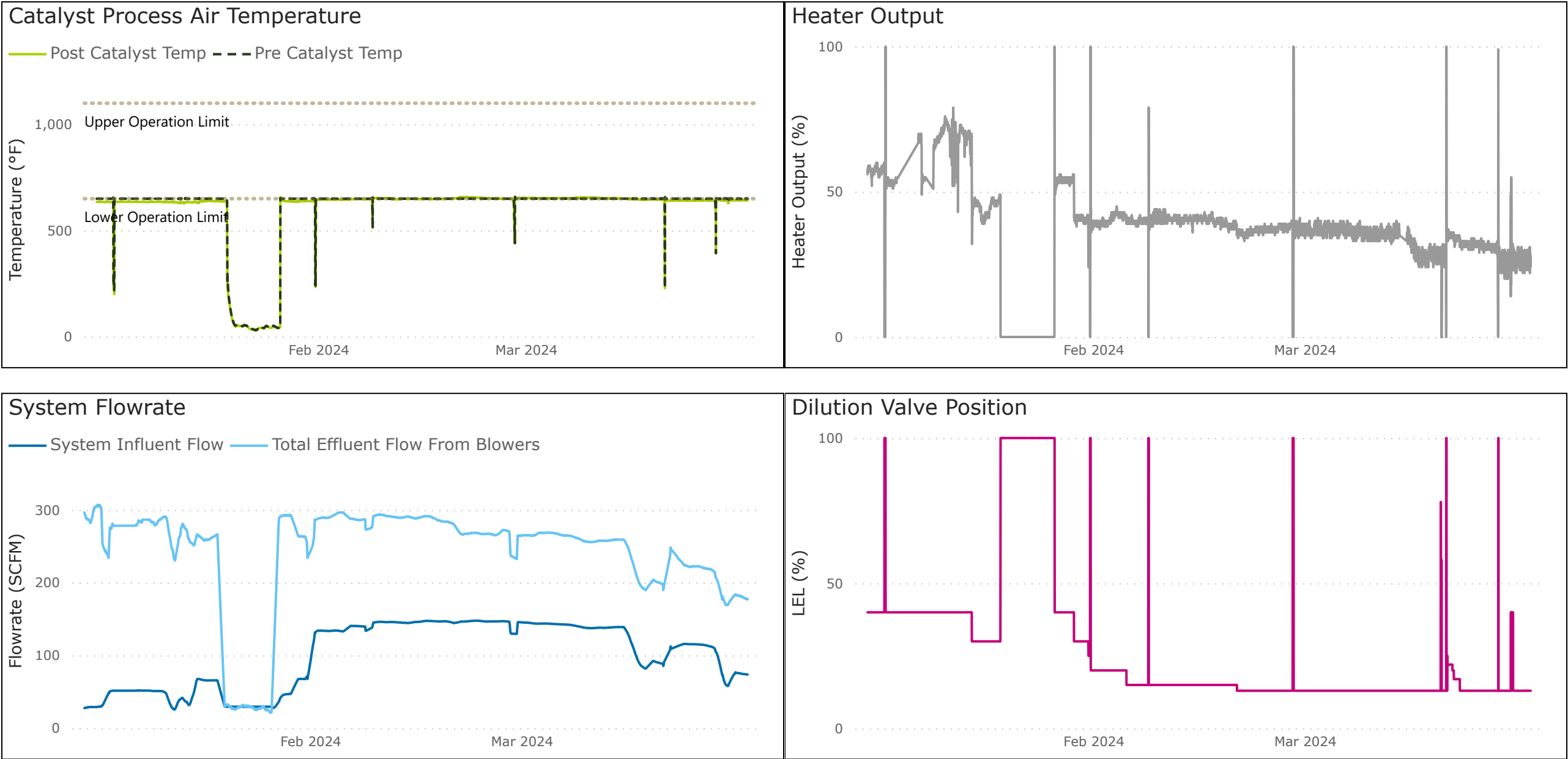
Figure 6: DPE System Operational Parameters



Notes:

- System flow is from FT-23401 (prior to dilution). Total Flow from blowers is based on readings from FT-23405 and FT-2306.
- Dilution valve position represents FV23904 valve position (% open).
- Total System Vacuum is measured at PT23623.
- LEL meter readings are from AT23904 LEL meter.

Figure 7: SRCO Operational Parameters



Notes:

- Post-catalyst process air temperature is based on TT-23702 reading.
- System flow is from FT-23401 (prior to dilution). Total Flow from blowers is based on readings from FT-23405 and FT-2306.
- Heater Output is based on H-2303 and H-2304 readings.
- Heater Output represents % energy supplied by CATOX to maintain catalyst temperature.
- Dilution valve position represents FV23702 valve position (% open).



MAXIMUM LNAPL THICKNESS
LNAPL RECOVERY WELLS
Q1 2024

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

FIGURE 08

Figure 9A: Groundwater Concentration Trend Graph - Benzene

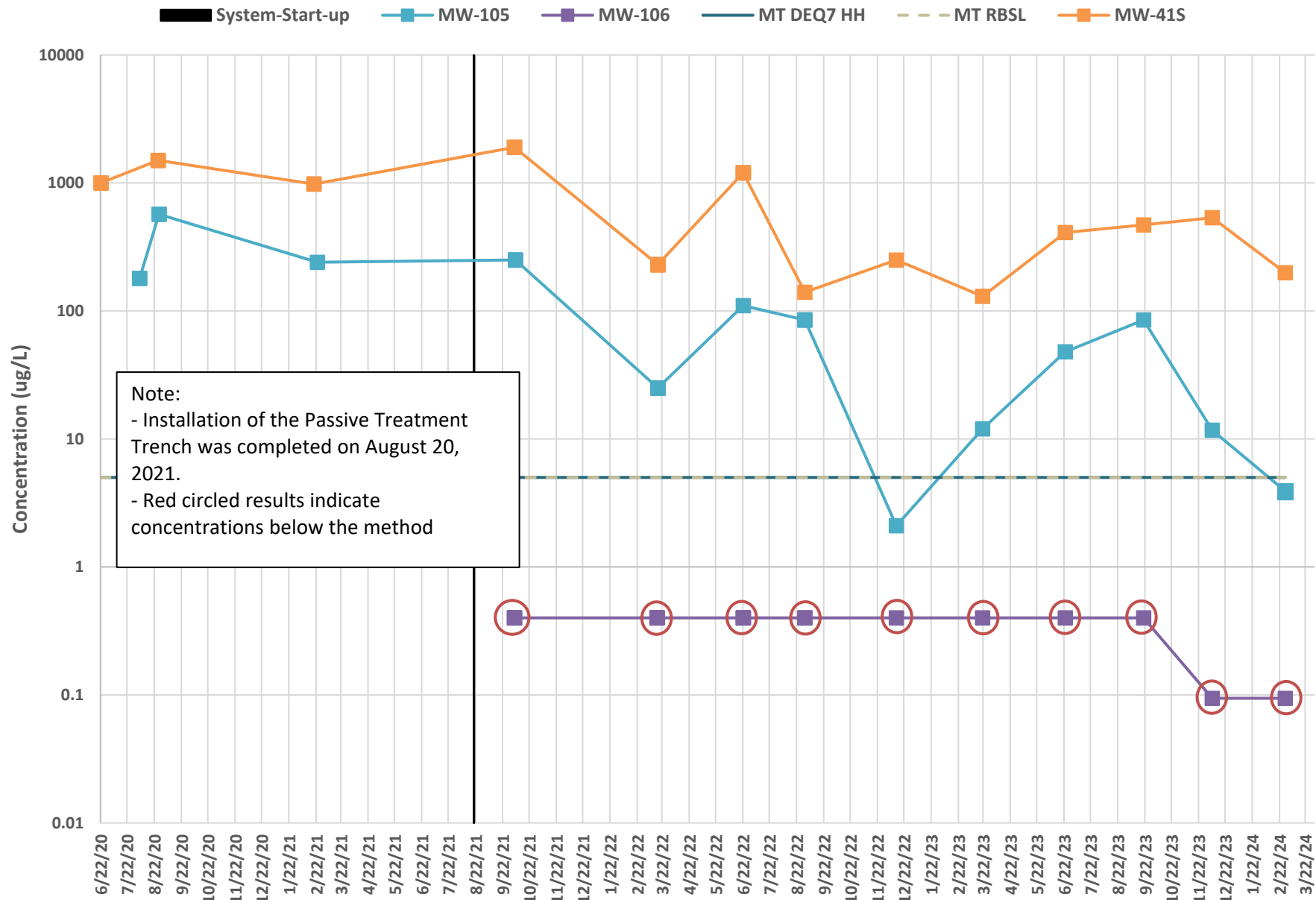


Figure 9B: Groundwater Concentration Trend Graph - C5-C8 Aliphatics

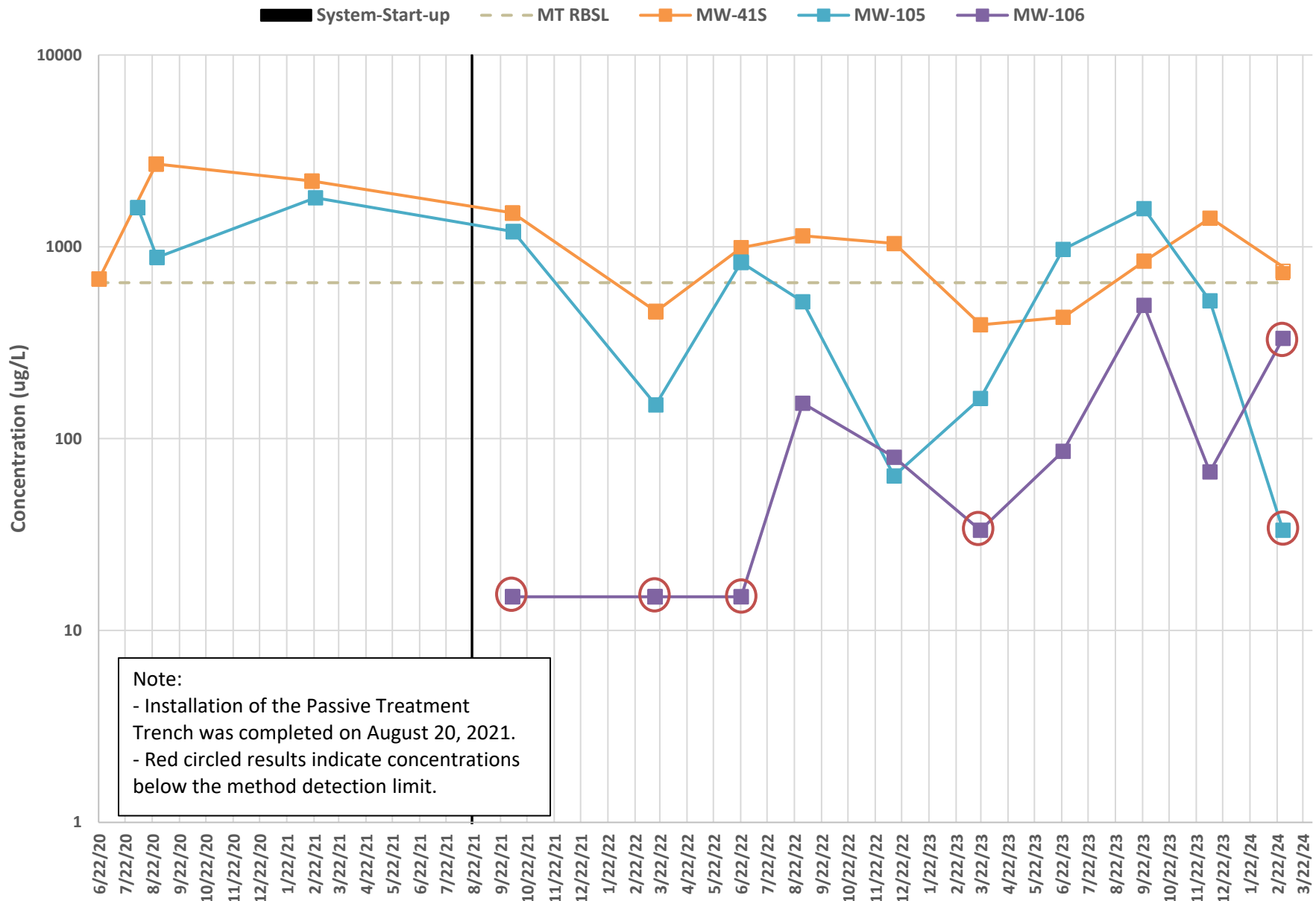
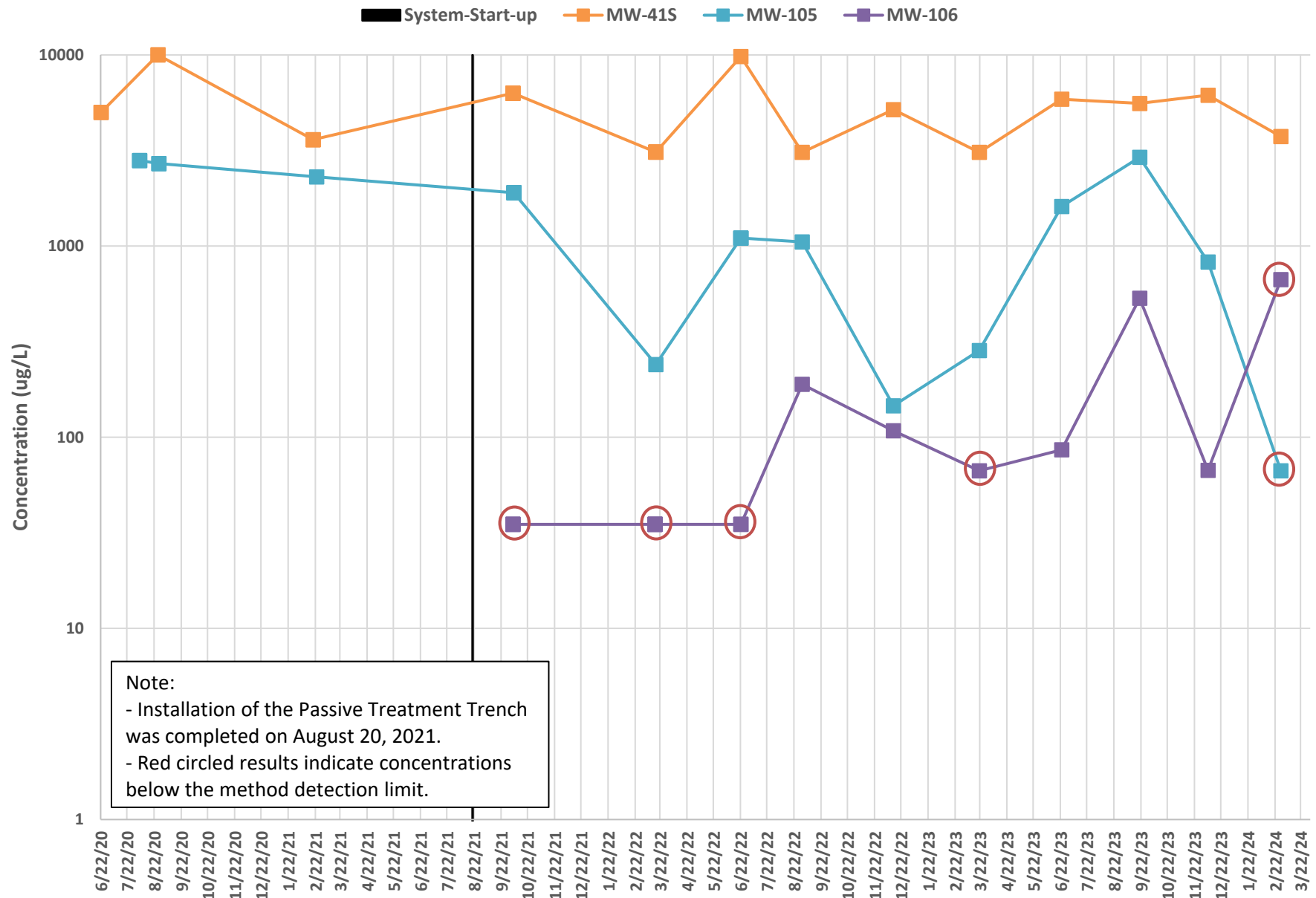


Figure 9C: Groundwater Concentration Trend Graph - Total Petroleum Hydrocarbons



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Table 1:	DPE System Operational Data
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Table 3:	Summary of Analytical Results and Contaminant Mass Removal – Liquid
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Table 6:	Summary of Groundwater Analytical Results - Petroleum COCs
Table 7:	Summary of Groundwater Analytical Results – Field Parameters

Table 1
DPE System Operational Data
Calumet Montana Refining, LLC - Great Falls, Montana

Operational Period	Percent Operational ^a	System Flowrate ^b (SCFM)	Average System Vacuum at Header ^c (in-Hg)	Liquid Extraction Rate (gpm)	Total Fluids Discharged During the Operational Period (gallons)	Total Water Discharged Since Start-up ^d (gallons)	Average Post-Catalyst Process Air Temperature When System is Operational ^e (°F)
Design Values	--	200	17	0.25 to 21	--	--	--
January 1 -31, 2024	75%	46	4.7	0.15	5,066	481,821	636
February 1 - 29, 2024	99%	143	7.4	0.21	8,550		650
March 1 - 31, 2024	99%	116	7.5	0.22	9,626		647
January 1 - March 31, 2024	91%	81	6.6	0.20	23,242		644

Notes:

- a. Percent operational is calculated using the system run-time hours (as logged by the system PLC) divided by the number of available operational hours in the time period.
- b. System flow is from FT-23401 (prior to dilution).
- c. Total System Vacuum is measured at PT23623.
- d. Commissioning and start-up testing of the DPE system commenced on October 14, 2021.
- e. Post-catalyst process air temperature is based on TT-23702 reading.

Abbreviations:

in-Hg = inches of mercury
NA = not applicable, system was not operational during time period
gpm = gallons per minute
scfm = standard cubic feet per minute

Table 2
Summary of Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Average Blower Flow (scfm) ¹ Period Operational Time (hrs) ² Notes	SP301		SP301		SP301		
	CMR-SP301-013124		CMR-SP301-240208		CMR-SP301-240327		
	1/31/2024		2/8/2024		3/27/2024		
	46		143		116		
	558		689		739		
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	2 U	0.00	2 U	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	1 U	0.00	1 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	1 U	0.00	1 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	5 U	0.00	5 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	2	0.00	810	0.30	100	0.03
1,2-Dibromoethane (EDB)	106-93-4	2 U	0.00	2 U	0.00	2 U	0.00
1,2-Dichlorobenzene	95-50-1	1 U	0.00	1 U	0.00	1 U	0.00
1,2-Dichloroethane	107-06-2	1 U	0.00	1 U	0.00	1 U	0.00
1,2-Dichloropropane	78-87-5	1 U	0.00	1 U	0.00	1 U	0.00
1,3,5-Trimethylbenzene	108-67-8	1 U	0.00	785	0.29	204	0.07
1,3-Butadiene	106-99-0	4 U	0.00	4 U	0.00	4 U	0.00
1,3-Dichlorobenzene	541-73-1	1 U	0.00	1 U	0.00	1 U	0.00
1,4-Dichlorobenzene	106-46-7	1 U	0.00	1 U	0.00	1 U	0.00
2-Butanone (MEK)	78-93-3	4 U	0.00	4 U	0.00	4 U	0.00
2-Hexanone	591-78-6	5 U	0.00	5 U	0.00	5 U	0.00
2-Propanol	67-63-0	3	0.00	5	0.00	3 U	0.00
4-Ethyltoluene	622-96-8	2	0.00	227	0.08	33	0.01
4-Methyl-2-pentanone (MIBK)	108-10-1	6	0.00	5 U	0.00	5 U	0.00
Acetone	67-64-1	17	0.00	10	0.00	3 U	0.00
Benzene	71-43-2	4	0.00	1,020	0.38	145	0.05
Benzyl chloride	100-44-7	1 U	0.00	1 U	0.00	1 U	0.00
Bromodichloromethane	75-27-4	1 U	0.00	1 U	0.00	1 U	0.00
Bromoform	75-25-2	6 U	0.00	6 U	0.00	6 U	0.00
Bromomethane	74-83-9	1 U	0.00	1 U	0.00	1 U	0.00
Carbon disulfide	75-15-0	1 U	0.00	2	0.00	3	0.00
Carbon tetrachloride	56-23-5	1 U	0.00	1 U	0.00	1 U	0.00
Chlorobenzene	108-90-7	1 U	0.00	1 U	0.00	1 U	0.00
Chloroethane	75-00-3	1 U	0.00	1 U	0.00	1 U	0.00
Chloroform	67-66-3	1 U	0.00	1 U	0.00	1 U	0.00
Chloromethane	74-87-3	1	0.00	0 U	0.00	0	0.00
cis-1,2-Dichloroethene	156-59-2	1 U	0.00	1 U	0.00	1 U	0.00
cis-1,3-Dichloropropene	10061-01-5	1 U	0.00	1 U	0.00	1 U	0.00
Cyclohexane	110-82-7	2	0.00	3,260	1.20	396	0.13
Dibromochloromethane	124-48-1	2 U	0.00	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	2	0.00	1	0.00	2	0.00
Dichlorotetrafluoroethane	76-14-2	1 U	0.00	1 U	0.00	1 U	0.00
Ethanol	64-17-5	17	0.00	8 B	0.00	13	0.00
Ethyl acetate	141-78-6	-- --	--	-- --	--	-- --	--
Ethylbenzene	100-41-4	2	0.00	233	0.09	41	0.01
Hexachloro-1,3-butadiene	87-68-3	7 U	0.00	7 U	0.00	7 U	0.00
m&p-Xylene	179601-23-1	9	0.00	2,990	1.10	299	0.10
Methylene Chloride	75-09-2	1 U	0.00	1 U	0.00	1 U	0.00
Methyl-tert-butyl ether	1634-04-4	1 U	0.00	1 U	0.00	1 U	0.00
Naphthalene	91-20-3	3 U	0.00	3 U	0.00	3 U	0.00
n-Heptane	142-82-5	4	0.00	2,000	0.74	194	0.06
n-Hexane	110-54-3	7	0.00	4,650	1.72	652	0.21
o-Xylene	95-47-6	4	0.00	720	0.27	102	0.03
Propylene	115-07-1	2 U	0.00	10	0.00	7	0.00
Styrene	100-42-5	1 U	0.00	1 U	0.00	1 U	0.00
Tetrachloroethene	127-18-4	1 U	0.00	1 U	0.00	1 U	0.00
Tetrahydrofuran	109-99-9	1 U	0.00	1 U	0.00	1 U	0.00
Toluene	108-88-3	8	0.00	36	0.01	13	0.00
trans-1,2-Dichloroethene	156-60-5	1 U	0.00	1 U	0.00	1 U	0.00
trans-1,3-Dichloropropene	10061-02-6	1 U	0.00	2	0.00	1 U	0.00
Trichloroethene	79-01-6	1 U	0.00	1 U	0.00	1 U	0.00
Trichlorofluoromethane	75-69-4	1	0.00	1 U	0.00	1	0.00
Vinyl acetate	108-05-4	2 U	0.00	2 U	0.00	2 U	0.00
Vinyl chloride	75-01-4	1 U	0.00	1 U	0.00	1 U	0.00
Total VOCs	--	--	0.02	--	6.22	--	0.73
Period Total VOC Mass Removed (lbs)	0.0		6.2		0.7		
Cumulative Total VOC Mass Removed (lbs) ⁴	2,888		2,894		2,895		

Notes:

- Blower flowrate is continuously recorded by the system PLC. Average blower flowrate during the period is used for the calculations
- Operational time represents system runtime (in
- Historical analytical results and mass recoveries are included in Appendix B.
- Cumulative Total VOC Mass Removed represents total mass removed since system start-up (October 2021).

U: The analyte was not detected in the sample at the estimated detection limit

VOCs : Volatile Organic Compounds

ug/m³ : micrograms per cubic meter

Sample Calculation

$$\text{Mass Removed (lb)} = 340000 \frac{\text{ug}}{\text{m}^3} \times 10^{-6} \frac{\text{g}}{\text{ug}} \times \frac{1}{453.6} \frac{\text{lb}}{\text{g}} \times 41 \frac{\text{ft}^3}{\text{min}} \times 0.02832 \frac{\text{m}^3}{\text{ft}^3} \times 26 \text{ hr} \times 60 \frac{\text{min}}{\text{hr}}$$

Table 3
Summary of Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-013124		CMR-SP200-240208		CMR-SP200-240320	
		1/31/2024		2/8/2024		3/20/2024	
		19,177		32,365		36,438	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
VOCs							
1,1,1-TRICHLOROETHANE	71-55-6	ND	--	ND	--	ND	--
1,1,2,2-TETRACHLOROETHANE	79-34-5	ND	--	ND	--	5.94	0.00
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ND	--	ND	--	ND	--
1,1,2-TRICHLOROETHANE	79-00-5	ND	--	ND	--	ND	--
1,1-DICHLOROETHANE	75-34-3	ND	--	ND	--	ND	--
1,1-DICHLOROETHENE	75-35-4	ND	--	ND	--	ND	--
1,2,3-TRICHLOROETHANE	87-61-6	ND	--	ND	--	ND	--
1,2,4-TRICHLOROETHANE	120-82-1	ND	--	ND	--	ND	--
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	ND	--	ND	--	ND	--
1,2-DIBROMOETHANE	106-93-4	ND	--	ND	--	ND	--
1,2-DICHLOROETHANE	95-50-1	ND	--	ND	--	ND	--
1,2-DICHLOROETHANE	107-06-2	ND	--	ND	--	ND	--
1,2-DICHLOROPROPANE	78-87-5	ND	--	ND	--	ND	--
1,3-DICHLOROETHANE	541-73-1	ND	--	ND	--	ND	--
1,4-DICHLOROETHANE	106-46-7	ND	--	ND	--	ND	--
1,4-DIOXANE	123-91-1	--	--	--	--	--	--
2-BUTANONE	78-93-3	ND	--	2.07	0.00	4.35	0.00
2-HEXANONE	591-78-6	ND	--	ND	--	ND	--
4-METHYL-2-PENTANONE	108-10-1	ND	--	3.07	0.00	4.72	0.00
ACETONE	67-64-1	ND	--	ND	--	28.4	0.00
BENZENE	71-43-2	10.6	0.00045	2.51	0.0002	1	0.0001
BROMOCHLOROMETHANE	74-97-5	ND	--	ND	--	ND	--
BROMODICHLOROMETHANE	75-27-4	ND	--	ND	--	ND	--
BROMOFORM	75-25-2	ND	--	ND	--	ND	--
BROMOMETHANE	74-83-9	ND	--	ND	--	ND	--
CARBON DISULFIDE	75-15-0	ND	--	ND	--	ND	--
CARBON TETRACHLORIDE	56-23-5	ND	--	ND	--	ND	--
CHLOROETHANE	108-90-7	ND	--	ND	--	ND	--
CHLOROETHANE	75-00-3	ND	--	ND	--	ND	--
CHLOROFORM	67-66-3	ND	--	ND	--	ND	--
CHLOROMETHANE	74-87-3	ND	--	ND	--	ND	--
CIS-1,2-DICHLOROETHENE	156-59-2	ND	--	ND	--	ND	--
CIS-1,3-DICHLOROPROPENE	10061-01-5	ND	--	ND	--	ND	--
CUMENE	98-82-8	ND	--	0.709	0.0001	1.24	0.0001
CYCLOHEXANE	110-82-7	--	--	--	--	--	--
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--	ND	--
ETHYL BENZENE	100-41-4	7	0.00	2.56	0.0002	6.22	0.0005
M,P-XYLENE	179601-23-1	--	--	--	--	--	--
METHYL ACETATE	79-20-9	--	--	--	--	--	--
METHYL TERT-BUTYL ETHER	1634-04-4	ND	--	ND	--	ND	--
METHYLCYCLOHEXANE	108-87-2	--	--	--	--	--	--
METHYLENE CHLORIDE	75-09-2	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	97.5	0.0041	10.3	0.0007	13.0	0.0010
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--
STYRENE	100-42-5	ND	--	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--
TOLUENE	108-88-3	ND	--	3	0.00	4	0.00
TRANS-1,2-DICHLOROETHENE	156-60-5	ND	--	ND	--	ND	--
TRANS-1,3-DICHLOROPROPENE	10061-02-6	ND	--	ND	--	ND	--
TRICHLOROETHENE	79-01-6	ND	--	ND	--	ND	--
TRICHLOROFUOROMETHANE	75-69-4	ND	--	ND	--	ND	--
VINYL CHLORIDE	75-01-4	ND	--	ND	--	ND	--
XYLENES (TOTAL)	1330-20-7	--	--	--	--	--	--
Total VOCs	--	--	4.9E-03	--	1.7E-03	--	5.6E-03
Period Total VOC Mass Removed (lbs)			4.9E-03		1.7E-03		5.6E-03
Cumulative Total VOC Mass Removed (lbs)			10.45		10.45		10.45

Table 3
Summary of Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-013124		CMR-SP200-240208		CMR-SP200-240320	
		1/31/2024		2/8/2024		3/20/2024	
		19,177		32,365		36,438	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
SVOCs							
1,2,4,5-TETRACHLOROBENZENE	95-94-3	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	--	--	--	--	--	--
1,3-DICHLOROBENZENE	541-73-1	--	--	--	--	--	--
1,4-DICHLOROBENZENE	106-46-7	--	--	--	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ND	--	ND	--	ND	--
2,3,4,6-TETRACHLOROPHENOL	58-90-2	ND	--	ND	--	ND	--
2,4,5-TRICHLOROPHENOL	95-95-4	ND	--	ND	--	ND	--
2,4,6-TRICHLOROPHENOL	88-06-2	ND	--	ND	--	ND	--
2,4-DICHLOROPHENOL	120-83-2	ND	--	ND	--	ND	--
2,4-DIMETHYLPHENOL	105-67-9	ND	--	24.2	0.0017	15.3	0.0012
2,4-DINITROPHENOL	51-28-5	ND	--	ND	--	ND	--
2,4-DINITROTOLUENE	121-14-2	ND	--	ND	--	ND	--
2,6-DINITROTOLUENE	606-20-2	ND	--	ND	--	ND	--
2-CHLORONAPHTHALENE	91-58-7	ND	--	ND	--	ND	--
2-CHLOROPHENOL	95-57-8	ND	--	ND	--	ND	--
2-METHYLNAPHTHALENE	91-57-6	156	0.01	ND	--	1.88	0.0002
2-METHYLPHENOL	95-48-7	ND	--	ND	--	ND	--
2-NITROANILINE	88-74-4	ND	--	ND	--	ND	--
2-NITROPHENOL	88-75-5	ND	--	ND	--	ND	--
3,3'-DICHLOROBENZIDINE	91-94-1	ND	--	ND	--	ND	--
3-NITROANILINE	99-09-2	ND	--	ND	--	ND	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	--	ND	--	ND	--
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	--	ND	--	ND	--
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	--	ND	--	ND	--
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	--	ND	--	ND	--
4-METHYLPHENOL	106-44-5	--	--	--	--	--	--
4-NITROANILINE	100-01-6	ND	--	ND	--	ND	--
4-NITROPHENOL	100-02-7	ND	--	ND	--	ND	--
ACENAPHTHENE	83-32-9	ND	--	ND	--	ND	--
ACENAPHTHYLENE	208-96-8	ND	--	ND	--	ND	--
ANTHRACENE	120-12-7	ND	--	ND	--	ND	--
BENZO(A)ANTHRACENE	56-55-3	ND	--	ND	--	ND	--
BENZO(A)PYRENE	50-32-8	ND	--	ND	--	ND	--
BENZO(B)FLUORANTHENE	205-99-2	ND	--	ND	--	ND	--
BENZO(G,H,I)PERYLENE	191-24-2	ND	--	ND	--	ND	--
BENZO(K)FLUORANTHENE	207-08-9	ND	--	ND	--	ND	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	--	ND	--	ND	--
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	--	ND	--	ND	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	--	ND	--	ND	--
BUTYLBENZYLPHTHALATE	85-68-7	ND	--	ND	--	ND	--
CARBAZOLE	86-74-8	--	--	--	--	--	--
CHRYSENE	218-01-9	ND	--	ND	--	ND	--
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	--	ND	--	ND	--
DIBENZOFURAN	132-64-9	ND	--	ND	--	ND	--
DIETHYLPHTHALATE	84-66-2	ND	--	ND	--	ND	--
DIMETHYLPHTHALATE	131-11-3	ND	--	ND	--	ND	--
DI-N-BUTYLPHTHALATE	84-74-2	ND	--	ND	--	ND	--
DI-N-OCTYLPHTHALATE	117-84-0	ND	--	ND	--	ND	--
FLUORANTHENE	206-44-0	ND	--	ND	--	ND	--
FLUORENE	86-73-7	61	0.00	ND	--	ND	--
HEXACHLOROBENZENE	118-74-1	ND	--	ND	--	ND	--
HEXACHLOROBUTADIENE	87-68-3	ND	--	ND	--	ND	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	--	ND	--	ND	--
HEXACHLOROETHANE	67-72-1	ND	--	ND	--	ND	--
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	--	ND	--	ND	--
ISOPHORONE	78-59-1	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	49.90	0.0021	1.74	0.0001	1.18	0.0001
NITROBENZENE	98-95-3	ND	--	ND	--	ND	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	--	ND	--	ND	--
N-NITROSODIPHENYLAMINE	86-30-6	ND	--	ND	--	ND	--
PENTACHLOROPHENOL	87-86-5	ND	--	ND	--	ND	--
PHENANTHRENE	85-01-8	50	0.00	ND	--	0.97	0.0001
PHENOL	108-95-2	ND	--	ND	--	ND	--
PYRENE	129-00-0	26	0.00	0.66	0.00	0.34	0.00
Total SVOCs	--	--	0.01449	--	0.002	--	0.002
Period Total SVOC Mass Removed (lbs)		1.4E-02		1.9E-03		1.6E-03	
Cumulative Total VOC Mass Removed (lbs)		13.82		13.82		13.82	

Table 3
Summary of Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		
		CMR-SP200-013124		CMR-SP200-240208		CMR-SP200-240320		
		1/31/2024		2/8/2024		3/20/2024		
		19,177		32,365		36,438		
Analyte		CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
EPH								
C11 THROUGH C22 AROMATIC HYDROCARBONS	C11-C22-AROM- J	252,000	10.65	4,390	0.31	10,500	0.84	
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	ALIPHATIC19- 36U	228,000	9.64	4,780	0.34	10,200	0.82	
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	539,000	22.79	10,900	0.78	34,100	2.74	
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	TPH-U	1,020,000	43.12	20,100	1.43	54,800	4.40	
TOTAL EXTRACTABLE HYDROCARBON	TPH	1,020,000	43.12	20,100	1.43	54,800	4.40	
Total EPHs	--	---	43.1	---	1.4	---	4.4	
Period Total EPH Mass Removed (lbs)		43.1		1.4		4.4		
Cumulative Total EPH Mass Removed (lbs)		2581.5		2582.9		2587.3		
VPH								
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	401	0.02	95.2	0.01	ND	--	
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	27,800	1.18	2,080	0.15	6,610	0.53	
C5-C8 ALIPHATICS (UNADJUSTED)	C05-C08-ALIP-U	412	0.017	97.9	0.01	ND	--	
C9 THROUGH C10 AROMATIC HYDROCARBONS (UNADJUSTED)	C09-C10-AROM- U	6,670	0.28	500	0.04	1,990	0.16	
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (UNADJUSTED)	C09-C12-ALIP-U	28,000	1.18	2,110	0.15	6,630	0.53	
TOTAL PETROLEUM HYDROCARBONS	VPH	35,100	1.48	2,710	0.19	8,620	0.69	
Total VPHs	--	---	1.48	---	0.19	---	0.69	
Period Total VPH Mass Removed (lbs)		1.5		0.2		0.7		
Cumulative Total VPH Mass Removed (lbs)		218.6		218.8		219.5		

Notes:

*Effluent volumes represent volume extracted during the month which the sample was taken.

1. Historical analytical results and mass recoveries are included in Appendix B.

2. Cumulative Total VOC Mass Removed represents total mass removed since system start-up (October 2021).

Sample Calculation

$$\text{Mass Removed (lb)} = 1800 \frac{\text{ug}}{\text{L}} \times 10^{-6} \frac{\text{g}}{\text{ug}} \times \frac{1}{453.6} \frac{\text{lb}}{\text{g}} \times 21138 \text{ L}$$

Abbreviations:

EPH : Extractable Petroleum Hydrocarbon
 ND : Non Detect
 SVOCs : Semi-volatile Organic Compounds
 ug/L : micrograms per liter
 VOCs : Volatile Organic Compounds
 VPH : Volatile Petroleum Hydrocarbons

Table 4
Fluid Level Measurements at AOC-16 Area
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)
MW-22	9/29/2021	--	7.12	--
MW-22	10/14/2021	--	7.26	--
MW-22	1/10/2023	--	8.89	--
MW-22	5/31/2023	--	8.01	--
MW-22	6/19/2023	--	6.67	--
MW-22	7/10/2023	--	7.87	--
MW-22	8/19/2023	--	8.49	--
MW-22	9/19/2023	--	7.16	--
MW-22	2/8/2024	--	7.54	--
MW-22	3/20/2024	--	7.31	--
MW-41D	8/27/2021	--	11.07	--
MW-41D	9/29/2021	--	10.83	--
MW-41D	10/15/2021	--	10.78	--
MW-41D	12/2/2021	--	10.65	--
MW-41D	1/3/2022	--	10.62	--
MW-41D	2/8/2022	--	10.70	--
MW-41D	2/8/2022	--	10.70	--
MW-41D	3/11/2022	--	10.76	--
MW-41D	4/11/2022	--	10.79	--
MW-41D	6/8/2022	--	10.95	--
MW-41D	7/27/2022	--	10.90	--
MW-41D	9/1/2022	--	10.94	--
MW-41D	1/10/2023	--	10.54	--
MW-41D	3/22/2023	--	10.60	--
MW-41D	5/31/2023	--	10.39	--
MW-41D	6/19/2023	--	10.22	--
MW-41D	7/10/2023	--	10.12	--
MW-41D	8/19/2023	--	10.52	--
MW-41D	9/19/2023	--	10.07	--
MW-41D	2/8/2024	--	10.20	--
MW-41D	3/20/2024	--	10.28	--
MW-41S	8/27/2021	--	8.25	--
MW-41S	9/29/2021	7.85	7.89	0.04
MW-41S	10/5/2021	7.78	7.81	0.03
MW-41S	10/15/2021	--	8.06	--
MW-41S	12/2/2021	--	7.90	--
MW-41S	1/3/2022	--	7.97	--
MW-41S	2/8/2022	--	8.13	--
MW-41S	3/11/2022	--	8.18	--
MW-41S	4/11/2022	--	8.55	--

Table 4
Fluid Level Measurements at AOC-16 Area
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)
MW-41S	6/8/2022	--	7.86	--
MW-41S	7/27/2022	--	7.99	--
MW-41S	9/1/2022	--	8.16	--
MW-41S	1/10/2023	--	7.52	--
MW-41S	3/22/2023	--	7.48	--
MW-41S	5/31/2023	--	6.51	--
MW-41S	6/19/2023	--	5.74	--
MW-41S	7/10/2023	--	6.41	--
MW-41S	8/19/2023	--	7.00	--
MW-41S	9/19/2023	--	7.40	--
MW-41S	2/8/2024	--	7.54	--
MW-41S	3/20/2024	--	7.22	--
MW-53	9/29/2021	7.90	8.49	0.59
MW-53	10/14/2021	--	8.26	--
MW-53	11/9/2021	8.54	8.59	0.05
MW-53	12/2/2021	8.83	8.88	0.06
MW-53	1/3/2022	--	9.32	--
MW-53	2/8/2022	9.31	9.32	0.00
MW-53	2/8/2022	9.31	9.32	0.01
MW-53	3/11/2022	9.43	9.44	0.01
MW-53	4/11/2022	--	9.38	--
MW-53	6/8/2022	9.08	10.03	0.95
MW-53	6/8/2022	9.08	10.03	0.95
MW-53	7/27/2022	--	10.23	--
MW-53	9/1/2022	--	9.59	--
MW-53	1/10/2023	--	8.53	--
MW-53	3/22/2023	--	9.00	--
MW-53	5/31/2023	9.36	9.41	0.05
MW-53	6/19/2023	7.99	8.10	0.11
MW-53	7/10/2023	8.50	8.52	0.02
MW-53	8/19/2023	9.20	9.22	0.02
MW-53	9/19/2023	--	7.85	--
MW-53	2/8/2024	--	8.59	--
MW-53	3/20/2024	--	8.14	--
MW-57	9/29/2021	--	10.29	--
MW-57	10/14/2021	--	10.51	--
MW-57	12/2/2021	--	11.10	--
MW-57	1/3/2022	--	11.27	--
MW-57	2/8/2022	--	11.23	--
MW-57	3/11/2022	--	11.19	--

Table 4
Fluid Level Measurements at AOC-16 Area
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)
MW-57	4/11/2022	--	11.06	--
MW-57	6/8/2022	--	10.25	--
MW-57	7/27/2022	--	10.17	--
MW-57	9/1/2022	--	10.07	--
MW-57	1/10/2023	--	9.79	--
MW-57	3/22/2023	--	10.14	--
MW-57	5/31/2023	--	8.62	--
MW-57	6/19/2023	--	7.54	--
MW-57	7/10/2023	--	6.35	--
MW-57	8/19/2023	--	9.02	--
MW-57	9/19/2023	--	10.08	--
MW-57	3/20/2024	--	10.33	--
MW-59D	9/29/2021	--	12.14	--
MW-59D	10/14/2021	--	12.06	--
MW-59D	12/2/2021	--	12.31	--
MW-59D	2/8/2022	--	12.49	--
MW-59D	2/8/2022	--	12.49	--
MW-59D	3/11/2022	--	12.54	--
MW-59D	4/11/2022	--	12.73	--
MW-59D	6/8/2022	--	12.53	--
MW-59D	7/27/2022	--	12.59	--
MW-59D	9/1/2022	--	12.59	--
MW-59D	1/10/2023	--	12.21	--
MW-59D	3/22/2023	--	12.48	--
MW-59D	5/31/2023	--	13.08	--
MW-59D	6/19/2023	--	12.80	--
MW-59D	7/10/2023	--	12.89	--
MW-59D	8/19/2023	--	13.23	--
MW-59D	9/19/2023	--	13.00	--
MW-59D	3/20/2024	--	13.15	--
MW-59S	9/29/2021	--	6.23	--
MW-59S	10/14/2021	--	6.22	--
MW-59S	12/2/2021	--	6.28	--
MW-59S	2/8/2022	--	6.32	--
MW-59S	3/11/2022	--	6.31	--
MW-59S	4/11/2022	--	6.31	--
MW-59S	6/8/2022	--	6.28	--
MW-59S	7/27/2022	--	6.24	--
MW-59S	9/1/2022	--	6.22	--
MW-59S	1/10/2023	--	6.23	--

Table 4
Fluid Level Measurements at AOC-16 Area
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)
MW-59S	3/22/2023	--	6.22	--
MW-59S	5/31/2023	--	6.11	--
MW-59S	6/19/2023	--	4.97	--
MW-59S	7/10/2023	--	6.08	--
MW-59S	8/19/2023	--	6.19	--
MW-59S	9/19/2023	--	6.22	--
MW-59S	3/20/2024	--	6.23	--
MW-63	9/29/2021	--	6.30	--
MW-63	10/14/2021	--	6.40	--
MW-63	11/4/2021	--	6.60	--
MW-63	2/8/2022	--	7.13	--
MW-63	3/11/2022	--	7.23	--
MW-63	4/11/2022	--	7.30	--
MW-63	6/8/2022	--	7.06	--
MW-63	7/27/2022	--	6.68	--
MW-63	9/1/2022	--	6.64	--
MW-63	1/10/2023	--	6.34	--
MW-63	3/22/2023	--	6.48	--
MW-63	5/31/2023	--	5.50	--
MW-63	6/19/2023	--	4.99	--
MW-63	7/10/2023	--	5.09	--
MW-63	8/19/2023	--	5.70	--
MW-63	9/19/2023	--	5.01	--
MW-63	3/20/2024	--	5.82	--
MW-64	9/29/2021	--	7.76	--
MW-64	10/14/2021	--	8.40	--
MW-64	11/4/2021	--	8.72	--
MW-64	12/2/2021	9.04	9.11	0.07
MW-64	1/3/2022	9.45	10.36	0.91
MW-64	2/8/2022	9.26	10.81	1.55
MW-64	3/11/2022	9.55	10.66	1.11
MW-64	4/11/2022	10.11	10.59	0.48
MW-64	6/8/2022	10.41	10.46	0.06
MW-64	7/27/2022	10.21	10.23	0.02
MW-64	9/1/2022	--	8.97	--
MW-64	1/10/2023	--	8.75	--
MW-64	3/20/2024	--	9.40	--
MW-102	9/29/2021	7.98	8.59	0.61
MW-102	10/14/2021	8.25	8.82	0.57
MW-102	11/4/2021	--	9.02	--

Table 4
Fluid Level Measurements at AOC-16 Area
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)
MW-102	12/2/2021	--	8.97	--
MW-102	1/3/2022	9.29	9.33	0.04
MW-102	2/8/2022	--	9.50	--
MW-102	2/8/2022	--	9.50	--
MW-102	3/11/2022	--	10.07	--
MW-102	4/11/2022	--	10.08	--
MW-102	6/8/2022	--	10.22	--
MW-102	7/27/2022	9.99	10.02	0.03
MW-102	9/1/2022	--	8.98	--
MW-102	1/10/2023	--	8.82	--
MW-102	3/22/2023	--	9.96	--
MW-102	5/31/2023	--	8.42	--
MW-102	6/19/2023	--	8.00	--
MW-102	7/10/2023	--	8.15	--
MW-102	8/19/2023	--	8.60	--
MW-102	9/19/2023	--	7.60	--
MW-102	3/20/2024	--	dry	--
MW-103	9/29/2021	--	8.04	--
MW-103	10/14/2021	--	8.35	--
MW-103	11/4/2021	--	8.77	--
MW-103	12/2/2021	--	9.32	--
MW-103	1/3/2022	--	9.66	--
MW-103	2/8/2022	--	9.61	--
MW-103	3/11/2022	--	9.87	--
MW-103	4/11/2022	--	9.87	--
MW-103	6/8/2022	--	9.79	--
MW-103	7/27/2022	--	9.66	--
MW-103	9/1/2022	--	9.12	--
MW-103	1/10/2023	--	8.81	--
MW-103	3/22/2023	--	9.60	--
MW-103	5/31/2023	--	8.53	--
MW-103	6/19/2023	--	8.09	--
MW-103	7/10/2023	--	5.80	--
MW-103	8/19/2023	--	6.20	--
MW-103	9/19/2023	--	7.88	--
MW-104	9/29/2021	6	6.25	0.25
MW-104	10/15/2021	6.1	6.23	0.13
MW-104	12/2/2021	6.62	6.79	0.17
MW-104	1/3/2022	6.75	7.02	0.27
MW-104	2/8/2022	6.83	7.16	0.33

Table 4
Fluid Level Measurements at AOC-16 Area
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)
MW-104	2/8/2022	6.83	7.16	0.33
MW-104	3/11/2022	7.13	7.57	0.44
MW-104	4/11/2022	7.38	7.81	0.43
MW-104	6/8/2022	7.86	7.86	0.00
MW-104	9/1/2022	7.72	7.82	0.10
MW-104	1/10/2023	--	7.37	--
MW-104	3/22/2023	--	6.89	--
MW-104	5/31/2023	--	6.61	--
MW-104	6/19/2023	--	5.79	--
MW-104	7/10/2023	--	5.80	--
MW-104	8/19/2023	--	6.22	--
MW-104	9/19/2023	--	5.96	--
MW-104	3/20/2024	--	6.13	--
MW-105	9/29/2021	--	5.58	--
MW-105	10/14/2021	--	8.97	--
MW-105	12/2/2021	--	6.67	--
MW-105	1/3/2022	--	5.63	--
MW-105	2/8/2022	--	5.89	--
MW-105	2/8/2022	--	5.92	--
MW-105	3/11/2022	--	5.85	--
MW-105	4/11/2022	--	8.01	--
MW-105	6/8/2022	--	6.06	--
MW-105	7/27/2022	--	6.63	--
MW-105	9/1/2022	--	4.89	--
MW-105	1/10/2023	--	7.50	--
MW-105	3/22/2023	--	5.59	--
MW-105	5/31/2023	--	5.39	--
MW-105	6/19/2023	--	2.94	--
MW-105	7/10/2023	--	8.41	--
MW-105	8/19/2023	--	8.87	--
MW-105	9/19/2023	--	5.39	--
MW-105	3/20/2024	--	7.69	--
MW-106	9/29/2021	--	6.14	--
MW-106	10/14/2021	--	5.83	--
MW-106	10/20/2021	--	5.71	--
MW-106	11/9/2021	--	5.48	--
MW-106	12/2/2021	--	5.70	--
MW-106	1/3/2022	--	6.19	--
MW-106	2/8/2022	--	5.92	--
MW-106	2/8/2022	--	5.84	--

Table 4
Fluid Level Measurements at AOC-16 Area
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)
MW-106	3/11/2022	--	5.80	--
MW-106	4/11/2022	--	5.70	--
MW-106	6/8/2022	--	5.03	--
MW-106	7/27/2022	--	5.40	--
MW-106	9/1/2022	--	5.83	--
MW-106	1/10/2023	--	4.62	--
MW-106	3/22/2023	--	4.60	--
MW-106	5/31/2023	--	3.51	--
MW-106	6/19/2023	--	2.95	--
MW-106	7/10/2023	--	4.81	--
MW-106	8/19/2023	--	4.40	--
MW-106	9/19/2023	--	4.59	--
MW-106	2/8/2024	--	4.45	--
MW-106	3/20/2024	--	4.12	--

Notes:

DTP Depth to Product
DTW Depth to Water
ft BTOC Below Top of Casing
LNAPL light non-aqueous phase liquid
NA Reading not collected
-- LNAPL was not present

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-1	8/27/2021	--	8.23	--	--	
LNAPL-1	9/30/2021	--	6.55	--		
LNAPL-1	10/5/2021	--	6.44	--		
LNAPL-1	10/12/2021	--	6.37	--		
LNAPL-1	10/19/2021	--	6.31	--		
LNAPL-1	11/9/2021	--	6.24	--		Sheen
LNAPL-1	11/18/2021	--	6.30	--		
LNAPL-1	12/2/2021	--	6.36	--		
LNAPL-1	1/3/2022	--	6.50	--		
LNAPL-1	2/8/2022	--	6.72	--		
LNAPL-1	5/15/2022	--	5.9	--		
LNAPL-1	5/22/2022	--	5.9	--		
LNAPL-1	5/29/2022	--	5.9	--		
LNAPL-1	6/5/2022	--	5.88	--		
LNAPL-1	6/12/2022	--	5.9	--		
LNAPL-1	6/19/2022	--	6	--		
LNAPL-1	6/26/2022	--	6	--		
LNAPL-1	7/3/2022	--	5.46	--		
LNAPL-1	7/10/2022	--	5.56	--		
LNAPL-1	7/17/2022	--	5.6	--		
LNAPL-1	7/31/2022	--	5.92	--		
LNAPL-1	8/7/2022	--	6.87	--		
LNAPL-1	8/14/2022	7.00	7.03	0.03		
LNAPL-1	9/4/2022	--	6.8	--		
LNAPL-1	9/10/2022	6.80	6.81	0.01		
LNAPL-1	9/18/2022	7.35	7.37	0.02		
LNAPL-1	9/25/2022	6.97	7	0.03		
LNAPL-1	10/2/2022	6.58	6.83	0.25		
LNAPL-1	10/9/2022	6.47	6.92	0.45		
LNAPL-1	11/14/2022	--	6.22	--		
LNAPL-1	12/6/2022	--	6.1	--		
LNAPL-1	1/15/2023	6.58	6.83	0.25		
LNAPL-1	3/5/2023	--	5.98	--		
LNAPL-1	3/23/2023	--	5.57	--		
LNAPL-1	4/2/2023	5.58	5.60	0.02	--	
LNAPL-1	5/31/2023	--	4.60	--		
LNAPL-1	6/19/2023	--	3.95	--		
LNAPL-1	7/10/2023	--	4.48	--		
LNAPL-1	8/19/2023	--	5.19	--		
LNAPL-1	9/19/2023	--	5.52	--		
LNAPL-1	2/7/2024	--	5.55	--		Sheen
LNAPL-1	2/23/2024	--	5.34	--		
LNAPL-1	3/7/2024	--	5.2	--		
LNAPL-1	3/20/2024	--	5.21	--		Sheen
LNAPL-2	8/27/2021	--	8.18	--	--	
LNAPL-2	9/30/2021	--	6.42	--	--	
LNAPL-2	10/5/2021	--	6.3	--	--	
LNAPL-2	10/12/2021	--	6.22	--	--	
LNAPL-2	10/19/2021	--	6.15	--	--	
LNAPL-2	11/9/2021	--	6.09	--	--	Sheen
LNAPL-2	11/18/2021	--	6.15	--	--	
LNAPL-2	12/2/2021	--	6.22	--	--	
LNAPL-2	1/3/2022	--	6.35	--	--	
LNAPL-2	2/8/2022	--	6.57	--	--	
LNAPL-2	5/15/2022	--	6	--	--	
LNAPL-2	5/22/2022	--	5.73	--	--	
LNAPL-2	5/29/2022	--	5.75	--	--	
LNAPL-2	6/5/2022	--	5.73	--	0.5	
LNAPL-2	6/12/2022	--	5.73	--	--	
LNAPL-2	6/19/2022	--	5.85	--	0.5	
LNAPL-2	6/26/2022	--	5.6	--	--	
LNAPL-2	7/3/2022	--	5.42	--	0.8	
LNAPL-2	7/10/2022	--	5.55	--	0.6	
LNAPL-2	7/17/2022	--	5.41	--	0.7	
LNAPL-2	7/31/2022	--	5.7	--	--	
LNAPL-2	8/7/2022	--	6.82	--	--	
LNAPL-2	8/14/2022	6.91	6.95	0.04	--	
LNAPL-2	9/4/2022	6.78	6.79	0.01	0.8	
LNAPL-2	9/10/2022	6.62	6.73	0.11	0.8	
LNAPL-2	9/18/2022	7.12	7.22	0.1	0.3	

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-2	9/25/2022	--	6.6	--	0.5	
LNAPL-2	10/2/2022	6.61	6.7	0.09	0.7	
LNAPL-2	10/9/2022	6.30	6.76	0.46	0.5	
LNAPL-2	11/14/2022	--	6.07	--	0.5	
LNAPL-2	12/6/2022	--	5.95	--	0.3	
LNAPL-2	2/26/2023	--	5.4	--	--	
LNAPL-2	3/5/2023	--	5.96	--	--	
LNAPL-2	3/23/2023	--	5.62	--	--	
LNAPL-2	5/31/2023	--	4.45	--	--	
LNAPL-2	6/19/2023	3.77	3.78	0.01	--	
LNAPL-2	7/10/2023	--	4.32	--	--	
LNAPL-2	8/19/2023	--	5.21	--	--	
LNAPL-2	9/19/2023	--	5.35	--	--	
LNAPL-2	2/7/2024	--	5.45	--	--	Sheen
LNAPL-2	2/23/2024	--	5.2	--	--	
LNAPL-2	3/7/2024	--	5.05	--	--	
LNAPL-2	3/20/2024	--	5.06	--	--	Sheen
LNAPL-3	8/27/2021	--	8.11	--	--	
LNAPL-3	9/30/2021	--	6.45	--	--	
LNAPL-3	10/5/2021	--	6.31	--	--	
LNAPL-3	10/12/2021	--	6.24	--	--	
LNAPL-3	10/19/2021	--	6.18	--	--	
LNAPL-3	11/9/2021	--	6.1	--	--	
LNAPL-3	11/18/2021	--	6.17	--	--	
LNAPL-3	12/2/2021	--	6.24	--	--	
LNAPL-3	1/3/2022	--	6.38	--	--	
LNAPL-3	2/8/2022	--	6.58	--	--	
LNAPL-3	5/15/2022	--	5.76	--	--	
LNAPL-3	5/22/2022	--	5.74	--	--	
LNAPL-3	5/29/2022	--	5.8	--	--	
LNAPL-3	6/5/2022	--	5.71	--	--	
LNAPL-3	6/12/2022	--	5.78	--	--	
LNAPL-3	6/19/2022	--	5.87	--	--	
LNAPL-3	6/26/2022	--	5.45	--	--	
LNAPL-3	7/3/2022	--	5.31	--	--	
LNAPL-3	7/10/2022	--	5.4	--	--	
LNAPL-3	7/17/2022	--	5.15	--	--	
LNAPL-3	7/31/2022	--	5.8	--	--	
LNAPL-3	8/7/2022	--	6.72	--	--	
LNAPL-3	8/14/2022	6.71	6.74	0.03	--	
LNAPL-3	9/4/2022	--	6.69	--	--	
LNAPL-3	9/10/2022	--	6.67	--	--	
LNAPL-3	9/18/2022	7.42	7.45	0.03	--	
LNAPL-3	9/25/2022	6.74	6.81	0.07	--	
LNAPL-3	10/2/2022	6.50	6.58	0.08	--	
LNAPL-3	10/9/2022	6.39	6.93	0.54	--	
LNAPL-3	11/14/2022	6.08	6.10	0.02	--	
LNAPL-3	12/6/2022	5.97	6	0.03	--	
LNAPL-3	12/11/2022	6.36	6.58	0.22	--	
LNAPL-3	12/18/2022	5.86	5.88	0.02	--	
LNAPL-3	2/26/2023	5.48	5.49	0.01	--	
LNAPL-3	3/23/2023	--	5.61	--	--	
LNAPL-3	4/2/2023	5.39	5.42	0.03	--	
LNAPL-3	5/31/2023	--	4.45	--	--	
LNAPL-3	6/19/2023	--	3.78	--	--	
LNAPL-3	7/10/2023	--	4.28	--	--	
LNAPL-3	8/19/2023	--	5.08	--	--	
LNAPL-3	9/19/2023	--	5.36	--	--	
LNAPL-3	2/7/2024	--	5.45	--	--	
LNAPL-3	2/23/2024	--	5.22	--	--	
LNAPL-3	3/7/2024	--	5.07	--	--	
LNAPL-3	3/20/2024	--	5.07	--	--	Sheen
LNAPL-4	8/27/2021	--	8.15	--	--	
LNAPL-4	9/30/2021	--	6.46	--	--	
LNAPL-4	10/5/2021	--	6.31	--	--	
LNAPL-4	10/12/2021	--	6.24	--	--	
LNAPL-4	10/19/2021	--	6.18	--	--	
LNAPL-4	11/9/2021	--	6.11	--	--	
LNAPL-4	11/18/2021	--	6.18	--	--	
LNAPL-4	12/2/2021	--	6.25	--	--	

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-4	1/3/2022	--	6.40	--	--	
LNAPL-4	2/8/2022	--	6.59	--	--	
LNAPL-4	5/15/2022	--	6.1	--	--	
LNAPL-4	5/22/2022	--	5.74	--	--	
LNAPL-4	5/29/2022	--	5.9	--	--	
LNAPL-4	6/5/2022	--	5.85	--	1.0	
LNAPL-4	6/12/2022	--	5.9	--	0.8	
LNAPL-4	6/19/2022	5.87	5.89	0.02	0.8	
LNAPL-4	6/26/2022	--	5.55	--	--	
LNAPL-4	7/3/2022	--	5.42	--	0.8	Oil film
LNAPL-4	7/10/2022	--	5.5	--	0.7	
LNAPL-4	7/17/2022	5.45	5.48	0.03	0.5	
LNAPL-4	7/31/2022	5.80	5.82	0.02	0.8	
LNAPL-4	8/7/2022	--	6.79	--	0.7	
LNAPL-4	8/14/2022	6.81	6.85	0.04	--	
LNAPL-4	9/4/2022	6.63	6.88	0.25	0.2	
LNAPL-4	9/10/2022	6.64	6.81	0.17	--	
LNAPL-4	9/18/2022	7.48	7.52	0.04	0.1	
LNAPL-4	9/25/2022	--	6.87	--	0.5	
LNAPL-4	10/2/2022	6.70	7.05	0.35	0.7	
LNAPL-4	10/9/2022	6.36	6.69	0.33	0.8	
LNAPL-4	11/14/2022	6.08	6.27	0.19	0.8	
LNAPL-4	12/6/2022	5.96	6.03	0.07	0.5	
LNAPL-4	12/11/2022	6.43	6.66	0.23	--	
LNAPL-4	12/18/2022	5.91	5.92	0.01	--	
LNAPL-4	12/25/2022	5.96	5.99	0.03	0.5	
LNAPL-4	1/15/2023	5.80	5.82	0.02	1.0	
LNAPL-4	1/22/2023	5.88	5.92	0.04	0.6	
LNAPL-4	1/30/2023	--	5.39	--	0.6	
LNAPL-4	2/5/2023	5.62	5.71	0.09	0.5	
LNAPL-4	2/12/2023	5.49	5.51	0.02	1.0	
LNAPL-4	2/18/2023	--	5.71	--	0.7	
LNAPL-4	2/26/2023	5.49	5.5	0.01	0.1	
LNAPL-4	3/5/2023	5.84	5.87	0.03	0.3	
LNAPL-4	3/12/2023	--	5.82	--	1.0	
LNAPL-4	3/19/2023	--	5.61	--	0.3	
LNAPL-4	3/23/2023	--	5.62	--	0.0	
LNAPL-4	4/2/2023	5.50	5.51	0.01	0.0	
LNAPL-4	4/30/2023	4.30	4.40	0.10	0.0	
LNAPL-4	5/31/2023	--	4.41	--	0.0	
LNAPL-4	6/19/2023	--	3.79	--	0.0	
LNAPL-4	7/10/2023	--	4.35	--	--	
LNAPL-4	8/19/2023	--	5.09	--	--	
LNAPL-4	9/19/2023	--	5.35	--	--	
LNAPL-4	2/7/2024	--	5.45	--	--	Sheen
LNAPL-4	2/23/2024	--	5.22	--	--	
LNAPL-4	3/7/2024	--	5.06	--	--	
LNAPL-4	3/20/2024	--	5.07	--	--	Sheen
LNAPL-5	8/27/2021	--	8.15	--	--	
LNAPL-5	9/30/2021	--	6.49	--	--	
LNAPL-5	10/5/2021	--	6.35	--	--	
LNAPL-5	10/12/2021	--	6.28	--	--	
LNAPL-5	10/19/2021	--	6.22	--	--	
LNAPL-5	11/9/2021	--	6.14	--	--	Sheen
LNAPL-5	11/18/2021	--	6.20	--	--	
LNAPL-5	12/2/2021	6.28	6.30	0.025	--	
LNAPL-5	12/15/2021	6.32	6.64	0.32	--	
LNAPL-5	1/3/2022	6.37	6.78	0.405	--	
LNAPL-5	2/8/2022	6.56	7.01	0.45	--	
LNAPL-5	3/7/2022	6.60	7.3	0.7	--	
LNAPL-5	4/11/2022	6.64	7.32	0.68	--	
LNAPL-5	5/15/2022	5.90	5.92	0.02	0.5	
LNAPL-5	5/22/2022	--	5.78	--	--	
LNAPL-5	5/29/2022	--	5.85	--	--	
LNAPL-5	6/5/2022	--	5.81	--	0.5	
LNAPL-5	6/12/2022	5.79	5.81	0.02	0.5	
LNAPL-5	6/19/2022	5.90	5.93	0.03	0.5	
LNAPL-5	6/26/2022	5.45	5.5	0.05	--	
LNAPL-5	7/3/2022	--	5.5	--	0.8	
LNAPL-5	7/10/2022	--	5.6	--	0.7	

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-5	7/17/2022	5.48	5.49	0.01	0.7	
LNAPL-5	7/31/2022	--	5.93	--	0.5	
LNAPL-5	8/7/2022	6.78	6.82	0.04	0.8	
LNAPL-5	9/4/2022	6.75	7.45	0.7	0.7	
LNAPL-5	9/10/2022	6.65	7.45	0.8	0.8	
LNAPL-5	9/18/2022	7.00	7.14	0.14	0.1	
LNAPL-5	9/25/2022	--	6.49	--	1.0	
LNAPL-5	10/2/2022	6.80	7.08	0.28	0.6	
LNAPL-5	10/9/2022	6.39	6.75	0.36	0.8	
LNAPL-5	11/14/2022	6.12	6.14	0.02	0.8	
LNAPL-5	12/6/2022	--	6.02	--	0.5	
LNAPL-5	12/25/2022	--	5.98	--	0.5	
LNAPL-5	1/15/2023	--	5.93	--		
LNAPL-5	1/22/2023	5.90	5.91	0.01	0.8	
LNAPL-5	1/30/2023	5.39	5.41	0.02	--	
LNAPL-5	2/5/2023	--	5.76	--	--	
LNAPL-5	2/12/2023	5.53	5.54	0.01	1.0	
LNAPL-5	2/18/2023	5.74	5.77	0.03	0.7	
LNAPL-5	2/26/2023	5.51	5.53	0.02	--	
LNAPL-5	3/5/2023	--	5.95	--	--	
LNAPL-5	3/12/2023	5.76	5.78	0.02	--	
LNAPL-5	3/19/2023	--	5.71	--	0.3	
LNAPL-5	3/23/2023	--	5.6	--	--	
LNAPL-5	4/2/2023	--	5.48	--	--	
LNAPL-5	4/30/2023	4.20	4.30	0.10	--	
LNAPL-5	5/31/2023	--	4.41	--	--	
LNAPL-5	6/19/2023	--	3.82	--	--	
LNAPL-5	7/10/2023	--	4.32	--	--	
LNAPL-5	8/19/2023	--	5.11	--	--	
LNAPL-5	9/19/2023	--	5.42	--	--	
LNAPL-5	2/7/2024	--	5.47	--	--	Slight sheen
LNAPL-5	2/23/2024	--	5.29	--	--	
LNAPL-5	3/7/2024	--	5.11	--	--	
LNAPL-5	3/20/2024	--	5.1	--	--	Sheen
LNAPL-6	8/27/2021	--	8.13	--	--	
LNAPL-6	9/30/2021	--	6.61	--	--	
LNAPL-6	10/5/2021	--	6.47	--	--	
LNAPL-6	10/12/2021	--	6.4	--	--	
LNAPL-6	10/19/2021	--	6.33	--	--	
LNAPL-6	11/9/2021	--	6.27	--	--	
LNAPL-6	11/18/2021	--	6.24	--	--	
LNAPL-6	12/2/2021	--	6.41	--	--	
LNAPL-6	12/15/2021	--	6.50	--	--	
LNAPL-6	1/3/2022	--	6.56	--	--	
LNAPL-6	2/8/2022	--	6.78	--	--	
LNAPL-6	5/15/2022	5.94	5.95	0.01	--	
LNAPL-6	5/22/2022	--	5.93	--	--	
LNAPL-6	5/29/2022	--	5.75	--	--	
LNAPL-6	6/5/2022	--	5.92	--	--	
LNAPL-6	6/12/2022	--	5.93	--	--	
LNAPL-6	6/19/2022	--	6.04	--	--	
LNAPL-6	6/26/2022	5.45	5.5	0.05	--	
LNAPL-6	7/3/2022	5.46	5.48	0.02	--	
LNAPL-6	7/10/2022	--	5.61	--	--	
LNAPL-6	7/17/2022	5.60	5.61	0.01	--	
LNAPL-6	7/31/2022	--	5.92	--	--	
LNAPL-6	8/7/2022	6.89	6.91	0.02	--	
LNAPL-6	8/14/2022	6.90	6.94	0.04	0.8	
LNAPL-6	9/4/2022	6.85	6.88	0.03	--	
LNAPL-6	9/10/2022	6.85	6.89	0.04	--	
LNAPL-6	9/18/2022	--	7.38	--	--	
LNAPL-6	9/25/2022	6.92	7	0.08	--	
LNAPL-6	10/2/2022	6.68	6.73	0.05	--	
LNAPL-6	10/9/2022	6.53	6.85	0.32	--	
LNAPL-6	11/14/2022	--	6.25	--	--	
LNAPL-6	12/6/2022	--	6.13	--	--	
LNAPL-6	12/25/2022	--	6.13	--	--	
LNAPL-6	1/15/2023	--	5.97	--	--	
LNAPL-6	1/15/2023	--	5.97	--	--	
LNAPL-6	1/22/2023	--	5.99	--	--	

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-6	1/30/2023	--	5.45	--	--	
LNAPL-6	2/5/2023	--	5.53	--	--	
LNAPL-6	2/12/2023	--	5.75	--	--	
LNAPL-6	2/18/2023	--	5.76	--	--	
LNAPL-6	2/26/2023	--	5.65	--	--	
LNAPL-6	3/5/2023	5.84	5.87	0.03	0.3	
LNAPL-6	3/19/2023	--	5.9	--	--	
LNAPL-6	3/23/2023	--	5.64	--	--	
LNAPL-6	4/2/2023	5.41	5.45	0.04	--	
LNAPL-6	4/30/2023	4.40	4.45	0.05	--	
LNAPL-6	5/31/2023	--	4.60	--	--	
LNAPL-6	6/19/2023	--	3.83	--	--	
LNAPL-6	7/10/2023	4.45	4.47	0.02	--	
LNAPL-6	8/19/2023	--	5.22	--	--	
LNAPL-6	9/19/2023	--	5.53	--	--	
LNAPL-6	2/7/2024	--	5.61	--	--	
LNAPL-6	2/23/2024	--	5.38	--	--	Sheen
LNAPL-6	3/7/2024	--	5.22	--	--	
LNAPL-6	3/20/2024	--	5.23	--	--	Sheen
LNAPL-7	8/27/2021	--	8.14	--	--	
LNAPL-7	9/30/2021	--	6.42	--	--	
LNAPL-7	10/5/2021	--	6.29	--	--	
LNAPL-7	10/12/2021	--	6.22	--	--	
LNAPL-7	10/19/2021	--	6.16	--	--	
LNAPL-7	11/9/2021	5.98	5.99	0.01	--	
LNAPL-7	11/18/2021	6.18	6.58	0.4	--	
LNAPL-7	12/2/2021	6.18	6.58	0.4	--	
LNAPL-7	12/15/2021	6.28	6.65	0.375	--	
LNAPL-7	1/3/2022	6.32	6.77	0.45	--	
LNAPL-7	2/8/2022	6.58	6.75	0.17	--	
LNAPL-7	3/7/2022	6.57	7.18	0.61	--	
LNAPL-7	4/11/2022	6.53	7.26	0.73	--	
LNAPL-7	5/15/2022	5.90	5.91	0.01	0.9	
LNAPL-7	5/22/2022	5.73	5.74	0.01	--	
LNAPL-7	5/29/2022	--	5.7	--	--	
LNAPL-7	6/5/2022	--	5.8	--	0.5	
LNAPL-7	6/12/2022	--	5.96	--	0.6	
LNAPL-7	6/19/2022	5.85	5.87	0.02	1.0	
LNAPL-7	6/26/2022	5.40	5.45	0.05	--	
LNAPL-7	7/3/2022	--	5.5	--	0.3	
LNAPL-7	7/10/2022	--	5.67	--	0.6	
LNAPL-7	7/17/2022	--	5.45	--	0.7	
LNAPL-7	7/31/2022	--	5.9	--	0.6	
LNAPL-7	8/7/2022	6.89	6.95	0.06	--	
LNAPL-7	8/14/2022	7.05	7.08	0.03	--	
LNAPL-7	9/4/2022	6.75	7.45	0.7	0.3	
LNAPL-7	9/10/2022	6.64	7.41	0.77	0.5	
LNAPL-7	9/18/2022	6.99	7.11	0.12	0.3	
LNAPL-7	9/25/2022	--	6.51	--	0.5	
LNAPL-7	10/2/2022	6.75	7.02	0.27	0.5	
LNAPL-7	10/9/2022	6.33	6.66	0.33	0.8	
LNAPL-7	11/14/2022	6.08	6.10	0.02	0.8	
LNAPL-7	12/6/2022	--	5.95	--	1.0	
LNAPL-7	12/25/2022	5.93	5.94	0.01	0.8	
LNAPL-7	1/15/2023	--	5.38	--	1.0	
LNAPL-7	1/22/2023	5.88	5.9	0.02	0.7	
LNAPL-7	1/30/2023	--	5.43	--	0.8	
LNAPL-7	2/12/2023	--	5.5	--	1.0	
LNAPL-7	2/18/2023	--	5.55	--	0.1	
LNAPL-7	2/26/2023	--	5.46	--	0.1	
LNAPL-7	3/5/2023	5.74	5.76	0.02	0.2	
LNAPL-7	3/12/2023	--	5.92	--	1.0	
LNAPL-7	3/19/2023	--	5.52	--	0.3	
LNAPL-7	3/23/2023	--	5.63	--	--	
LNAPL-7	4/2/2023	5.43	5.45	0.02	--	
LNAPL-7	4/30/2023	4.50	4.55	0.05	--	
LNAPL-7	5/31/2023	--	4.41	--	--	
LNAPL-7	6/19/2023	--	3.72	--	--	
LNAPL-7	7/10/2023	--	4.25	--	--	
LNAPL-7	8/19/2023	--	5.10	--	--	

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-7	9/19/2023	--	5.35	--	--	
LNAPL-7	2/7/2024	--	5.4	--	--	
LNAPL-7	2/23/2024	--	5.2	--	--	Sheen
LNAPL-7	3/7/2024	--	5.02	--	--	
LNAPL-7	3/20/2024	--	5.05	--	--	Sheen
LNAPL-8	8/27/2021	--	8.1	--	--	
LNAPL-8	9/30/2021	--	6.3	--	--	
LNAPL-8	10/5/2021	--	6.2	--	--	
LNAPL-8	10/12/2021	--	6.11	--	--	
LNAPL-8	10/19/2021	--	6.05	--	--	
LNAPL-8	11/9/2021	5.88	5.9	0.02	--	
LNAPL-8	11/18/2021	6.08	6.43	0.35	--	
LNAPL-8	12/2/2021	6.08	6.46	0.38	--	
LNAPL-8	12/15/2021	6.18	6.55	0.37	--	
LNAPL-8	1/3/2022	6.28	6.37	0.09	--	
LNAPL-8	2/8/2022	6.50	6.59	0.09	--	
LNAPL-8	2/25/2022	6.47	6.98	0.51	--	
LNAPL-8	3/7/2022	6.45	7.10	0.65	--	
LNAPL-8	4/11/2022	6.46	7.07	0.61	--	
LNAPL-8	5/15/2022	5.82	5.83	0.01	0.6	
LNAPL-8	5/22/2022	--	5.65	--	--	
LNAPL-8	5/29/2022	5.75	5.8	0.05	--	
LNAPL-8	6/5/2022	5.75	5.76	0.01	0.3	
LNAPL-8	6/12/2022	--	5.96	--	0.8	
LNAPL-8	6/19/2022	5.77	5.8	0.03	--	
LNAPL-8	6/26/2022	--	5.4	--	--	
LNAPL-8	7/3/2022	--	5.67	--	0.8	
LNAPL-8	7/10/2022	--	5.61	--	0.4	
LNAPL-8	7/17/2022	--	5.33	--	0.3	
LNAPL-8	7/31/2022	--	5.92	--	0.8	
LNAPL-8	8/7/2022	6.84	6.88	0.04	0.1	
LNAPL-8	8/14/2022	7.21	7.25	0.04	--	
LNAPL-8	9/4/2022	6.68	7.25	0.57	--	
LNAPL-8	9/10/2022	6.38	7.17	0.79	--	
LNAPL-8	9/18/2022	--	6.98	--	--	
LNAPL-8	9/25/2022	--	6.28	--	1.0	
LNAPL-8	10/2/2022	6.69	6.96	0.27	0.8	
LNAPL-8	10/9/2022	6.24	6.57	0.33	0.5	
LNAPL-8	11/14/2022	--	6.10	--	0.8	
LNAPL-8	12/6/2022	--	5.86	--	1.0	
LNAPL-8	12/25/2022	--	5.84	--	0.5	
LNAPL-8	1/15/2023	--	5.74	--	--	
LNAPL-8	1/22/2023	5.88	5.9	0.02	0.6	
LNAPL-8	1/30/2023	--	5.4	--	--	
LNAPL-8	2/5/2023	--	5.6	--	0.5	
LNAPL-8	2/12/2023	--	5.44	--	--	
LNAPL-8	2/18/2023	--	5.43	--	0.8	
LNAPL-8	2/26/2023	5.37	5.38	0.01	--	
LNAPL-8	3/5/2023	5.82	5.84	0.02	0.2	
LNAPL-8	3/12/2023	5.83	5.84	0.01	--	
LNAPL-8	3/19/2023	--	5.52	--	0.3	
LNAPL-8	3/23/2023	5.43	5.44	0.01	--	
LNAPL-8	4/2/2023	5.46	5.47	0.01	--	
LNAPL-8	4/30/2023	4.30	4.40	0.10	--	
LNAPL-8	5/31/2023	--	4.31	--	--	
LNAPL-8	6/19/2023	--	3.63	--	--	
LNAPL-8	7/10/2023	--	4.17	--	--	
LNAPL-8	8/19/2023	--	4.95	--	--	
LNAPL-8	9/19/2023	--	5.27	--	--	
LNAPL-8	2/7/2024	--	5.32	--	--	
LNAPL-8	2/23/2024	--	5.11	--	--	Sheen
LNAPL-8	3/7/2024	--	4.95	--	--	
LNAPL-8	3/20/2024	--	4.96	--	--	Sheen
LNAPL-9	8/27/2021	--	8.09	--	--	
LNAPL-9	9/30/2021	--	6.33	--	--	
LNAPL-9	10/5/2021	--	6.23	--	--	
LNAPL-9	10/12/2021	--	6.16	--	--	
LNAPL-9	10/19/2021	6.11	6.12	0.01	--	
LNAPL-9	10/22/2021	--	6.12	--	--	
LNAPL-9	10/25/2021	--	6.09	--	--	

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-9	10/28/2021	--	6.1	--	--	
LNAPL-9	11/4/2021	--	6.15	--	--	
LNAPL-9	11/9/2021	6.05	6.09	0.04	--	
LNAPL-9	11/18/2021	6.17	6.20	0.035	--	
LNAPL-9	12/2/2021	6.17	6.31	0.14	--	
LNAPL-9	12/15/2021	6.27	6.40	0.13	--	
LNAPL-9	1/3/2022	--	6.42	--	--	
LNAPL-9	2/8/2022	--	6.56	--	--	
LNAPL-9	5/15/2022	--	5.71	--	--	Sheen
LNAPL-9	5/22/2022	--	5.7	--	--	
LNAPL-9	5/29/2022	--	5.7	--	--	
LNAPL-9	6/5/2022	--	5.76	--	--	
LNAPL-9	6/12/2022	--	5.72	--	--	
LNAPL-9	6/19/2022	5.80	5.82	0.02	--	
LNAPL-9	6/26/2022	--	5.4	--	--	
LNAPL-9	7/3/2022	--	5.29	--	--	
LNAPL-9	7/10/2022	--	5.39	--	--	
LNAPL-9	7/17/2022	5.34	5.36	0.02	--	
LNAPL-9	7/31/2022	--	5.7	--	--	
LNAPL-9	8/7/2022	6.68	6.72	0.04	--	
LNAPL-9	8/14/2022	7.70	7.75	0.05	--	
LNAPL-9	9/4/2022	6.62	6.76	0.14	--	
LNAPL-9	9/10/2022	6.60	6.8	0.2	--	
LNAPL-9	9/18/2022	--	6.83	--	--	
LNAPL-9	9/25/2022	--	6.67	--	--	
LNAPL-9	10/2/2022	6.45	6.75	0.3	--	
LNAPL-9	10/9/2022	6.30	6.62	0.32	--	
LNAPL-9	11/14/2022	--	6.04	--	--	
LNAPL-9	12/6/2022	--	5.91	--	--	
LNAPL-9	2/5/2023	--	5.62	--	--	
LNAPL-9	2/26/2023	--	5.42	--	--	
LNAPL-9	3/5/2023	--	5.86	--	--	
LNAPL-9	3/23/2023	--	5.45	--	--	
LNAPL-9	4/2/2023	5.55	5.58	0.03	--	
LNAPL-9	5/31/2023	--	4.36	--	--	
LNAPL-9	6/19/2023	--	3.66	--	--	
LNAPL-9	7/10/2023	--	3.25	--	--	
LNAPL-9	8/19/2023	--	5.00	--	--	
LNAPL-9	9/19/2023	--	5.30	--	--	
LNAPL-9	2/7/2024	--	5.37	--	--	
LNAPL-9	2/23/2024	--	5.16	--	--	
LNAPL-9	3/7/2024	--	4.98	--	--	
LNAPL-9	3/20/2024	--	4.98	--	--	
LNAPL-10	8/27/2021	--	8.11	--	--	
LNAPL-10	9/30/2021	6.31	6.36	0.05	--	
LNAPL-10	10/5/2021	6.14	6.59	0.45	--	
LNAPL-10	10/12/2021	6.15	6.64	0.49	--	
LNAPL-10	10/14/2021	6.05	6.49	0.44	--	
LNAPL-10	10/19/2021	6.05	6.42	0.37	--	
LNAPL-10	10/20/2021	6.04	6.22	0.18	--	
LNAPL-10	10/21/2021	6.15	6.23	0.08	--	
LNAPL-10	10/22/2021	6.09	6.18	0.09	--	
LNAPL-10	10/25/2021	6.02	6.18	0.16	--	
LNAPL-10	10/28/2021	6.05	6.28	0.23	--	
LNAPL-10	11/4/2021	5.98	6.26	0.28	--	
LNAPL-10	11/9/2021	6.04	6.35	0.31	--	
LNAPL-10	11/18/2021	6.08	6.45	0.375	--	
LNAPL-10	12/2/2021	6.09	6.62	0.53	--	
LNAPL-10	12/15/2021	6.19	6.64	0.45	--	
LNAPL-10	1/3/2022	6.24	6.75	0.51	--	
LNAPL-10	2/8/2022	6.47	7.05	0.585	--	
LNAPL-10	2/25/2022	6.43	7.33	0.9	--	
LNAPL-10	3/7/2022	6.47	7.10	0.63	--	
LNAPL-10	4/11/2022	6.52	7.19	0.67	--	
LNAPL-10	5/15/2022	5.90	5.91	0.01	1.0	
LNAPL-10	5/22/2022	5.69	5.7	0.01	--	
LNAPL-10	5/29/2022	5.62	5.65	0.03	--	
LNAPL-10	6/5/2022	--	5.89	--	1.0	
LNAPL-10	6/12/2022	6.00	6.03	0.03	0.8	
LNAPL-10	6/19/2022	5.76	6	0.24	0.8	

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-10	6/26/2022	--	5.35	--	--	
LNAPL-10	7/3/2022	5.45	5.48	0.03	0.8	
LNAPL-10	7/10/2022	5.62	5.63	0.01	0.6	
LNAPL-10	7/17/2022	5.37	5.39	0.02	0.7	
LNAPL-10	7/31/2022	6.00	6.01	0.01	0.8	
LNAPL-10	8/7/2022	6.91	7.15	0.24	0.6	
LNAPL-10	8/14/2022	7.61	7.8	0.19	--	
LNAPL-10	9/4/2022	6.70	7.3	0.6	0.4	
LNAPL-10	9/10/2022	6.51	7.21	0.7	0.8	
LNAPL-10	9/18/2022	7.08	7.18	0.1	0.3	
LNAPL-10	9/25/2022	--	6.34	--	0.5	
LNAPL-10	10/2/2022	6.88	7.09	0.21	0.6	
LNAPL-10	10/9/2022	6.30	6.61	0.31	0.8	
LNAPL-10	11/14/2022	--	6.10	--	0.5	
LNAPL-10	12/6/2022	--	5.96	--	1.0	
LNAPL-10	12/25/2022	--	5.9	--	0.3	
LNAPL-10	1/15/2023	--	5.72	--	1.0	
LNAPL-10	1/22/2023	--	5.94	--	0.3	
LNAPL-10	1/30/2023	--	5.44	--	0.4	
LNAPL-10	2/12/2023	5.60	5.62	0.02	1.0	
LNAPL-10	2/18/2023	--	5.47	--	0.7	
LNAPL-10	2/26/2023	5.41	5.42	0.01	0.3	
LNAPL-10	3/5/2023	--	5.8	--	--	
LNAPL-10	3/12/2023	--	5.71	--	1.0	
LNAPL-10	3/19/2023	--	5.52	--	0.3	
LNAPL-10	3/23/2023	--	5.4	--	--	
LNAPL-10	5/31/2023	--	4.35	--	--	
LNAPL-10	6/19/2023	--	3.65	--	--	
LNAPL-10	7/10/2023	--	4.19	--	--	
LNAPL-10	8/19/2023	--	4.95	--	--	
LNAPL-10	9/19/2023	--	5.30	--	--	
LNAPL-10	2/7/2024	--	5.35	--	--	
LNAPL-10	2/23/2024	--	5.15	--	--	
LNAPL-10	3/7/2024	--	4.98	--	--	
LNAPL-10	3/20/2024	--	4.99	--	--	Sheen
LNAPL-11	8/27/2021	--	8.2	--	--	
LNAPL-11	9/30/2021	--	6.52	--	--	
LNAPL-11	10/5/2021	6.29	6.3	0.01	--	
LNAPL-11	10/12/2021	--	6.34	--	--	
LNAPL-11	10/19/2021	6.22	6.63	0.41	--	
LNAPL-11	10/20/2021	6.32	6.35	0.03	--	
LNAPL-11	10/21/2021	6.4	6.41	0.01	--	
LNAPL-11	10/22/2021	--	6.3	--	--	Sheen
LNAPL-11	10/25/2021	6.22	6.25	0.03	--	
LNAPL-11	10/28/2021	6.25	6.38	0.13	--	
LNAPL-11	11/4/2021	6.2	6.4	0.2	--	
LNAPL-11	11/9/2021	6.21	6.45	0.24	--	
LNAPL-11	11/18/2021	6.26	6.53	0.27	--	
LNAPL-11	12/2/2021	6.28	6.68	0.4	--	
LNAPL-11	12/15/2021	6.38	6.78	0.405	--	
LNAPL-11	1/3/2022	6.42	6.88	0.46	--	
LNAPL-11	2/8/2022	6.73	7.29	0.56	--	
LNAPL-11	2/25/2022	6.61	7.39	0.78	--	
LNAPL-11	3/7/2022	6.63	7.43	0.8	--	
LNAPL-11	4/11/2022	6.70	7.43	0.73	--	
LNAPL-11	5/15/2022	6.12	6.5	0.38	0.5	
LNAPL-11	5/22/2022	--	5.86	--	--	
LNAPL-11	5/29/2022	--	5.9	--	--	
LNAPL-11	6/5/2022	--	6.09	--	1.0	
LNAPL-11	6/12/2022	6.21	6.25	0.04	0.5	
LNAPL-11	6/19/2022	5.94	6.18	0.24	0.8	
LNAPL-11	6/26/2022	--	5.5	--	--	
LNAPL-11	7/3/2022	5.56	5.58	0.02	0.9	
LNAPL-11	7/10/2022	--	5.83	--	1.0	
LNAPL-11	7/17/2022	5.55	5.57	0.02	0.7	
LNAPL-11	7/31/2022	6.10	6.2	0.1	0.5	
LNAPL-11	8/7/2022	7.15	7.16	0.01	0.7	
LNAPL-11	8/14/2022	7.82	7.86	0.04	--	
LNAPL-11	9/4/2022	7.19	7.6	0.41	0.7	
LNAPL-11	9/10/2022	6.58	7.2	0.62	0.8	

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-11	9/18/2022	7.34	7.38	0.04	0.1	
LNAPL-11	9/25/2022	--	6.56	--	0.5	
LNAPL-11	10/2/2022	7.21	7.34	0.13	0.7	
LNAPL-11	10/9/2022	6.46	6.76	0.3	0.5	
LNAPL-11	11/14/2022	--	6.10	--	0.5	
LNAPL-11	12/6/2022	--	6.03	--	0.8	
LNAPL-11	12/25/2022	--	6.06	--	0.3	
LNAPL-11	1/15/2023	--	5.89	--	--	
LNAPL-11	1/22/2023	--	6.07	--	0.4	
LNAPL-11	1/30/2023	5.56	5.58	0.02	0.5	
LNAPL-11	2/12/2023	5.60	5.62	0.02	1.0	
LNAPL-11	2/18/2023	5.62	5.65	0.03	0.5	
LNAPL-11	2/26/2023	5.58	5.6	0.02	--	
LNAPL-11	3/5/2023	--	5.77	--	--	
LNAPL-11	3/12/2023	--	5.83	--	--	
LNAPL-11	3/19/2023	--	5.63	--	0.3	
LNAPL-11	3/23/2023	--	5.19	--	--	
LNAPL-11	4/2/2023	5.55	5.56	0.01	--	
LNAPL-11	4/30/2023	4.30	4.35	0.05	--	
LNAPL-11	5/31/2023	--	4.51	--	--	
LNAPL-11	6/19/2023	--	3.81	--	--	
LNAPL-11	7/10/2023	--	4.34	--	--	
LNAPL-11	8/19/2023	--	5.12	--	--	
LNAPL-11	9/19/2023	--	5.50	--	--	
LNAPL-11	2/7/2024	--	5.55	--	--	
LNAPL-11	2/23/2024	--	5.3	--	--	Sheen
LNAPL-11	3/7/2024	--	5.15	--	--	
LNAPL-11	3/20/2024	--	5.18	--	--	Sheen
LNAPL-12	8/14/2022	--	6.92	--	--	
LNAPL-12	8/20/2022	--	6.81	--	--	
LNAPL-12	9/4/2022	--	6.71	--	--	
LNAPL-12	9/10/2022	--	6.71	--	--	
LNAPL-12	9/18/2022	--	6.95	--	--	
LNAPL-12	9/25/2022	--	6.85	--	--	
LNAPL-12	10/2/2022	--	6.64	--	--	
LNAPL-12	10/9/2022	--	6.52	--	--	
LNAPL-12	11/14/2022	--	6.12	--	--	
LNAPL-12	12/6/2022	--	6.01	--	--	
LNAPL-12	2/26/2023	--	5.59	--	--	
LNAPL-12	3/5/2023	--	5.81	--	--	
LNAPL-12	3/23/2023	--	5.67	--	--	
LNAPL-12	5/31/2023	--	4.45	--	--	
LNAPL-12	6/19/2023	--	3.75	--	--	
LNAPL-12	7/10/2023	--	4.39	--	--	
LNAPL-12	8/19/2023	--	5.14	--	--	
LNAPL-12	9/19/2023	--	5.48	--	--	
LNAPL-12	2/7/2024	--	5.53	--	--	
LNAPL-12	2/23/2024	--	5.3	--	--	
LNAPL-12	3/7/2024	--	5.17	--	--	
LNAPL-12	3/20/2024	--	5.16	--	--	Sheen
LNAPL-13	8/14/2022	--	6.88	--	--	
LNAPL-13	8/20/2022	--	6.82	--	--	
LNAPL-13	9/4/2022	--	6.69	--	--	
LNAPL-13	9/10/2022	--	6.7	--	--	
LNAPL-13	9/18/2022	--	6.83	--	--	
LNAPL-13	9/25/2022	--	6.81	--	--	
LNAPL-13	10/2/2022	--	6.62	--	--	
LNAPL-13	10/9/2022	--	6.52	--	--	
LNAPL-13	11/14/2022	--	6.11	--	--	
LNAPL-13	12/6/2022	--	5.98	--	--	
LNAPL-13	2/26/2023	--	5.57	--	--	
LNAPL-13	3/5/2023	--	5.78	--	--	
LNAPL-13	3/23/2023	--	5.54	--	--	
LNAPL-13	5/31/2023	--	4.45	--	--	
LNAPL-13	6/19/2023	--	3.75	--	--	
LNAPL-13	7/10/2023	--	4.39	--	--	
LNAPL-13	8/19/2023	--	5.15	--	--	
LNAPL-13	9/19/2023	--	5.48	--	--	
LNAPL-13	2/7/2024	--	5.5	--	--	
LNAPL-13	2/23/2024	--	5.26	--	--	

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-13	3/7/2024	--	5.13	--	--	
LNAPL-13	3/20/2024	--	5.14	--	--	
LNAPL-14	8/14/2022	--	6.93	--	--	
LNAPL-14	8/20/2022	--	6.85	--	--	
LNAPL-14	9/4/2022	--	6.74	--	--	
LNAPL-14	9/10/2022	--	6.73	--	--	
LNAPL-14	9/18/2022	--	7.13	--	--	
LNAPL-14	9/25/2022	--	7.02	--	--	
LNAPL-14	10/2/2022	--	6.66	--	--	
LNAPL-14	10/9/2022	--	6.55	--	--	
LNAPL-14	11/14/2022	--	6.15	--	--	
LNAPL-14	12/6/2022	--	6.04	--	--	
LNAPL-14	2/26/2023	--	5.62	--	--	
LNAPL-14	3/5/2023	--	5.8	--	--	
LNAPL-14	3/23/2023	--	5.5	--	--	
LNAPL-14	5/31/2023	--	4.48	--	--	
LNAPL-14	6/19/2023	--	3.75	--	--	
LNAPL-14	7/10/2023	--	4.43	--	--	
LNAPL-14	8/19/2023	--	5.19	--	--	
LNAPL-14	9/19/2023	--	5.47	--	--	
LNAPL-14	2/7/2024	--	5.53	--	--	
LNAPL-14	2/23/2024	--	5.3	--	--	
LNAPL-14	3/7/2024	--	5.15	--	--	
LNAPL-14	3/20/2024	--	5.13	--	--	
LNAPL-15	8/14/2022	--	6.93	--	--	
LNAPL-15	8/20/2022	--	6.82	--	--	
LNAPL-15	9/4/2022	--	6.73	--	--	
LNAPL-15	9/10/2022	--	6.72	--	--	
LNAPL-15	9/18/2022	--	7.24	--	--	
LNAPL-15	9/25/2022	--	6.84	--	--	
LNAPL-15	10/2/2022	--	6.65	--	--	
LNAPL-15	10/9/2022	--	6.53	--	--	
LNAPL-15	11/14/2022	--	6.14	--	--	
LNAPL-15	12/6/2022	--	5.99	--	--	
LNAPL-15	2/26/2023	--	5.6	--	--	
LNAPL-15	3/5/2023	--	5.77	--	--	
LNAPL-15	3/23/2023	--	5.49	--	--	
LNAPL-15	5/31/2023	--	4.45	--	--	
LNAPL-15	6/19/2023	--	3.73	--	--	
LNAPL-15	7/10/2023	--	4.41	--	--	
LNAPL-15	8/19/2023	--	5.22	--	--	
LNAPL-15	9/19/2023	--	5.42	--	--	
LNAPL-15	2/7/2024	--	5.52	--	--	
LNAPL-15	2/23/2024	--	5.3	--	--	
LNAPL-15	3/7/2024	--	5.13	--	--	
LNAPL-15	3/20/2024	--	5.14	--	--	
LNAPL-16	8/14/2022	--	6.92	--	--	
LNAPL-16	8/20/2022	--	6.83	--	--	
LNAPL-16	9/4/2022	--	6.72	--	--	
LNAPL-16	9/10/2022	--	6.72	--	--	
LNAPL-16	9/18/2022	--	6.91	--	--	
LNAPL-16	9/25/2022	--	6.83	--	--	
LNAPL-16	10/2/2022	--	6.66	--	--	
LNAPL-16	10/9/2022	--	6.52	--	--	
LNAPL-16	11/14/2022	--	6.12	--	--	
LNAPL-16	12/6/2022	--	5.97	--	--	
LNAPL-16	2/26/2023	--	5.6	--	--	
LNAPL-16	3/5/2023	--	5.82	--	--	
LNAPL-16	3/23/2023	--	5.45	--	--	
LNAPL-16	5/31/2023	--	4.47	--	--	
LNAPL-16	6/19/2023	--	3.73	--	--	
LNAPL-16	7/10/2023	--	4.40	--	--	
LNAPL-16	8/19/2023	--	5.22	--	--	
LNAPL-16	9/19/2023	--	5.44	--	--	
LNAPL-16	2/7/2024	--	5.5	--	--	
LNAPL-16	2/23/2024	--	5.27	--	--	Sheen
LNAPL-16	3/7/2024	--	5.11	--	--	
LNAPL-16	3/20/2024	--	5.12	--	--	Sheen
LNAPL-17	8/14/2022	--	6.9	--	--	
LNAPL-17	8/20/2022	--	6.79	--	--	

Table 5
Fluid Level Measurements at LNAPL Wells
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	LNAPL Thickness (ft)	Fluid Recovery (gal)	Notes
LNAPL-17	9/4/2022	--	6.68	--	--	
LNAPL-17	9/10/2022	--	6.67	--	--	
LNAPL-17	9/18/2022	--	6.87	--	--	
LNAPL-17	9/25/2022	--	6.95	--	--	
LNAPL-17	10/2/2022	--	6.62	--	--	
LNAPL-17	10/9/2022	--	6.51	--	--	
LNAPL-17	11/14/2022	--	6.10	--	--	
LNAPL-17	12/6/2022	--	6.02	--	--	
LNAPL-17	2/26/2023	--	5.57	--	--	
LNAPL-17	3/5/2023	--	5.75	--	--	
LNAPL-17	3/23/2023	--	6.63	--	--	
LNAPL-17	5/31/2023	--	4.42	--	--	
LNAPL-17	6/19/2023	--	3.64	--	--	
LNAPL-17	7/10/2023	--	4.39	--	--	
LNAPL-17	8/19/2023	--	5.19	--	--	
LNAPL-17	9/19/2023	--	5.50	--	--	
LNAPL-17	2/7/2024	--	5.44	--	--	
LNAPL-17	2/23/2024	--	5.23	--	--	Sheen
LNAPL-17	3/7/2024	--	5.08	--	--	
LNAPL-17	3/20/2024	--	5.09	--	--	

Notes:

DTP	Depth to Product
DTW	Depth to Water
ft BTOC	Below Top of Casing
LNAPL	light non-aqueous phase liquid
NA	Reading not collected
--	LNAPL was not present/No LNAPL Recovery

Table 6
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location		Montana DEQ-7	Montana DEQ	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S
Field Sample ID		Human Health	Tier 1	CMR-MW41S-200622	CMR-MW41S-200826	CMR-MW41S-210219	CMR-MW41S-211005	CMR-MW141S-220317	MW41S-GW-220622	CMR-MW41S-220831	CMR-MW-41S-221213-L1569525	MW-041S
Lab Sample ID		Standards -	Groundwater	VF24007-001	VH28044-002	WB24062-035	WJ08015-001	XC21009-002	XF23073-001	XI01059-003	XL14017-003	MW-041S
Sample Method		Groundwater	RBSLs	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date				6/22/2020	8/26/2020	2/19/2021	10/5/2021	3/17/2022	6/22/2022	8/31/2022	12/13/2022	
Comments												
VOC												
	Acetone			220 (40)	U (80)	94 J (80)	U (80)	76 (20)	HU (80)	88 (4)	35 J (20)	
	Benzene	5	5	<u>1000 (4)</u>	<u>1500 (8)</u>	<u>980 (8)</u>	<u>1900 (8)</u>	<u>230 (2)</u>	<u>1200 H (8)</u>	<u>140 (0.4)</u>	<u>250 (2)</u>	
	Bromoform	80		U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	U (0.4)	U (2)	
	2-Butanone			89 J (20)	U (40)	U (40)	U (40)	28 J (10)	HU (40)	16 (2)	14 J (10)	
	n-Butylbenzene			---	---	---	---	---	---	---	---	
	sec-Butylbenzene			---	---	---	---	---	---	---	---	
	tert-Butylbenzene			---	---	---	---	---	---	---	---	
	Carbon Disulfide			U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	4.2 (0.4)	U (2)	
	Chloroform	70		4 J (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	U (0.4)	U (2)	
	Chloromethane	600		U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	U (0.4)	U (2)	
	Cumene			10 (4)	11 (8)	U (8)	14 (8)	U (2)	16 H (8)	0.57 (0.4)	U (2)	
	Cyclohexane			24 (4)	77 J (8)	97 (8)	110 (8)	15 (2)	22 H (8)	27 (0.4)	33 (2)	
	p-Cymene			---	---	---	---	---	---	---	---	
	cis-1,2-Dichloroethene	70		U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	0.48 J (0.4)	U (2)	
	Ethyl Benzene	700	700	370 (4)	250 (8)	67 (8)	450 (8)	15 (2)	410 H (8)	21 (0.4)	50 (2)	
	n-Hexane			---	---	---	---	---	---	---	---	
	Iodomethane			---	---	---	---	---	---	---	---	
	4-Methyl-2-pentanone			U (20)	U (40)	U (40)	U (40)	U (10)	HU (40)	2.4 J (2)	U (10)	
	Methylcyclohexane			11 J (4)	34 J (8)	53 J (8)	57 J (8)	9.4 J (2)	12 (8)	18 (0.4)	34 (2)	
	Methylene Chloride	5		U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	U (0.4)	U (2)	
	Naphthalene	100	100	31 (4)	26 (8)	9.5 J (8)	35 (8)	31 (2)	77 H (8)	3.4 (0.4)	27 (2)	
	n-Propylbenzene			---	---	---	---	---	---	---	---	
	Styrene	100		U (4.1)	U (8.2)	U (8.2)	U (8.2)	U (2.1)	HU (8.2)	U (0.41)	U (2.1)	
	Toluene	1000	1000	82 (4)	12 (8)	11 (8)	270 (8)	44 (2)	180 H (8)	11 (0.4)	9.5 (2)	
	1,1,2-Trichloroethane	3		U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	U (0.4)	U (2)	
	1,2,3-Trimethylbenzene			---	---	---	---	---	---	---	---	
	1,2,4-Trimethylbenzene			---	---	---	---	---	---	---	---	
	1,3,5-Trimethylbenzene			---	---	---	---	---	---	---	---	
	m,p-xylene			550 (4)	370 (8)	220 (8)	640 (8)	580 (2)	2000 H (8)	150 (0.4)	730 (2)	
	ortho-xylene	10000		67 (4)	16 (8)	10 (8)	200 (8)	300 (2)	750 H (8)	67 (0.4)	300 (2)	
	Xylenes (total)	10000	10000	620 (4)	390 (8)	230 (8)	840 (8)	870 (2)	2700 H (8)	220 (0.4)	1000 (2)	
SVOC												
	Acenaphthene	70	70	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	U (0.04)	U (0.8)	
	Acenaphthylene			U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	U (0.04)	U (0.8)	
	Benzo(a)anthracene	0.5	0.5	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	U (0.04)	U (0.8)	
	Benzo(a)pyrene	0.05	0.05	U (0.7)	U (0.7)	U (0.7)	U (0.35)	U (1.4)	U (3.5)	U (0.04)	U (0.8)	
	Benzo(b)fluoranthene	0.5	0.5	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	U (0.04)	U (0.8)	
	Benzo(g,h,i)perylene			U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	U (0.04)	U (0.8)	
	1,1-Biphenyl			---	---	---	---	---	---	U (0.21)	U (4.2)	
	bis(2-Ethylhexyl)phthalate	6		11 BJ (5)	U (5)	U (5)	U (5)	U (40)	U (100)	3.8 BJ (1.5)	U (30)	
	Chrysene	50	50	U (0.3)	U (0.3)	U (0.3)	U (0.15)	U (0.6)	U (1.5)	U (0.04)	U (0.8)	
	Dibenzofuran			U (5)	U (5)	U (5)	U (2.5)	U (10)	U (25)	U (0.16)	U (3.2)	
	Diethylphthalate	600		U (5)	U (5)	U (5)	U (2.5)	U (10)	U (25)	U (0.19)	U (3.8)	
	2,4-Dimethylphenol	100		84 (4.8)	U (4.8)	24 (4.8)	U (2.4)	160 (9.6)	36 J (24)	U (0.15)	100 (3)	
	Di-n-butylphthalate	20		6.1 BJ (5)	U (5)	U (5)	U (2.5)	U (10)	U (25)	U (0.42)	U (8.4)	
	Fluoranthene	20	20	U (1)	U (1)	U (1)	U (0.5)	U (2)	U (5)	U (0.04)	U (0.8)	
	Fluorene	50	50	U (0.3)	U (0.3)	U (0.3)	0.63 BJ (0.15)	U (0.6)	2.3 J (1.5)	U (0.04)	U (0.8)	
	Indeno(1,2,3-cd)pyrene	0.5	0.5	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	U (0.04)	U (0.8)	
	1-Methylnaphthalene		11	---	---	---	---	---	---	0.065 J (0.04)	<u>12 (0.8)</u>	
	2-Methylnaphthalene		36	5.4 (0.4)	0.41 J (0.4)	0.5 J (0.4)	1.7 B (0.2)	7.7 (0.8)	33 (2)	0.11 J (0.04)	6.7 (0.8)	
	2-Methylphenol			U (2.1)	U (2.1)	U (2.1)	U (1.1)	U (4.2)	U (11)	U (0.21)	U (4.2)	
	Naphthalene	100	100	24 B (0.5)	7.1 (0.5)	10 (0.5)	15 B (0.25)	18 (1)	60 (2.5)	U (0.04)	19 (0.8)	
	Phenanthrene			U (0.6)	U (0.6)	U (0.6)	U (0.3)	U (1.2)	U (3)	U (0.04)	U (0.8)	
	Phenol	4000		53 (5)	61 (5)	34 (5)	5.6 (2.5)	15 J (10)	U (25)	U (0.19)	9.1 J (3.8)	
	Pyrene	20	20	U (1)	U (1)	U (1)	U (0.5)	U (2)	U (5)	U (0.04)	U (0.8)	

Table 6
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location		MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S
Field Sample ID	Montana DEQ-7	Montana DEQ	CMR-MW41S-200622	CMR-MW41S-200826	CMR-MW41S-210219	CMR-MW41S-211005	CMR-MW141S-220317	MW41S-GW-220622	CMR-MW41S-220831	CMR-MW-41S-221213-L1569525	MW-041S
Lab Sample ID	Human Health	Tier 1	VF24007-001	VH28044-002	WB24062-035	WJ08015-001	XC21009-002	XF23073-001	XI01059-003	XL14017-003	
Sample Method	Standards -	Groundwater	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	
Sample Date	Groundwater	RBSLs	6/22/2020	8/26/2020	2/19/2021	10/5/2021	3/17/2022	6/22/2022	8/31/2022	12/13/2022	
Comments											
MTDEQ VPH											
	C5-C8 Aliphatics (Unadjusted)	650	---	---	---	---	---	---	1460 (33.3)	1050 (33.3)	
	C5-C8 Aliphatics (Adjusted)	650	---	---	---	---	---	---	---	---	
	C5-C8 Aliphatics	650	680 J (150)	2700 (300)	2200 (300)	1500 (150)	460 J (150)	990 (150)	1140 (33.3)	1040 (33.3)	
	C9-C12 Aliphatics (Unadjusted)	1400	---	---	---	---	---	---	1200 (33.3)	2060 (33.3)	
	C9-C12 Aliphatics (Adjusted)	1400	---	---	---	---	---	---	---	---	
	C9-C12 Aliphatics	1400	1700 (150)	740 J (300)	510 J (300)	370 J (150)	730 J (150)	710 J (150)	625 (33.3)	405 (33.3)	
	C9-C10 Aromatics (Unadjusted)	1100	---	---	---	---	---	---	530 (33.3)	1570 (33.3)	
	C9-C10 Aromatics	1100	1100 (50)	2400 (100)	730 (100)	990 (50)	810 (50)	3100 (50)	---	---	
	Volatile Petroleum Hydrocarbons		---	---	---	---	---	---	---	---	
	Petroleum Hydrocarbons (Total)		5000 (350)	10000 (700)	3600 (700)	6300 (350)	3100 (350)	9800 (350)	3190 (66.7)	5170 (66.7)	
MTDEQ EPH											
	C9-C18 Aliphatics	1400	U (320)	U (100)	U (110)	---	---	990 (100)	---	---	
	C19-C36 Aliphatics unadjusted	1000	---	---	---	---	---	---	---	---	
	C19-C36 Aliphatics	1000	U (320)	U (100)	U (110)	---	---	U (100)	---	---	
	C11 through C22 Aromatics (Unadjusted)	1100	---	---	---	---	---	---	---	375 (200)	
	C11 through C22 Aromatics (Adjusted)	1100	---	---	---	---	---	---	---	---	
	C11-C22 Aromatics	1100	U (320)	100 (100)	3200 (110)	---	---	4000 (100)	---	375 (200)	
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS			---	---	---	---	---	---	---	375 (200)	
	Petroleum Hydrocarbons (Total)		---	---	---	---	---	---	---	375 (200)	
	Petroleum Hydrocarbons (Extractable)		4300 (650)	3100 (210)	4700 (210)	---	---	5700 (2000)	5560 (500)	---	
	Total Petroleum Hydrocarbons (GC/FID)		---	---	---	---	---	---	---	---	
	Extractable Petroleum Hydrocarbons (Frac)		U (320)	120 J (100)	3300 (110)	---	---	5000 B (100)	---	4460 Q (100)	

- Notes:**
- All concentrations are presented in ug/L.
 - Only compounds with at least one detection are shown.
 - Concentrations that exceed the Montana DEQ-7 Human Health Standards - Groundwater are **boldfaced**.
 - Concentrations that exceed the Montana DEQ Tier 1 Groundwater RBSLs are underlined.
- Abbreviations:**
- U -- Not Detected.
 - J -- Estimated Concentration.
 - () -- Reporting Detection Limit.
 - -- Not Analyzed.

Table 6
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location Field Sample ID Lab Sample ID Sample Method Sample Date Comments	Montana DEQ-7	Montana DEQ	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-105	MW-105	MW-105
	Montana DEQ-7	Montana DEQ	CMR-MW-415-230321	CMR-MW-41S-270623	CMR-MW-41S-092023	CMR-MW-415-231207	CMR-MW-41S-240228	CMR-MW105-200827	CMR-MW105-210223	CMR-MW105S-211006	
	Human Health	Tier 1	YC22023-003	YF29005-005	YI21013-003	L1685777-03	L1710780-01	VH28044-018	WB25040-009	WJ08015-002	
	Standards -	Groundwater	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	
	Groundwater	RBSLs	3/21/2023	6/27/2023	9/20/2023	12/7/2023	2/28/2024	8/27/2020	2/23/2021	10/6/2021	
VOC											
Acetone			U (20)	40 H (4)	U (200)	23.2 J (11.3)	U (11.3)	43 J (40)	65 J (40)	58 H (20)	
Benzene	5	5	130 (0.4)	410 (2)	470 (20)	535 (1.88)	199 (0.0941)	570 (4)	240 (4)	250 H (2)	
Bromoform	80		U (0.4)	U (2)	U (20)	U (0.129)	U (0.129)	U (4)	U (4)	U (0.4)	
2-Butanone			U (2)	18 H (2)	U (100)	U (1.19)	U (1.19)	U (20)	U (20)	17 (2)	
n-Butylbenzene			---	---	---	6.9 (0.157)	U (0.157)	---	---	---	
sec-Butylbenzene			---	---	---	8.12 (0.125)	0.801 (0.125)	---	---	---	
tert-Butylbenzene			---	---	---	U (0.127)	0.149 J (0.127)	---	---	---	
Carbon Disulfide			U (0.4)	U (2)	U (20)	0.363 J (0.0962)	U (0.0962)	U (4)	U (4)	HU (2)	
Chloroform	70		U (0.4)	U (2)	U (20)	U (0.111)	U (0.111)	U (4)	U (4)	U (0.4)	
Chloromethane	600		U (0.4)	U (2)	U (20)	U (0.96)	U (0.96)	U (4)	U (4)	U (0.4)	
Cumene			0.55 (0.4)	5.6 (2)	U (20)	8.52 (0.105)	0.975 (0.105)	5.4 (4)	5.5 (4)	2.4 (0.4)	
Cyclohexane			18 (2)	17 (2)	45 (20)	---	---	55 J (4)	70 (4)	59 (0.4)	
p-Cymene			---	---	---	6.35 (0.12)	2.96 (0.12)	---	---	---	
cis-1,2-Dichloroethene	70		U (0.4)	U (2)	U (20)	U (0.126)	U (0.126)	U (4)	U (4)	U (0.4)	
Ethyl Benzene	700	700	16 (0.4)	150 (2)	170 (20)	191 (2.74)	21.9 (0.137)	320 (4)	160 (4)	150 (0.4)	
n-Hexane			---	---	---	U (0.749)	U (0.749)	---	---	---	
Iodomethane			---	---	---	2.19 B J (0.554)	U (0.554)	---	---	---	
4-Methyl-2-pentanone			U (2)	U (10)	U (100)	2.78 J (0.478)	1.94 J (0.478)	U (20)	U (20)	U (2)	
Methylcyclohexane			12 (0.4)	15 J (2)	33 J (20)	---	---	17 J (4)	37 J (4)	25 (0.4)	
Methylene Chloride	5		U (0.4)	U (2)	U (20)	U (0.43)	U (0.43)	U (4)	U (4)	U (0.4)	
Naphthalene	100	100	18 (0.4)	35 (2)	30 (20)	63.7 (0.174)	28.4 (0.174)	9.1 (4)	12 (4)	8.5 (0.4)	
n-Propylbenzene			---	---	---	21.1 (0.0993)	2.81 (0.0993)	---	---	---	
Styrene	100		U (0.41)	4.8 (2.1)	U (21)	U (0.118)	U (0.118)	U (4.1)	U (4.1)	U (0.41)	
Toluene	1000	1000	2.2 (0.4)	3.4 (2)	U (20)	6.45 (0.278)	1.5 (0.278)	42 (4)	15 (4)	14 (0.4)	
1,1,2-Trichloroethane	3		U (0.4)	U (2)	U (20)	U (0.158)	U (0.158)	U (4)	U (4)	U (0.4)	
1,2,3-Trimethylbenzene			---	---	---	248 (2.08)	199 (0.104)	---	---	---	
1,2,4-Trimethylbenzene			---	---	---	613 (6.44)	266 (3.22)	---	---	---	
1,3,5-Trimethylbenzene			---	---	---	83.3 (0.104)	26.5 (0.104)	---	---	---	
m,p-xylene			320 (2)	470 (2)	590 (20)	---	---	260 (4)	55 (4)	41 (0.4)	
ortho-xylene	10000		150 (2)	150 (2)	200 (20)	---	---	20 (4)	5.7 (4)	3.8 (0.4)	
Xylenes (total)	10000	10000	460 (2)	630 (2)	790 (20)	987 (3.48)	535 (0.174)	280 (4)	61 (4)	45 (0.4)	
SVOC											
Acenaphthene	70	70	U (0.8)	0.34 J (0.2)	0.65 J (0.2)	0.788 J (0.0886)	0.347 J (0.0886)	U (0.2)	0.065 J (0.04)	U (0.4)	
Acenaphthylene			U (0.8)	U (0.2)	U (0.2)	U (0.0921)	U (0.0921)	U (0.2)	U (0.04)	U (0.4)	
Benzo(a)anthracene	0.5	0.5	U (0.8)	U (0.2)	U (0.2)	U (0.199)	U (0.199)	U (0.2)	U (0.04)	U (0.4)	
Benzo(a)pyrene	0.05	0.05	U (0.8)	U (0.2)	U (0.2)	U (0.0381)	U (0.0381)	U (0.35)	U (0.07)	U (0.7)	
Benzo(b)fluoranthene	0.5	0.5	U (0.8)	U (0.2)	U (0.2)	U (0.13)	U (0.13)	U (0.2)	U (0.04)	U (0.4)	
Benzo(g,h,i)perylene			U (0.8)	U (0.2)	U (0.2)	U (0.121)	U (0.121)	U (0.2)	U (0.04)	U (0.4)	
1,1-Biphenyl			U (4.2)	1.4 J (1.1)	U (1.1)	---	---	---	---	---	
bis(2-Ethylhexyl)phthalate	6		U (30)	U (7.5)	U (7.5)	U (0.895)	U (0.895)	U (2.5)	U (0.5)	U (20)	
Chrysene	50	50	U (0.8)	U (0.2)	U (0.2)	U (0.13)	U (0.13)	U (0.15)	U (0.03)	U (0.3)	
Dibenzofuran			U (3.2)	U (0.8)	U (0.8)	0.55 J (0.097)	0.193 J (0.097)	U (2.5)	U (0.5)	U (5)	
Diethylphthalate	600		U (3.8)	U (0.95)	U (0.95)	U (0.287)	U (0.287)	U (2.5)	U (0.5)	U (5)	
2,4-Dimethylphenol	100		60 (3)	8.3 (0.75)	75 (0.75)	15.8 (0.0636)	16 J3 (0.0636)	U (2.4)	1.1 (0.48)	U (4.8)	
Di-n-butylphthalate	20		U (8.4)	U (2.1)	U (2.1)	U (0.453)	U (0.453)	U (2.5)	U (0.5)	U (5)	
Fluoranthene	20	20	U (0.8)	U (0.2)	U (0.2)	U (0.102)	U (0.102)	U (0.5)	U (0.1)	U (1)	
Fluorene	50	50	1.2 J (0.8)	0.67 J (0.2)	1.4 (0.2)	0.914 J (0.0844)	0.511 J (0.0844)	U (0.15)	0.15 J (0.03)	U (0.3)	
Indeno(1,2,3-cd)pyrene	0.5	0.5	U (0.8)	U (0.2)	U (0.2)	U (0.279)	U (0.279)	U (0.2)	U (0.04)	U (0.4)	
1-Methylnaphthalene		11	14 (0.8)	10 (0.2)	7.3 (0.2)	31 (0.0687)	---	---	---	---	
2-Methylnaphthalene		36	11 (0.8)	12 (0.2)	0.74 J (0.2)	13.3 (0.117)	7.41 (0.117)	0.77 J (0.2)	2.4 (0.04)	U (0.4)	
2-Methylphenol			U (4.2)	U (1.1)	U (1.1)	U (0.0929)	U (0.0929)	U (1.1)	0.24 J (0.21)	U (2.1)	
Naphthalene	100	100	11 (0.8)	15 (0.2)	6.9 (0.2)	27.1 (0.159)	13 (0.159)	6.6 (0.25)	6.1 (0.05)	3.1 (0.5)	
Phenanthrene			U (0.8)	0.42 J (0.2)	U (0.2)	0.555 J (0.112)	0.257 J (0.112)	U (0.3)	0.088 J (0.06)	U (0.6)	
Phenol	4000		U (3.8)	U (0.95)	15 (0.95)	4.95 J (4.33)	U (4.33)	U (2.5)	3.4 (0.5)	U (5)	
Pyrene	20	20	U (0.8)	U (0.2)	U (0.2)	U (0.107)	U (0.107)	U (0.5)	U (0.1)	U (1)	

Table 6
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location		MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-105	MW-105	MW-105
Field Sample ID	Montana DEQ-7	CMR-MW-415-230321	CMR-MW-41S-270623	CMR-MW-41S-092023	CMR-MW-415-231207	CMR-MW-41S-240228	CMR-MW105-200827	CMR-MW105-210223	CMR-MW105S-211006
Lab Sample ID	Human Health	YC22023-003	YF29005-005	YI21013-003	L1685777-03	L1710780-01	VH28044-018	WB25040-009	WJ08015-002
Sample Method	Standards -	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	Groundwater	3/21/2023	6/27/2023	9/20/2023	12/7/2023	2/28/2024	8/27/2020	2/23/2021	10/6/2021
Comments									
MTDEQ VPH									
	C5-C8 Aliphatics (Unadjusted)	650	516 (33.3)	850 (167)	1310 (33.3)	1410 (33.3)	782 (33.3)	---	---
	C5-C8 Aliphatics (Adjusted)	650	---	---	---	---	582 (33.3)	---	---
	C5-C8 Aliphatics	650	392 (33.3)	429 J (167)	842 (33.3)	869 (33.3)	---	880 (75)	1800 (75)
	C9-C12 Aliphatics (Unadjusted)	1400	1330 (33.3)	3100 (167)	2510 (33.3)	3560 (33.3)	2240 (33.3)	---	---
	C9-C12 Aliphatics (Adjusted)	1400	---	---	---	---	1680 (33.3)	---	---
	C9-C12 Aliphatics	1400	456 (33.3)	U (167)	844 (33.3)	2380 (33.3)	---	200 J (75)	210 J (75)
	C9-C10 Aromatics (Unadjusted)	1100	1240 (167)	1910 (167)	1750 (33.3)	1180 (33.3)	720 (33.3)	---	---
	C9-C10 Aromatics	1100	---	---	---	---	650 (25)	350 (25)	300 (5)
	Volatile Petroleum Hydrocarbons		3090 (333)	5860 (333)	5570 (66.7)	6150 (66.7)	3740 (66.7)	---	---
	Petroleum Hydrocarbons (Total)		---	---	---	---	2700 (180)	2300 (180)	1900 (180)
MTDEQ EPH									
	C9-C18 Aliphatics	1400	---	---	---	U (200)	U (200)	U (480)	---
	C19-C36 Aliphatics unadjusted	1000	---	---	---	---	U (200)	---	---
	C19-C36 Aliphatics	1000	---	---	---	---	740 (480)	---	---
	C11 through C22 Aromatics (Unadjusted)	1100	506 J (222)	425 JJ3 (200)	397 J (200)	813 (200)	569 J (200)	---	---
	C11 through C22 Aromatics (Adjusted)	1100	---	---	---	---	548 J (200)	---	---
	C11-C22 Aromatics	1100	506 J (222)	425 J (200)	397 J (200)	700 (200)	---	U (480)	---
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS			506 J (222)	425 J (200)	397 J (200)	813 (200)	569 J (200)	---	---
	Petroleum Hydrocarbons (Total)		506 J (222)	425 J (200)	397 J (200)	700 (200)	---	---	---
	Petroleum Hydrocarbons (Extractable)		5640 (111)	5490 (100)	5660 (100)	6840 (100)	---	1900 (950)	470 (240)
	Total Petroleum Hydrocarbons (GC/FID)		---	---	---	---	548 J (200)	---	---
	Extractable Petroleum Hydrocarbons (Frac)		---	---	---	---	880 J (480)	---	---

- Notes:
- All concentrations are presented in ug/L.
 - Only compounds with at least one detection are shown.
 - Concentrations that exceed the Montana DEQ-7 Human Health Standards - Groundwater are **boldfaced**.
 - Concentrations that exceed the Montana DEQ Tier 1 Groundwater RBSLs are underlined.
- Abbreviations:
- U -- Not Detected.
 - J -- Estimated Concentration.
 - () -- Reporting Detection Limit.
 - -- Not Analyzed.

Table 6
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105
Field Sample ID	Montana DEQ-7	Montana DEQ	CMR-MW105-220317	MW105-GW-220622	CMR-MW105-220831	CMR-MW-105-221213-L1569525	CMR-MW-105-230321	CMR-MW-105-270623	CMR-MW-105-092023	CMR-MW-105-231207	CMR-MW-105-231207
Lab Sample ID	Human Health	Tier 1	XC21009-003	XF23073-003	XI01059-001	XL14017-001	YC22023-001	YF29005-003	YI21013-001	L1685777-01	L1685777-01
Sample Method	Standards -	Groundwater	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	Groundwater	RBSLs	3/17/2022	6/22/2022	8/31/2022	12/13/2022	3/21/2023	6/27/2023	9/20/2023	12/7/2023	12/7/2023
Comments											
VOC											
Acetone			6.8 J (4)	U (4)	77 (4)	8 J (4)	U (4)	21 H (4)	U (200)	U (11.3)	
Benzene	5	5	25 (0.4)	110 (0.4)	85 (0.4)	2.1 (0.4)	12 (0.4)	48 (0.4)	85 (20)	11.7 (0.0941)	
Bromoform	80		U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (20)	U (0.129)	
2-Butanone			U (2)	3 J (2)	U (2)	U (2)	U (2)	3.2 J (2)	U (100)	U (1.19)	
n-Butylbenzene			---	---	---	---	---	---	---	0.247 J (0.157)	
sec-Butylbenzene			---	---	---	---	---	---	---	0.191 J (0.125)	
tert-Butylbenzene			---	---	---	---	---	---	---	U (0.127)	
Carbon Disulfide			U (0.4)	1.4 (0.4)	0.55 (0.4)	5.8 (0.4)	U (0.4)	U (0.4)	U (20)	0.197 J (0.0962)	
Chloroform	70		U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (20)	U (0.111)	
Chloromethane	600		U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	1.5 (0.4)	U (20)	U (0.96)	
Cumene			U (0.4)	2.9 (0.4)	0.67 (0.4)	U (0.4)	U (0.4)	0.72 (0.4)	U (20)	1.73 (0.105)	
Cyclohexane			3 (0.4)	50 (0.4)	26 (0.4)	3.4 (0.4)	6.6 (0.4)	9.4 H (0.4)	96 (20)	---	
p-Cymene			---	---	---	---	---	---	---	0.165 J (0.12)	
cis-1,2-Dichloroethene	70		U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (20)	U (0.126)	
Ethyl Benzene	700	700	20 (0.4)	200 (0.4)	120 (0.4)	7.9 (0.4)	21 (0.4)	15 (0.4)	570 (20)	75 (0.137)	
n-Hexane			---	---	---	---	---	---	---	1.41 J (0.749)	
Iodomethane			---	---	---	---	---	---	---	U (0.554)	
4-Methyl-2-pentanone			U (2)	U (2)	U (2)	U (2)	U (2)	U (2)	U (100)	U (0.478)	
Methylcyclohexane			0.85 J (0.4)	14 (0.4)	8.1 (0.4)	0.91 J (0.4)	1.7 J (0.4)	3.8 J (0.4)	28 J (20)	---	
Methylene Chloride	5		U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (20)	U (0.43)	
Naphthalene	100	100	0.86 (0.4)	4.9 (0.4)	4.9 (0.4)	U (0.4)	0.57 (0.4)	1.5 (0.4)	U (20)	0.374 J (0.174)	
n-Propylbenzene			---	---	---	---	---	---	---	5.33 (0.0993)	
Styrene	100		U (0.41)	U (0.41)	U (0.41)	U (0.41)	U (0.41)	U (0.41)	U (21)	U (0.118)	
Toluene	1000	1000	2 (0.4)	12 (0.4)	9.9 (0.4)	U (0.4)	1.5 (0.4)	2.2 (0.4)	20 J (20)	1.78 (0.278)	
1,1,2-Trichloroethane	3		U (0.4)	U (0.4)	0.51 (0.4)	U (0.4)	U (0.4)	U (0.4)	U (20)	U (0.158)	
1,2,3-Trimethylbenzene			---	---	---	---	---	---	---	1.1 (0.104)	
1,2,4-Trimethylbenzene			---	---	---	---	---	---	---	2.33 (0.322)	
1,3,5-Trimethylbenzene			---	---	---	---	---	---	---	U (0.104)	
m,p-xylene			6.7 (0.4)	28 (0.4)	12 (0.4)	0.57 (0.4)	3.6 (0.4)	4.7 (0.4)	U (20)	---	
ortho-xylene	10000		2.3 (0.4)	3.9 (0.4)	3.9 (0.4)	0.44 J (0.4)	0.57 (0.4)	1.2 (0.4)	U (20)	---	
Xylenes (total)	10000	10000	9 (0.4)	31 (0.4)	16 (0.4)	1 (0.4)	4.1 (0.4)	5.9 (0.4)	U (20)	2.43 (0.174)	
SVOC											
Acenaphthene	70	70	U (0.04)	U (0.25)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	0.102 J (0.0886)	
Acenaphthylene			U (0.04)	U (0.25)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.0921)	
Benzo(a)anthracene	0.5	0.5	U (0.04)	U (0.25)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.199)	
Benzo(a)pyrene	0.05	0.05	U (0.07)	U (0.44)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.0381)	
Benzo(b)fluoranthene	0.5	0.5	U (0.04)	U (0.25)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.13)	
Benzo(g,h,i)perylene			U (0.04)	U (0.25)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.121)	
1,1-Biphenyl			---	---	U (4.2)	U (1.1)	U (1.1)	U (1.1)	U (1.1)	---	
bis(2-Ethylhexyl)phthalate	6		U (2)	U (13)	U (30)	U (7.5)	U (7.5)	U (7.5)	U (7.5)	U (0.895)	
Chrysene	50	50	U (0.03)	U (0.19)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.13)	
Dibenzofuran			U (0.5)	U (3.1)	U (3.2)	U (0.8)	U (0.8)	U (0.8)	U (0.8)	U (0.097)	
Diethylphthalate	600		U (0.5)	U (3.1)	U (3.8)	U (0.95)	U (0.95)	U (0.95)	U (0.95)	0.309 J (0.287)	
2,4-Dimethylphenol	100		0.63 J (0.48)	U (3)	37 (3)	U (0.75)	U (0.75)	U (0.75)	31 (0.75)	3.08 J (0.0636)	
Di-n-butylphthalate	20		U (0.5)	U (3.1)	U (8.4)	U (2.1)	U (2.1)	U (2.1)	U (2.1)	U (0.453)	
Fluoranthene	20	20	U (0.1)	U (0.63)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.102)	
Fluorene	50	50	U (0.03)	U (0.19)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.0844)	
Indeno(1,2,3-cd)pyrene	0.5	0.5	U (0.04)	U (0.25)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.279)	
1-Methylnaphthalene		11	---	---	1.3 J (0.8)	U (0.2)	U (0.2)	0.73 J (0.2)	4 (0.2)	---	
2-Methylnaphthalene		36	U (0.04)	U (0.25)	1.9 J (0.8)	U (0.2)	U (0.2)	0.31 J (0.2)	0.29 J (0.2)	U (0.117)	
2-Methylphenol			U (0.21)	U (1.3)	U (4.2)	U (1.1)	U (1.1)	U (1.1)	U (1.1)	U (0.0929)	
Naphthalene	100	100	0.42 (0.05)	2.1 (0.31)	1.5 J (0.8)	U (0.2)	0.23 J (0.2)	0.91 (0.2)	4 (0.2)	0.293 J (0.159)	
Phenanthrene			U (0.06)	U (0.38)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.112)	
Phenol	4000		U (0.5)	U (3.1)	U (3.8)	U (0.95)	U (0.95)	1.2 J (0.95)	3.3 J (0.95)	U (4.33)	
Pyrene	20	20	U (0.1)	U (0.63)	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.107)	

Table 6
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location		MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105
Field Sample ID	Montana DEQ-7	Montana DEQ	CMR-MW105-220317	MW105-GW-220622	CMR-MW105-220831	CMR-MW-105-221213-L1569525	CMR-MW-105-230321	CMR-MW-105-270623	CMR-MW-105-092023	CMR-MW-105-231207		
Lab Sample ID	Human Health	Tier 1	XC21009-003	XF23073-003	XI01059-001	XL14017-001	YC22023-001	YF29005-003	YI21013-001	L1685777-01		
Sample Method	Standards -	Groundwater	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow		
Sample Date	Groundwater	RBSLs	3/17/2022	6/22/2022	8/31/2022	12/13/2022	3/21/2023	6/27/2023	9/20/2023	12/7/2023		
Comments												
MTDEQ VPH												
	C5-C8 Aliphatics (Unadjusted)		650	---	---	650 (33.3)	63.9 J (33.3)	178 (33.3)	1050 (33.3)	1580 (33.3)	523 (33.3)	
	C5-C8 Aliphatics (Adjusted)		650	---	---	---	---	---	---	---	---	
	C5-C8 Aliphatics		650	150 (15)	830 (15)	517 (33.3)	63.9 J (33.3)	162 (33.3)	969 (33.3)	1490 (33.3)	510 (33.3)	
	C9-C12 Aliphatics (Unadjusted)		1400	---	---	240 B (33.3)	U (33.3)	106 (33.3)	377 (33.3)	955 (33.3)	231 (33.3)	
	C9-C12 Aliphatics (Adjusted)		1400	---	---	---	---	---	---	---	---	
	C9-C12 Aliphatics		1400	21 J (15)	37 J (15)	140 B (33.3)	U (33.3)	67.5 J (33.3)	117 (33.3)	396 (33.3)	154 (33.3)	
	C9-C10 Aromatics (Unadjusted)		1100	---	---	158 (33.3)	51 J (33.3)	U (33.3)	185 (33.3)	375 (33.3)	70.6 J (33.3)	
	C9-C10 Aromatics		1100	52 (5)	150 (5)	---	---	---	---	---	---	
	Volatile Petroleum Hydrocarbons			---	---	---	---	284 (66.7)	1610 (66.7)	2910 (66.7)	825 (66.7)	
	Petroleum Hydrocarbons (Total)			240 (35)	1100 (35)	1050 (66.7)	146 J (66.7)	---	---	---	---	
MTDEQ EPH												
	C9-C18 Aliphatics		1400	---	---	---	---	---	---	---	---	
	C19-C36 Aliphatics unadjusted		1000	---	---	---	---	---	---	---	---	
	C19-C36 Aliphatics		1000	---	---	---	---	---	---	---	---	
	C11 through C22 Aromatics (Unadjusted)		1100	---	---	---	---	U (200)	UJ3 (200)	U (200)	---	
	C11 through C22 Aromatics (Adjusted)		1100	---	---	---	---	---	---	---	---	
	C11-C22 Aromatics		1100	---	---	---	---	U (200)	U (200)	U (200)	---	
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS				---	---	---	---	U (200)	U (200)	U (200)	---	
	Petroleum Hydrocarbons (Total)			---	---	---	---	U (200)	U (200)	U (200)	---	
	Petroleum Hydrocarbons (Extractable)			---	---	---	---	374 (100)	638 (100)	843 (100)	---	
	Total Petroleum Hydrocarbons (GC/FID)			---	---	---	---	---	---	---	---	
	Extractable Petroleum Hydrocarbons (Frac)			---	---	---	---	---	---	---	---	

- Notes:**
- 1 All concentrations are presented in ug/L.
 - 2 Only compounds with at least one detection are shown.
 - 3 Concentrations that exceed the Montana DEQ-7 Human Health Standards - Groundwater are **boldfaced**.
 - 4 Concentrations that exceed the Montana DEQ Tier 1 Groundwater RBSLs are underlined.
- Abbreviations:**
- U -- Not Detected.
 - J -- Estimated Concentration.
 - () -- Reporting Detection Limit.
 - -- Not Analyzed.

Table 6
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Field Sample ID	Montana DEQ-7	Montana DEQ	MW-105	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106
	Lab Sample ID	Human Health	Tier 1	CMR-MW-105-240228	CMR-MW106-211005	CMR-MW106-220316	MW106-GW-220622	CMR-MW106-220831	CMR-MW-106-221213-L1569525	CMR-DS1-221213	CMR-MW-106-230321	MW-106
	Sample Method	Standards -	Groundwater	L1710780-02	WJ08009-001	XC21009-001	XF23073-002	XI01059-002	XL14017-002	XL14017-004	YC22023-002	MW-106
	Sample Date	Groundwater	RBSLs	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
	Comments			2/28/2024	10/5/2021	3/16/2022	6/22/2022	8/31/2022	12/13/2022	12/13/2022	3/21/2023	Field Duplicate
VOC												
	Acetone			U (11.3)	6.9 J (4)	U (4)	U (4)	U (4)	14 (4)	12 (4)	U (4)	
	Benzene	5	5	3.91 (0.0941)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	Bromoform	80		U (0.129)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	0.96 (0.4)	U (0.4)	U (0.4)	
	2-Butanone			U (1.19)	U (2)	U (2)	U (2)	U (2)	U (2)	U (2)	U (2)	
	n-Butylbenzene			U (0.157)	---	---	---	---	---	---	---	
	sec-Butylbenzene			U (0.125)	---	---	---	---	---	---	---	
	tert-Butylbenzene			U (0.127)	---	---	---	---	---	---	---	
	Carbon Disulfide			U (0.0962)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	4.2 (0.4)	3.2 (0.4)	U (0.4)	
	Chloroform	70		U (0.111)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	Chloromethane	600		U (0.96)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	Cumene			0.184 J (0.105)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	Cyclohexane			---	U (0.4)	U (0.4)	U (0.4)	U (0.4)	7.2 (0.4)	2.6 (0.4)	U (0.4)	
	p-Cymene			U (0.12)	---	---	---	---	---	---	---	
	cis-1,2-Dichloroethene	70		U (0.126)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	Ethyl Benzene	700	700	2.41 (0.137)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	n-Hexane			U (0.749)	---	---	---	---	---	---	---	
	Iodomethane			U (0.554)	---	---	---	---	---	---	---	
	4-Methyl-2-pentanone			U (0.478)	U (2)	U (2)	U (2)	U (2)	U (2)	U (2)	U (2)	
	Methylcyclohexane			---	U (0.4)	U (0.4)	U (0.4)	1.7 J (0.4)	1 J (0.4)	1.1 J (0.4)	U (0.4)	
	Methylene Chloride	5		U (0.43)	0.47 J (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	0.49 J (0.4)	U (0.4)	
	Naphthalene	100	100	U (0.174)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	n-Propylbenzene			0.397 J (0.0993)	---	---	---	---	---	---	---	
	Styrene	100		U (0.118)	U (0.41)	U (0.41)	U (0.41)	U (0.41)	U (0.41)	U (0.41)	U (0.41)	
	Toluene	1000	1000	0.431 J (0.278)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	1,1,2-Trichloroethane	3		U (0.158)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	1,2,3-Trimethylbenzene			0.198 J (0.104)	---	---	---	---	---	---	---	
	1,2,4-Trimethylbenzene			0.351 J (0.322)	---	---	---	---	---	---	---	
	1,3,5-Trimethylbenzene			0.117 J (0.104)	---	---	---	---	---	---	---	
	m,p-xylene			---	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	ortho-xylene	10000		---	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
	Xylenes (total)	10000	10000	0.59 J (0.174)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	
SVOC												
	Acenaphthene	70	70	U (0.0886)	U (0.04)	U (0.04)	U (0.2)	U (0.04)	U (0.2)	---	U (0.2)	
	Acenaphthylene			U (0.0921)	U (0.04)	U (0.04)	U (0.2)	U (0.04)	U (0.2)	---	U (0.2)	
	Benzo(a)anthracene	0.5	0.5	U (0.199)	U (0.04)	0.084 J (0.04)	U (0.2)	U (0.04)	U (0.2)	---	U (0.2)	
	Benzo(a)pyrene	0.05	0.05	U (0.0381)	U (0.07)	0.17 J (0.07)	U (0.35)	U (0.04)	U (0.2)	---	U (0.2)	
	Benzo(b)fluoranthene	0.5	0.5	U (0.13)	U (0.04)	0.2 (0.04)	U (0.2)	U (0.04)	U (0.2)	---	U (0.2)	
	Benzo(g,h,i)perylene			U (0.121)	U (0.04)	0.12 J (0.04)	U (0.2)	U (0.04)	U (0.2)	---	U (0.2)	
	1,1-Biphenyl			---	---	---	---	U (0.21)	U (1.1)	---	U (1.1)	
	bis(2-Ethylhexyl)phthalate	6		1.87 (0.895)	U (1)	U (2)	U (10)	2 BJ (1.5)	U (7.5)	---	U (7.5)	
	Chrysene	50	50	U (0.13)	U (0.03)	0.042 J (0.03)	U (0.15)	U (0.04)	U (0.2)	---	U (0.2)	
	Dibenzofuran			U (0.097)	U (0.5)	U (0.5)	U (2.5)	U (0.16)	U (0.8)	---	U (0.8)	
	Diethylphthalate	600		U (0.287)	U (0.5)	U (0.5)	U (2.5)	0.21 J (0.19)	U (0.95)	---	U (0.95)	
	2,4-Dimethylphenol	100		U (0.0636)	U (0.48)	U (0.48)	U (2.4)	U (0.15)	U (0.75)	---	U (0.75)	
	Di-n-butylphthalate	20		U (0.453)	U (0.5)	U (0.5)	U (2.5)	U (0.42)	U (2.1)	---	U (2.1)	
	Fluoranthene	20	20	U (0.102)	U (0.1)	0.16 J (0.1)	U (0.5)	U (0.04)	U (0.2)	---	U (0.2)	
	Fluorene	50	50	U (0.0844)	U (0.03)	U (0.03)	U (0.15)	U (0.04)	U (0.2)	---	U (0.2)	
	Indeno(1,2,3-cd)pyrene	0.5	0.5	U (0.279)	U (0.04)	0.15 J (0.04)	U (0.2)	U (0.04)	U (0.2)	---	U (0.2)	
	1-Methylnaphthalene		11	---	---	---	---	0.061 J (0.04)	U (0.2)	---	U (0.2)	
	2-Methylnaphthalene		36	U (0.117)	0.044 BJ (0.04)	U (0.04)	U (0.2)	0.1 J (0.04)	U (0.2)	---	U (0.2)	
	2-Methylphenol			U (0.0929)	U (0.21)	U (0.21)	U (1.1)	U (0.21)	U (1.1)	---	U (1.1)	
	Naphthalene	100	100	0.27 J (0.159)	U (0.05)	U (0.05)	U (0.25)	0.045 J (0.04)	U (0.2)	---	U (0.2)	
	Phenanthrene			U (0.112)	U (0.06)	U (0.06)	U (0.3)	U (0.04)	U (0.2)	---	U (0.2)	
	Phenol	4000		U (4.33)	U (0.5)	U (0.5)	U (2.5)	U (0.19)	U (0.95)	---	U (0.95)	
	Pyrene	20	20	U (0.107)	U (0.1)	U (0.1)	U (0.5)	U (0.04)	U (0.2)	---	U (0.2)	

Table 6
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

	Location			MW-105	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106
	Field Sample ID	Montana DEQ-7	Montana DEQ	CMR-MW-105-240228	CMR-MW106-211005	CMR-MW106-220316	MW106-GW-220622	CMR-MW106-220831	CMR-MW-106-221213-L1569525	CMR-DS1-221213	CMR-MW-106-230321	MW-106
	Lab Sample ID	Human Health	Tier 1	L1710780-02	WJ08009-001	XC21009-001	XF23073-002	XI01059-002	XL14017-002	XL14017-004	YC22023-002	MW-106
	Sample Method	Standards -	Groundwater	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	MW-106
	Sample Date	Groundwater	RBSLs	2/28/2024	10/5/2021	3/16/2022	6/22/2022	8/31/2022	12/13/2022	12/13/2022	3/21/2023	MW-106
	Comments											MW-106
Field Duplicate												
MTDEQ VPH												
	C5-C8 Aliphatics (Unadjusted)		650	U (33.3)	---	---	---	153 (33.3)	80 J (33.3)	---	U (33.3)	
	C5-C8 Aliphatics (Adjusted)		650	U (33.3)	---	---	---	---	---	---	---	
	C5-C8 Aliphatics		650	---	U (15)	U (15)	U (15)	153 (33.3)	80 J (33.3)	---	U (33.3)	
	C9-C12 Aliphatics (Unadjusted)		1400	U (33.3)	---	---	---	36 B J (33.3)	U (33.3)	---	U (33.3)	
	C9-C12 Aliphatics (Adjusted)		1400	U (33.3)	---	---	---	---	---	---	---	
	C9-C12 Aliphatics		1400	---	U (15)	U (15)	U (15)	36 B J (33.3)	U (33.3)	---	U (33.3)	
	C9-C10 Aromatics (Unadjusted)		1100	U (33.3)	---	---	---	U (33.3)	U (33.3)	---	U (33.3)	
	C9-C10 Aromatics		1100	---	U (5)	U (5)	U (5)	---	---	---	---	
	Volatile Petroleum Hydrocarbons			U (66.7)	---	---	---	---	---	---	U (66.7)	
	Petroleum Hydrocarbons (Total)			---	U (35)	U (35)	U (35)	189 J (66.7)	108 J (66.7)	---	---	
MTDEQ EPH												
	C9-C18 Aliphatics		1400	U (200)	---	---	U (100)	---	---	---	---	
	C19-C36 Aliphatics unadjusted		1000	411 J (200)	---	---	---	---	---	---	---	
	C19-C36 Aliphatics		1000	---	---	---	U (100)	---	---	---	---	
	C11 through C22 Aromatics (Unadjusted)		1100	U (200)	---	---	---	---	U (200)	---	U (222)	
	C11 through C22 Aromatics (Adjusted)		1100	U (200)	---	---	---	---	---	---	---	
	C11-C22 Aromatics		1100	---	---	---	U (100)	---	U (200)	---	U (222)	
	UNADJUSTED TOTAL PETROLEUM HYDROCARBONS			411 J (200)	---	---	---	---	U (200)	---	U (222)	
	Petroleum Hydrocarbons (Total)			---	---	---	---	---	U (200)	---	U (222)	
	Petroleum Hydrocarbons (Extractable)			---	U (200)	U (200)	U (200)	U (100)	---	---	U (111)	
	Total Petroleum Hydrocarbons (GC/FID)			411 J (200)	---	---	---	---	---	---	---	
	Extractable Petroleum Hydrocarbons (Frac)			---	---	---	U (100)	---	U (100)	---	---	

- Notes:**
- 1 All concentrations are presented in ug/L.
 - 2 Only compounds with at least one detection are shown.
 - 3 Concentrations that exceed the Montana DEQ-7 Human Health Standards - Groundwater are **boldfaced**.
 - 4 Concentrations that exceed the Montana DEQ Tier 1 Groundwater RBSLs are underlined.
- Abbreviations:**
- U -- Not Detected.
 - J -- Estimated Concentration.
 - () -- Reporting Detection Limit.
 - -- Not Analyzed.

Table 6
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Field Sample ID	Montana DEQ-7	Montana DEQ	MW-106	MW-106	MW-106	MW-106	MW-106
	Lab Sample ID	Human Health	Tier 1	CMR-DUP-1-230321	CMR-MW-106-280623	CMR-MW-106-092023	CMR-MW-106-231207	CMR-MW-106-240228
	Sample Method	Standards -	Groundwater	YC22023-004	YF29005-001	YI21013-002	L1685777-02	L1710780-03
	Sample Date	Groundwater	RBSLs	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
	Comments			3/21/2023	6/28/2023	9/20/2023	12/7/2023	2/28/2024
Field Duplicate								
VOC								
	Acetone			U (4)	U (4)	13 (4)	U (11.3)	U (11.3)
	Benzene	5	5	U (0.4)	U (0.4)	U (0.4)	U (0.0941)	U (0.0941)
	Bromoform	80		U (0.4)	U (0.4)	U (0.4)	U (0.129)	U (0.129)
	2-Butanone			U (2)	U (2)	U (2)	U (1.19)	U (1.19)
	n-Butylbenzene			---	---	---	U (0.157)	U (0.157)
	sec-Butylbenzene			---	---	---	U (0.125)	U (0.125)
	tert-Butylbenzene			---	---	---	U (0.127)	U (0.127)
	Carbon Disulfide			U (0.4)	U (0.4)	U (0.4)	U (0.0962)	U (0.0962)
	Chloroform	70		U (0.4)	U (0.4)	U (0.4)	U (0.111)	U (0.111)
	Chloromethane	600		U (0.4)	U (0.4)	U (0.4)	U (0.96)	U (0.96)
	Cumene			U (0.4)	U (0.4)	U (0.4)	U (0.105)	U (0.105)
	Cyclohexane			U (0.4)	U (0.4)	1.7 (0.4)	---	---
	p-Cymene			---	---	---	U (0.12)	U (0.12)
	cis-1,2-Dichloroethene	70		U (0.4)	U (0.4)	U (0.4)	U (0.126)	U (0.126)
	Ethyl Benzene	700	700	U (0.4)	U (0.4)	U (0.4)	U (0.137)	U (0.137)
	n-Hexane			---	---	---	U (0.749)	U (0.749)
	Iodomethane			---	---	---	2.23 B J (0.554)	U (0.554)
	4-Methyl-2-pentanone			U (2)	U (2)	3.8 J (2)	3.21 J (0.478)	3.27 J (0.478)
	Methylcyclohexane			U (0.4)	U (0.4)	0.5 J (0.4)	---	---
	Methylene Chloride	5		U (0.4)	U (0.4)	U (0.4)	U (0.43)	U (0.43)
	Naphthalene	100	100	U (0.4)	U (0.4)	U (0.4)	U (0.174)	U (0.174)
	n-Propylbenzene			---	---	---	U (0.0993)	U (0.0993)
	Styrene	100		U (0.41)	U (0.41)	U (0.41)	U (0.118)	U (0.118)
	Toluene	1000	1000	U (0.4)	U (0.4)	U (0.4)	U (0.278)	U (0.278)
	1,1,2-Trichloroethane	3		U (0.4)	U (0.4)	U (0.4)	U (0.158)	U (0.158)
	1,2,3-Trimethylbenzene			---	---	---	U (0.104)	U (0.104)
	1,2,4-Trimethylbenzene			---	---	---	U (0.322)	U (0.322)
	1,3,5-Trimethylbenzene			---	---	---	U (0.104)	U (0.104)
	m,p-xylene			U (0.4)	U (0.4)	U (0.4)	---	---
	ortho-xylene	10000		U (0.4)	U (0.4)	U (0.4)	---	---
	Xylenes (total)	10000	10000	U (0.4)	U (0.4)	U (0.4)	U (0.174)	U (0.174)
SVOC								
	Acenaphthene	70	70	---	U (0.2)	U (0.2)	U (0.0886)	U (0.0886)
	Acenaphthylene			---	U (0.2)	U (0.2)	U (0.0921)	U (0.0921)
	Benzo(a)anthracene	0.5	0.5	---	U (0.2)	U (0.2)	U (0.199)	U (0.199)
	Benzo(a)pyrene	0.05	0.05	---	U (0.2)	U (0.2)	U (0.0381)	U (0.0381)
	Benzo(b)fluoranthene	0.5	0.5	---	U (0.2)	U (0.2)	U (0.13)	U (0.13)
	Benzo(g,h,i)perylene			---	U (0.2)	U (0.2)	U (0.121)	U (0.121)
	1,1-Biphenyl			---	U (1.1)	U (1.1)	---	---
	bis(2-Ethylhexyl)phthalate	6		---	U (7.5)	U (7.5)	U (0.895)	1.87 (0.895)
	Chrysene	50	50	---	U (0.2)	U (0.2)	U (0.13)	U (0.13)
	Dibenzofuran			---	U (0.8)	U (0.8)	U (0.097)	U (0.097)
	Diethylphthalate	600		---	U (0.95)	U (0.95)	U (0.287)	U (0.287)
	2,4-Dimethylphenol	100		---	U (0.75)	U (0.75)	U (0.0636)	U (0.0636)
	Di-n-butylphthalate	20		---	U (2.1)	U (2.1)	U (0.453)	U (0.453)
	Fluoranthene	20	20	---	U (0.2)	U (0.2)	U (0.102)	U (0.102)
	Fluorene	50	50	---	U (0.2)	U (0.2)	U (0.0844)	U (0.0844)
	Indeno(1,2,3-cd)pyrene	0.5	0.5	---	U (0.2)	U (0.2)	U (0.279)	U (0.279)
	1-Methylnaphthalene		11	---	U (0.2)	U (0.2)	U (0.0687)	---
	2-Methylnaphthalene		36	---	U (0.2)	U (0.2)	U (0.117)	U (0.117)
	2-Methylphenol			---	U (1.1)	U (1.1)	U (0.0929)	U (0.0929)
	Naphthalene	100	100	---	U (0.2)	U (0.2)	U (0.159)	U (0.159)
	Phenanthrene			---	U (0.2)	U (0.2)	U (0.112)	U (0.112)
	Phenol	4000		---	U (0.95)	U (0.95)	U (4.33)	U (4.33)
	Pyrene	20	20	---	U (0.2)	U (0.2)	U (0.107)	U (0.107)

Table 6
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location		MW-106	MW-106	MW-106	MW-106	MW-106
Field Sample ID	Montana DEQ-7	CMR-DUP-1-230321	CMR-MW-106-280623	CMR-MW-106-092023	CMR-MW-106-231207	CMR-MW-106-240228
Lab Sample ID	Human Health	YC22023-004	YF29005-001	YI21013-002	L1685777-02	L1710780-03
Sample Method	Standards -	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	Groundwater	3/21/2023	6/28/2023	9/20/2023	12/7/2023	2/28/2024
Comments	RBSLs	Field Duplicate				
MTDEQ VPH						
C5-C8 Aliphatics (Unadjusted)	650	---	85.9 J (33.3)	495 (33.3)	67.1 J (33.3)	U (333)
C5-C8 Aliphatics (Adjusted)	650	---	---	---	---	U (333)
C5-C8 Aliphatics	650	---	85.9 J (33.3)	495 (33.3)	67.1 J (33.3)	---
C9-C12 Aliphatics (Unadjusted)	1400	---	U (33.3)	U (33.3)	U (33.3)	U (333)
C9-C12 Aliphatics (Adjusted)	1400	---	---	---	---	U (333)
C9-C12 Aliphatics	1400	---	U (33.3)	U (33.3)	U (33.3)	---
C9-C10 Aromatics (Unadjusted)	1100	---	U (33.3)	38.4 J (33.3)	U (33.3)	U (333)
C9-C10 Aromatics	1100	---	---	---	---	---
Volatile Petroleum Hydrocarbons		---	85.9 J (66.7)	533 (66.7)	67.1 J (66.7)	U (667)
Petroleum Hydrocarbons (Total)		---	---	---	---	---
MTDEQ EPH						
C9-C18 Aliphatics	1400	---	---	---	U (200)	U (200)
C19-C36 Aliphatics unadjusted	1000	---	---	---	---	U (200)
C19-C36 Aliphatics	1000	---	---	---	---	---
C11 through C22 Aromatics (Unadjusted)	1100	---	UJ3 (200)	U (200)	U (200)	U (200)
C11 through C22 Aromatics (Adjusted)	1100	---	---	---	---	U (200)
C11-C22 Aromatics	1100	---	U (200)	U (200)	U (200)	---
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS		---	U (200)	U (200)	U (200)	U (200)
Petroleum Hydrocarbons (Total)		---	U (200)	U (200)	U (200)	---
Petroleum Hydrocarbons (Extractable)		---	1650 (100)	17000 (100)	5630 (100)	---
Total Petroleum Hydrocarbons (GC/FID)		---	---	---	---	U (200)
Extractable Petroleum Hydrocarbons (Frac)		---	---	---	---	---

- Notes:**
- 1 All concentrations are presented in ug/L.
 - 2 Only compounds with at least one detection are shown.
 - 3 Concentrations that exceed the Montana DEQ-7 Human Health Standards - Groundwater are **boldfaced**.
 - 4 Concentrations that exceed the Montana DEQ Tier 1 Groundwater RBSLs are underlined.

Abbreviations:
U -- Not Detected.
J -- Estimated Concentration.
() -- Reporting Detection Limit.
--- -- Not Analyzed.

Table 7
Summary of Groundwater Analytical Results - Field Parameters
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S
Field Sample ID	CMR-MW41S-211005	CMR-MW141S-220317	MW41S-GW-220622	CMR-MW41S-220831	CMR-MW-41S-221213	CMR-MW-41S-230321	CMR-MW-41S-230627	CMR-MW-41S-092023	CMR-MW-41S-231207	CMR-MW-41S-240228
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	10/5/2021	3/17/2022	6/22/2022	8/31/2022	12/13/2022	3/21/2023	6/27/2023	9/20/2023	12/7/2023	2/28/2024
FIELD PARAMETERS										
Specific Conductivity (Field Analysis)	1.26	0.00	1.40	1.40	1.76	1.22	0.00	1.38	1.33	0.92
Dissolved Oxygen	0.00	5.65	2.99	0.00	8.56	0.76	8.16	0.00	0.00	0.13
Oxidation Reduction Potential	-93	-40	-123	-127	-139	-149	-26	-147	-78	-93.2
pH (Field Analysis)	7.22	5.32	7	6.34	7.17	7.24	6.22	7.18	7.99	6.97
Turbidity (Field Parameters)	0.8	221.0	55	1.7	78.0	19.0	664.0	26	0	---

Location	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105
Field Sample ID	CMR-MW105S-211006	CMR-MW105S-220317	MW105-GW-220622	CMR-MW105S-220831	CMR-MW-105-221213	CMR-MW-105-230321	CMR-MW-105-230627	CMR-MW-105-092023	CMR-MW-105-231207	CMR-MW-105-240228
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	10/6/2021	3/17/2022	6/22/2022	8/31/2022	12/13/2022	3/21/2023	6/27/2023	9/20/2023	12/7/2023	2/28/2024
FIELD PARAMETERS										
Specific Conductivity (Field Analysis)	1.99	1.98	2.16	2.19	2.25	2.16	0.00	---	2.06	1.58
Dissolved Oxygen	0.00	0.00	1.81	0.00	0.00	4.20	8.25	6.31	0.00	2.84
Oxidation Reduction Potential	-107	-81	-113	-53	49	121	144	98	-44	96.7
pH (Field Analysis)	7.57	7.36	7.31	6.10	7.14	7.32	6.30	7.12	7.91	6.93
Turbidity (Field Parameters)	2.7	0	12.9	0	139	0	369	---	0	---

Location	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106
Field Sample ID	CMR-MW106S-211005	CMR-MW106S-220316	MW106-GW-220622	CMR-MW106S-220831	CMR-MW-106-221213	CMR-MW-106-230321	CMR-MW-106-230628	CMR-MW-106-092023	CMR-MW-106-231207	CMR-MW-106-240228
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	10/5/2021	3/16/2022	6/22/2022	8/31/2022	12/13/2022	3/21/2023	6/28/2023	9/20/2023	12/7/2023	2/28/2024
FIELD PARAMETERS										
Specific Conductivity (Field Analysis)	6.91	2.01	2.35	2.28	2.29	2.09	0.00	2.18	2.23	1.37
Dissolved Oxygen	0.00	0.02	0.85	0.00	8.16	2.90	9.03	0.00	0.00	0.41
Oxidation Reduction Potential	13	14	17	34	31	39	47	-127	-79	-96.2
pH (Field Analysis)	8.07	7.50	7.27	6.57	7.54	7.23	6.74	7.35	7.82	6.92
Turbidity (Field Parameters)	3.1	0	101	423	90	0	519	159	0	---

Abbreviations:
NTU -- Nephelometric Turbidity unit,
mg/L -- milligram per liter
mS/cm -- millisiemens per centimeter
mV -- millivolt

APPENDIX A

LABORATORY ANALYTICAL REPORTS

A1: Dual-Phase Extraction Vapor Analytical Results

A2: Dual-Phase Extraction Effluent Liquid Analytical Results

A3: Passive Treatment Trench Groundwater Analytical Results

APPENDIX A1

DUAL-PHASE EXTRACTION VAPOR ANALYTICAL RESULTS

Pace Project Numbers:

L1701979, L1704180, L1720189

Ramboll - Chicago, IL

Sample Delivery Group: L1701979
Samples Received: 02/03/2024
Project Number: 1690029636-002AOC-16
Description:

Report To: Ruta Deshpande
333 West Wacker Drive
Suite 2700
Chicago, IL 60606

Entire Report Reviewed By:



Jennifer A McCurdy
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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Sc: Sample Chain of Custody	13	⁷ Gl
		⁸ Al
		⁹ Sc

SAMPLE SUMMARY

CMR-SP301-013124 L1701979-01 Air

Collected by
MG

Collected date/time
01/31/24 16:13

Received date/time
02/03/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2219783	1	02/04/24 19:21	02/04/24 19:21	GH	Mt. Juliet, TN

¹Cp ${}^2\text{Tc}$ 3S_S ${}^4\text{Cn}$ ${}^5\text{Sr}$

6 Qc

 ${}^7\text{Gf}$ ${}^8\text{Al}$ ${}^9\text{Sc}$

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Jennifer A McCurdy
Project Manager

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	1.25	2.97	7.30	17.3		1	WG2219783
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG2219783
Benzene	71-43-2	78.10	0.200	0.639	1.19	3.80		1	WG2219783
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG2219783
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG2219783
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG2219783
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG2219783
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG2219783
Carbon disulfide	75-15-0	76.10	0.200	0.622	ND	ND		1	WG2219783
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG2219783
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG2219783
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG2219783
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG2219783
Chloromethane	74-87-3	50.50	0.200	0.413	0.659	1.36		1	WG2219783
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG2219783
Cyclohexane	110-82-7	84.20	0.200	0.689	0.506	1.74		1	WG2219783
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG2219783
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG2219783
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG2219783
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG2219783
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG2219783
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG2219783
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG2219783
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG2219783
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG2219783
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG2219783
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG2219783
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG2219783
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG2219783
1,4-Dioxane	123-91-1	88.10	0.630	2.27	ND	ND		1	WG2219783
Ethanol	64-17-5	46.10	2.50	4.71	9.14	17.2		1	WG2219783
Ethylbenzene	100-41-4	106	0.200	0.867	0.505	2.19		1	WG2219783
4-Ethyltoluene	622-96-8	120	0.200	0.982	0.424	2.08		1	WG2219783
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	0.226	1.27		1	WG2219783
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.346	1.71		1	WG2219783
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG2219783
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG2219783
Heptane	142-82-5	100	0.200	0.818	1.07	4.38		1	WG2219783
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG2219783
n-Hexane	110-54-3	86.20	0.630	2.22	2.10	7.40		1	WG2219783
Isopropylbenzene	98-82-8	120.20	0.200	0.983	ND	ND		1	WG2219783
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG2219783
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG2219783
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	ND	ND		1	WG2219783
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	1.41	5.77		1	WG2219783
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG2219783
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG2219783
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG2219783
2-Propanol	67-63-0	60.10	1.25	3.07	1.33	3.27		1	WG2219783
Propene	115-07-1	42.10	1.25	2.15	ND	ND		1	WG2219783
Styrene	100-42-5	104	0.200	0.851	ND	ND		1	WG2219783
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG2219783
Tetrachloroethylene	127-18-4	166	0.200	1.36	ND	ND		1	WG2219783
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG2219783
Toluene	108-88-3	92.10	0.500	1.88	2.02	7.61		1	WG2219783
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND		1	WG2219783



Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG2219783
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG2219783
Trichloroethylene	79-01-6	131	0.200	1.07	ND	ND		1	WG2219783
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	0.472	2.32		1	WG2219783
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	ND	ND		1	WG2219783
2,2,4-Trimethylpentane	540-84-1	114.22	0.200	0.934	1.03	4.81		1	WG2219783
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG2219783
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG2219783
Vinyl acetate	108-05-4	86.10	0.630	2.22	ND	ND		1	WG2219783
Xylenes, Total	1330-20-7	106.16	0.600	2.61	2.97	12.9		1	WG2219783
m&p-Xylene	179601-23-1	106	0.400	1.73	2.12	9.19		1	WG2219783
o-Xylene	95-47-6	106	0.200	0.867	0.845	3.66		1	WG2219783
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		98.1				WG2219783

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4030011-3 02/04/24 10:21

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Acetone	U		0.584	1.25
Allyl chloride	U		0.114	0.200
Benzene	U		0.0715	0.200
Benzyl Chloride	U		0.0598	0.200
Bromodichloromethane	U		0.0702	0.200
Bromoform	U		0.0732	0.600
Bromomethane	U		0.0982	0.200
1,3-Butadiene	U		0.104	2.00
Carbon disulfide	U		0.102	0.200
Carbon tetrachloride	U		0.0732	0.200
Chlorobenzene	U		0.0832	0.200
Chloroethane	U		0.0996	0.200
Chloroform	U		0.0717	0.200
Chloromethane	U		0.103	0.200
2-Chlorotoluene	U		0.0828	0.200
Cyclohexane	U		0.0753	0.200
Dibromochloromethane	U		0.0727	0.200
1,2-Dibromoethane	U		0.0721	0.200
1,2-Dichlorobenzene	U		0.128	0.200
1,3-Dichlorobenzene	U		0.182	0.200
1,4-Dichlorobenzene	U		0.0557	0.200
1,2-Dichloroethane	U		0.0700	0.200
1,1-Dichloroethane	U		0.0723	0.200
1,1-Dichloroethene	U		0.0762	0.200
cis-1,2-Dichloroethene	U		0.0784	0.200
trans-1,2-Dichloroethene	U		0.0673	0.200
1,2-Dichloropropane	U		0.0760	0.200
cis-1,3-Dichloropropene	U		0.0689	0.200
trans-1,3-Dichloropropene	U		0.0728	0.200
1,4-Dioxane	U		0.0833	0.630
Ethanol	0.835	U	0.265	2.50
Ethylbenzene	U		0.0835	0.200
4-Ethyltoluene	U		0.0783	0.200
Trichlorofluoromethane	U		0.0819	0.200
Dichlorodifluoromethane	U		0.137	0.200
1,1,2-Trichlorotrifluoroethane	U		0.0793	0.200
1,2-Dichlorotetrafluoroethane	U		0.0890	0.200
Heptane	U		0.104	0.200
Hexachloro-1,3-butadiene	U		0.105	0.630
n-Hexane	U		0.206	0.630

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4030011-3 02/04/24 10:21

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Isopropylbenzene	U		0.0777	0.200
Methylene Chloride	U		0.0979	0.200
Methyl Butyl Ketone	U		0.133	1.25
2-Butanone (MEK)	U		0.0814	1.25
4-Methyl-2-pentanone (MIBK)	U		0.0765	1.25
Methyl methacrylate	U		0.0876	0.200
MTBE	U		0.0647	0.200
Naphthalene	U		0.350	0.630
2-Propanol	U		0.264	1.25
Propene	U		0.0932	1.25
Styrene	U		0.0788	0.200
1,1,2,2-Tetrachloroethane	U		0.0743	0.200
Tetrachloroethylene	U		0.0814	0.200
Tetrahydrofuran	U		0.0734	0.200
Toluene	U		0.0870	0.500
1,2,4-Trichlorobenzene	U		0.148	0.630
1,1,1-Trichloroethane	U		0.0736	0.200
1,1,2-Trichloroethane	U		0.0775	0.200
Trichloroethylene	U		0.0680	0.200
1,2,4-Trimethylbenzene	U		0.0764	0.200
1,3,5-Trimethylbenzene	U		0.0779	0.200
2,2,4-Trimethylpentane	U		0.133	0.200
Vinyl chloride	U		0.0949	0.200
Vinyl Bromide	U		0.0852	0.200
Vinyl acetate	U		0.116	0.630
Xylenes, Total	U		0.135	0.600
m&p-Xylene	U		0.135	0.400
o-Xylene	U		0.0828	0.200
(S) 1,4-Bromofluorobenzene	95.6			60.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4030011-1 02/04/24 09:00 • (LCSD) R4030011-2 02/04/24 09:41

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	3.75	3.95	3.64	105	97.1	70.0-130			8.17	25
Allyl chloride	3.75	4.18	4.20	111	112	70.0-130			0.477	25
Benzene	3.75	4.38	4.35	117	116	70.0-130			0.687	25
Benzyl Chloride	3.75	4.29	4.24	114	113	70.0-152			1.17	25

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4030011-1 02/04/24 09:00 • (LCSD) R4030011-2 02/04/24 09:41

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Bromodichloromethane	3.75	4.29	4.26	114	114	70.0-130			0.702	25
Bromoform	3.75	4.18	4.15	111	111	70.0-130			0.720	25
Bromomethane	3.75	3.58	3.61	95.5	96.3	70.0-130			0.834	25
1,3-Butadiene	3.75	3.74	3.87	99.7	103	70.0-130			3.42	25
Carbon disulfide	3.75	3.99	3.93	106	105	70.0-130			1.52	25
Carbon tetrachloride	3.75	4.14	4.14	110	110	70.0-130			0.000	25
Chlorobenzene	3.75	4.36	4.42	116	118	70.0-130			1.37	25
Chloroethane	3.75	3.86	3.82	103	102	70.0-130			1.04	25
Chloroform	3.75	4.11	4.13	110	110	70.0-130			0.485	25
Chloromethane	3.75	3.93	3.94	105	105	70.0-130			0.254	25
2-Chlorotoluene	3.75	4.44	4.37	118	117	70.0-130			1.59	25
Cyclohexane	3.75	4.24	4.22	113	113	70.0-130			0.473	25
Dibromochloromethane	3.75	4.31	4.28	115	114	70.0-130			0.698	25
1,2-Dibromoethane	3.75	4.25	4.29	113	114	70.0-130			0.937	25
1,2-Dichlorobenzene	3.75	4.35	4.27	116	114	70.0-130			1.86	25
1,3-Dichlorobenzene	3.75	4.33	4.23	115	113	70.0-130			2.34	25
1,4-Dichlorobenzene	3.75	4.45	4.44	119	118	70.0-130			0.225	25
1,2-Dichloroethane	3.75	4.33	4.34	115	116	70.0-130			0.231	25
1,1-Dichloroethane	3.75	4.11	4.10	110	109	70.0-130			0.244	25
1,1-Dichloroethene	3.75	4.17	3.57	111	95.2	70.0-130			15.5	25
cis-1,2-Dichloroethene	3.75	4.00	4.12	107	110	70.0-130			2.96	25
trans-1,2-Dichloroethene	3.75	4.22	4.17	113	111	70.0-130			1.19	25
1,2-Dichloropropane	3.75	4.27	4.25	114	113	70.0-130			0.469	25
cis-1,3-Dichloropropene	3.75	4.52	4.47	121	119	70.0-130			1.11	25
trans-1,3-Dichloropropene	3.75	4.42	4.43	118	118	70.0-130			0.226	25
1,4-Dioxane	3.75	4.31	4.42	115	118	70.0-140			2.52	25
Ethanol	3.75	3.87	3.79	103	101	55.0-148			2.09	25
Ethylbenzene	3.75	4.37	4.35	117	116	70.0-130			0.459	25
4-Ethyltoluene	3.75	4.48	4.35	119	116	70.0-130			2.94	25
Trichlorofluoromethane	3.75	4.14	4.31	110	115	70.0-130			4.02	25
Dichlorodifluoromethane	3.75	3.77	3.66	101	97.6	64.0-139			2.96	25
1,1,2-Trichlorotrifluoroethane	3.75	3.70	3.79	98.7	101	70.0-130			2.40	25
1,2-Dichlorotetrafluoroethane	3.75	4.23	4.23	113	113	70.0-130			0.000	25
Heptane	3.75	4.58	4.67	122	125	70.0-130			1.95	25
Hexachloro-1,3-butadiene	3.75	4.56	4.41	122	118	70.0-151			3.34	25
n-Hexane	3.75	4.24	4.17	113	111	70.0-130			1.66	25
Isopropylbenzene	3.75	4.66	4.62	124	123	70.0-130			0.862	25
Methylene Chloride	3.75	3.93	4.07	105	109	70.0-130			3.50	25
Methyl Butyl Ketone	3.75	4.85	4.65	129	124	70.0-149			4.21	25
2-Butanone (MEK)	3.75	4.08	4.07	109	109	70.0-130			0.245	25

1
Cp

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Tc

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Gl

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Al

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Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4030011-1 02/04/24 09:00 • (LCSD) R4030011-2 02/04/24 09:41

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
4-Methyl-2-pentanone (MIBK)	3.75	4.73	4.65	126	124	70.0-139			1.71	25
Methyl methacrylate	3.75	4.42	4.46	118	119	70.0-130			0.901	25
MTBE	3.75	4.33	4.30	115	115	70.0-130			0.695	25
Naphthalene	3.75	4.47	4.31	119	115	70.0-159			3.64	25
2-Propanol	3.75	3.89	3.93	104	105	70.0-139			1.02	25
Propene	3.75	3.96	4.02	106	107	64.0-144			1.50	25
Styrene	3.75	4.70	4.62	125	123	70.0-130			1.72	25
1,1,2,2-Tetrachloroethane	3.75	4.07	4.04	109	108	70.0-130			0.740	25
Tetrachloroethylene	3.75	4.34	4.38	116	117	70.0-130			0.917	25
Tetrahydrofuran	3.75	4.24	4.20	113	112	70.0-137			0.948	25
Toluene	3.75	4.49	4.42	120	118	70.0-130			1.57	25
1,2,4-Trichlorobenzene	3.75	4.45	4.51	119	120	70.0-160			1.34	25
1,1,1-Trichloroethane	3.75	4.26	4.18	114	111	70.0-130			1.90	25
1,1,2-Trichloroethane	3.75	4.26	4.12	114	110	70.0-130			3.34	25
Trichloroethylene	3.75	4.33	4.24	115	113	70.0-130			2.10	25
1,2,4-Trimethylbenzene	3.75	4.60	4.51	123	120	70.0-130			1.98	25
1,3,5-Trimethylbenzene	3.75	4.69	4.54	125	121	70.0-130			3.25	25
2,2,4-Trimethylpentane	3.75	4.25	4.25	113	113	70.0-130			0.000	25
Vinyl chloride	3.75	3.78	3.91	101	104	70.0-130			3.38	25
Vinyl Bromide	3.75	4.01	4.10	107	109	70.0-130			2.22	25
Vinyl acetate	3.75	4.32	4.26	115	114	70.0-130			1.40	25
Xylenes, Total	11.3	13.8	13.7	122	121	70.0-130			0.727	25
m&p-Xylene	7.50	9.26	9.21	123	123	70.0-130			0.541	25
o-Xylene	3.75	4.55	4.50	121	120	70.0-130			1.10	25
(S) 1,4-Bromofluorobenzene				98.2	96.6	60.0-140				

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J	The identification of the analyte is acceptable; the reported value is an estimate.
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¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

ACCREDITATIONS & LOCATIONS

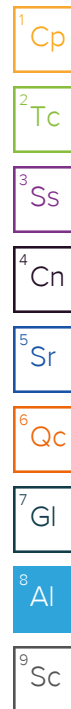
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA -- ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



February 15, 2024

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1704180
Samples Received: 02/09/2024
Project Number:
Description: Monthyl GW Calumet - Great Falls, MT

Report To: Abby Small
1999 Broadway Suite 2225
Denver, CO 80202

Entire Report Reviewed By:



Kelly Mercer
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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		⁸ Al
		⁹ Sc

SAMPLE SUMMARY

CMR-SP301-240208 L1704180-01 Air

Collected by
Kyle G

Collected date/time
02/08/24 09:55

Received date/time
02/09/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2223854	1	02/10/24 17:22	02/10/24 17:22	MNP	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2225293	20	02/13/24 16:01	02/13/24 16:01	MNP	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2226306	100	02/14/24 17:41	02/14/24 17:41	DBB	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

SDG:

L1704180

DATE/TIME:

02/15/24 11:40

PAGE:

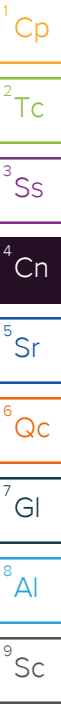
3 of 15

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Kelly Mercer
Project Manager



Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	1.25	2.97	4.00	9.51		1	WG2223854
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG2223854
Benzene	71-43-2	78.10	4.00	12.8	320	1020		20	WG2225293
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG2223854
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG2223854
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG2223854
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG2223854
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG2223854
Carbon disulfide	75-15-0	76.10	0.200	0.622	0.587	1.83		1	WG2223854
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG2223854
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG2223854
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG2223854
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG2223854
Chloromethane	74-87-3	50.50	0.200	0.413	ND	ND		1	WG2223854
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG2223854
Cyclohexane	110-82-7	84.20	4.00	13.8	947	3260		20	WG2225293
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG2223854
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG2223854
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG2223854
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG2223854
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG2223854
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG2223854
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG2223854
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG2223854
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG2223854
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG2223854
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG2223854
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG2223854
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	0.350	1.59		1	WG2223854
1,4-Dioxane	123-91-1	88.10	0.630	2.27	ND	ND		1	WG2223854
Ethanol	64-17-5	46.10	2.50	4.71	4.46	8.41	B	1	WG2223854
Ethylbenzene	100-41-4	106	0.200	0.867	53.8	233		1	WG2223854
4-Ethyltoluene	622-96-8	120	0.200	0.982	46.3	227		1	WG2223854
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	ND	ND		1	WG2223854
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.203	1.00		1	WG2223854
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG2223854
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG2223854
Heptane	142-82-5	100	4.00	16.4	490	2000		20	WG2225293
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG2223854
n-Hexane	110-54-3	86.20	12.6	44.4	1320	4650		20	WG2225293
Isopropylbenzene	98-82-8	120.20	0.200	0.983	3.85	18.9		1	WG2223854
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG2223854
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG2223854
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	ND	ND		1	WG2223854
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG2223854
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG2223854
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG2223854
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG2223854
2-Propanol	67-63-0	60.10	1.25	3.07	1.84	4.52		1	WG2223854
Propene	115-07-1	42.10	1.25	2.15	5.77	9.94		1	WG2223854
Styrene	100-42-5	104	0.200	0.851	ND	ND		1	WG2223854
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG2223854
Tetrachloroethylene	127-18-4	166	0.200	1.36	ND	ND		1	WG2223854
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG2223854
Toluene	108-88-3	92.10	0.500	1.88	9.54	35.9		1	WG2223854
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND		1	WG2223854

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG2223854
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG2223854
Trichloroethylene	79-01-6	131	0.200	1.07	ND	ND		1	WG2223854
1,2,4-Trimethylbenzene	95-63-6	120	4.00	19.6	165	810		20	WG2225293
1,3,5-Trimethylbenzene	108-67-8	120	4.00	19.6	160	785		20	WG2225293
2,2,4-Trimethylpentane	540-84-1	114.22	20.0	93.4	5870	27400		100	WG2226306
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG2223854
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG2223854
Vinyl acetate	108-05-4	86.10	0.630	2.22	ND	ND		1	WG2223854
Xylenes, Total	1330-20-7	106.16	12.0	52.1	855	3710		20	WG2225293
m&p-Xylene	179601-23-1	106	8.00	34.7	689	2990		20	WG2225293
o-Xylene	95-47-6	106	4.00	17.3	166	720		20	WG2225293
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		238		J1		WG2223854
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		108				WG2225293
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		101				WG2226306

Sample Narrative:

L1704180-01 WG2223854: Surrogate failure due to matrix interference

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4032651-2 02/10/24 07:50

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Acetone	U		0.584	1.25
Allyl chloride	U		0.114	0.200
Benzyl Chloride	U		0.0598	0.200
Bromodichloromethane	U		0.0702	0.200
Bromoform	U		0.0732	0.600
Bromomethane	U		0.0982	0.200
1,3-Butadiene	U		0.104	2.00
Carbon disulfide	U		0.102	0.200
Carbon tetrachloride	U		0.0732	0.200
Chlorobenzene	U		0.0832	0.200
Chloroethane	U		0.0996	0.200
Chloroform	U		0.0717	0.200
Chloromethane	U		0.103	0.200
2-Chlorotoluene	U		0.0828	0.200
Dibromochloromethane	U		0.0727	0.200
1,2-Dibromoethane	U		0.0721	0.200
1,2-Dichlorobenzene	U		0.128	0.200
1,3-Dichlorobenzene	U		0.182	0.200
1,4-Dichlorobenzene	U		0.0557	0.200
1,2-Dichloroethane	U		0.0700	0.200
1,1-Dichloroethane	U		0.0723	0.200
1,1-Dichloroethene	U		0.0762	0.200
cis-1,2-Dichloroethene	U		0.0784	0.200
trans-1,2-Dichloroethene	U		0.0673	0.200
1,2-Dichloropropane	U		0.0760	0.200
cis-1,3-Dichloropropene	U		0.0689	0.200
trans-1,3-Dichloropropene	U		0.0728	0.200
1,4-Dioxane	U		0.0833	0.630
Ethanol	0.943	U	0.265	2.50
Ethylbenzene	U		0.0835	0.200
4-Ethyltoluene	U		0.0783	0.200
Trichlorofluoromethane	U		0.0819	0.200
Dichlorodifluoromethane	U		0.137	0.200
1,1,2-Trichlorotrifluoroethane	U		0.0793	0.200
1,2-Dichlorotetrafluoroethane	U		0.0890	0.200
Hexachloro-1,3-butadiene	U		0.105	0.630
Isopropylbenzene	U		0.0777	0.200
Methylene Chloride	U		0.0979	0.200
Methyl Butyl Ketone	U		0.133	1.25
2-Butanone (MEK)	U		0.0814	1.25

1
Cp

2
Tc

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Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

Method Blank (MB)

(MB) R4032651-2 02/10/24 07:50

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
4-Methyl-2-pentanone (MIBK)	U		0.0765	1.25
Methyl methacrylate	0.0886	U	0.0876	0.200
MTBE	U		0.0647	0.200
Naphthalene	U		0.350	0.630
2-Propanol	U		0.264	1.25
Propene	U		0.0932	1.25
Styrene	U		0.0788	0.200
1,1,2,2-Tetrachloroethane	U		0.0743	0.200
Tetrachloroethylene	U		0.0814	0.200
Tetrahydrofuran	U		0.0734	0.200
Toluene	U		0.0870	0.500
1,2,4-Trichlorobenzene	U		0.148	0.630
1,1,1-Trichloroethane	U		0.0736	0.200
1,1,2-Trichloroethane	U		0.0775	0.200
Trichloroethylene	U		0.0680	0.200
Vinyl chloride	U		0.0949	0.200
Vinyl Bromide	U		0.0852	0.200
Vinyl acetate	U		0.116	0.630
(S) 1,4-Bromofluorobenzene	98.6			60.0-140

1
Cp

2
Tc

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Ss

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Cn

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Sr

6
Qc

7
Gl

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Al

9
Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4032651-1 02/10/24 07:25 • (LCSD) R4032651-3 02/10/24 08:17

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	3.75	3.08	3.04	82.1	81.1	70.0-130			1.31	25
Allyl chloride	3.75	3.26	3.18	86.9	84.8	70.0-130			2.48	25
Benzyl Chloride	3.75	3.52	3.25	93.9	86.7	70.0-152			7.98	25
Bromodichloromethane	3.75	3.27	3.14	87.2	83.7	70.0-130			4.06	25
Bromoform	3.75	3.23	3.04	86.1	81.1	70.0-130			6.06	25
Bromomethane	3.75	3.13	3.03	83.5	80.8	70.0-130			3.25	25
1,3-Butadiene	3.75	3.36	3.36	89.6	89.6	70.0-130			0.000	25
Carbon disulfide	3.75	3.22	3.07	85.9	81.9	70.0-130			4.77	25
Carbon tetrachloride	3.75	3.23	3.11	86.1	82.9	70.0-130			3.79	25
Chlorobenzene	3.75	3.26	3.11	86.9	82.9	70.0-130			4.71	25
Chloroethane	3.75	3.17	3.09	84.5	82.4	70.0-130			2.56	25
Chloroform	3.75	3.23	3.15	86.1	84.0	70.0-130			2.51	25
Chloromethane	3.75	3.16	3.07	84.3	81.9	70.0-130			2.89	25
2-Chlorotoluene	3.75	3.37	3.22	89.9	85.9	70.0-130			4.55	25

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4032651-1 02/10/24 07:25 • (LCSD) R4032651-3 02/10/24 08:17

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Dibromochloromethane	3.75	3.28	3.14	87.5	83.7	70.0-130			4.36	25
1,2-Dibromoethane	3.75	3.27	3.10	87.2	82.7	70.0-130			5.34	25
1,2-Dichlorobenzene	3.75	3.27	3.13	87.2	83.5	70.0-130			4.37	25
1,3-Dichlorobenzene	3.75	3.34	3.20	89.1	85.3	70.0-130			4.28	25
1,4-Dichlorobenzene	3.75	3.31	3.18	88.3	84.8	70.0-130			4.01	25
1,2-Dichloroethane	3.75	3.27	3.16	87.2	84.3	70.0-130			3.42	25
1,1-Dichloroethane	3.75	3.20	3.17	85.3	84.5	70.0-130			0.942	25
1,1-Dichloroethene	3.75	3.23	3.12	86.1	83.2	70.0-130			3.46	25
cis-1,2-Dichloroethene	3.75	3.23	3.12	86.1	83.2	70.0-130			3.46	25
trans-1,2-Dichloroethene	3.75	3.22	3.18	85.9	84.8	70.0-130			1.25	25
1,2-Dichloropropane	3.75	3.26	3.15	86.9	84.0	70.0-130			3.43	25
cis-1,3-Dichloropropene	3.75	3.47	3.26	92.5	86.9	70.0-130			6.24	25
trans-1,3-Dichloropropene	3.75	3.22	3.08	85.9	82.1	70.0-130			4.44	25
1,4-Dioxane	3.75	3.72	3.44	99.2	91.7	70.0-140			7.82	25
Ethanol	3.75	3.01	2.87	80.3	76.5	55.0-148			4.76	25
Ethylbenzene	3.75	3.35	3.26	89.3	86.9	70.0-130			2.72	25
4-Ethyltoluene	3.75	3.43	3.29	91.5	87.7	70.0-130			4.17	25
Trichlorofluoromethane	3.75	3.18	3.09	84.8	82.4	70.0-130			2.87	25
Dichlorodifluoromethane	3.75	3.36	3.18	89.6	84.8	64.0-139			5.50	25
1,1,2-Trichlorotrifluoroethane	3.75	3.14	3.06	83.7	81.6	70.0-130			2.58	25
1,2-Dichlorotetrafluoroethane	3.75	3.28	3.23	87.5	86.1	70.0-130			1.54	25
Hexachloro-1,3-butadiene	3.75	3.22	3.08	85.9	82.1	70.0-151			4.44	25
Isopropylbenzene	3.75	3.39	3.28	90.4	87.5	70.0-130			3.30	25
Methylene Chloride	3.75	3.21	3.18	85.6	84.8	70.0-130			0.939	25
Methyl Butyl Ketone	3.75	3.95	3.54	105	94.4	70.0-149			10.9	25
2-Butanone (MEK)	3.75	3.25	3.13	86.7	83.5	70.0-130			3.76	25
4-Methyl-2-pentanone (MIBK)	3.75	3.41	3.32	90.9	88.5	70.0-139			2.67	25
Methyl methacrylate	3.75	3.33	3.23	88.8	86.1	70.0-130			3.05	25
MTBE	3.75	3.24	3.12	86.4	83.2	70.0-130			3.77	25
Naphthalene	3.75	3.35	3.12	89.3	83.2	70.0-159			7.11	25
2-Propanol	3.75	3.67	3.48	97.9	92.8	70.0-139			5.31	25
Propene	3.75	3.46	3.38	92.3	90.1	64.0-144			2.34	25
Styrene	3.75	3.39	3.28	90.4	87.5	70.0-130			3.30	25
1,1,2,2-Tetrachloroethane	3.75	3.36	3.20	89.6	85.3	70.0-130			4.88	25
Tetrachloroethylene	3.75	3.26	3.11	86.9	82.9	70.0-130			4.71	25
Tetrahydrofuran	3.75	3.37	3.28	89.9	87.5	70.0-137			2.71	25
Toluene	3.75	3.26	3.15	86.9	84.0	70.0-130			3.43	25
1,2,4-Trichlorobenzene	3.75	3.26	3.04	86.9	81.1	70.0-160			6.98	25
1,1,1-Trichloroethane	3.75	3.15	3.07	84.0	81.9	70.0-130			2.57	25
1,1,2-Trichloroethane	3.75	3.22	3.14	85.9	83.7	70.0-130			2.52	25

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4032651-1 02/10/24 07:25 • (LCSD) R4032651-3 02/10/24 08:17

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Trichloroethylene	3.75	3.19	3.15	85.1	84.0	70.0-130			1.26	25
Vinyl chloride	3.75	3.22	3.12	85.9	83.2	70.0-130			3.15	25
Vinyl Bromide	3.75	3.17	3.03	84.5	80.8	70.0-130			4.52	25
Vinyl acetate	3.75	3.08	3.05	82.1	81.3	70.0-130			0.979	25
(S) 1,4-Bromofluorobenzene				101	99.5	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4033624-3 02/13/24 09:59

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Benzene	U		0.0715	0.200
Cyclohexane	U		0.0753	0.200
Heptane	U		0.104	0.200
n-Hexane	U		0.206	0.630
1,2,4-Trimethylbenzene	U		0.0764	0.200
1,3,5-Trimethylbenzene	U		0.0779	0.200
Xylenes, Total	U		0.135	0.600
m&p-Xylene	U		0.135	0.400
o-Xylene	U		0.0828	0.200
(S) 1,4-Bromofluorobenzene	97.0			60.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4033624-1 02/13/24 09:02 • (LCSD) R4033624-2 02/13/24 09:31

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	3.75	4.16	4.10	111	109	70.0-130			1.45	25
Cyclohexane	3.75	4.06	4.07	108	109	70.0-130			0.246	25
Heptane	3.75	4.06	3.98	108	106	70.0-130			1.99	25
n-Hexane	3.75	4.10	4.07	109	109	70.0-130			0.734	25
1,2,4-Trimethylbenzene	3.75	4.40	4.24	117	113	70.0-130			3.70	25
1,3,5-Trimethylbenzene	3.75	4.38	4.20	117	112	70.0-130			4.20	25
Xylenes, Total	11.3	12.9	12.6	114	112	70.0-130			2.35	25
m&p-Xylene	7.50	8.62	8.37	115	112	70.0-130			2.94	25
o-Xylene	3.75	4.32	4.25	115	113	70.0-130			1.63	25
(S) 1,4-Bromofluorobenzene				100	100	60.0-140				

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4034014-3 02/14/24 10:47

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ppbv		ppbv	ppbv
2,2,4-Trimethylpentane	U		0.133	0.200
(S) 1,4-Bromofluorobenzene	99.2			60.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4034014-1 02/14/24 09:12 • (LCSD) R4034014-2 02/14/24 10:01

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppbv	ppbv	ppbv	%	%	%			%	%
2,2,4-Trimethylpentane	3.75	4.58	4.65	122	124	70.0-130			1.52	25
(S) 1,4-Bromofluorobenzene				96.9	98.0	60.0-140				

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

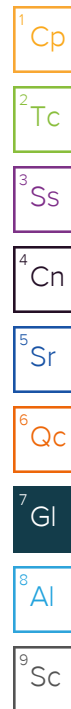
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.



ACCREDITATIONS & LOCATIONS

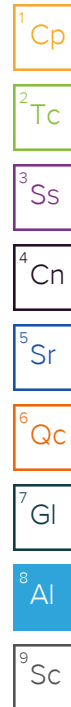
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA -- ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



[illegible]

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1720189
Samples Received: 03/29/2024
Project Number:
Description: CMR Great Falls - 2023 RFI Soil Sampling
Site: GREAT FALLS, MT
Report To: Kit Carson
1999 Broadway Suite 2225
Denver, CO 80202

Entire Report Reviewed By:



Kelly Mercer
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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		⁸ Al
		⁹ Sc

SAMPLE SUMMARY

CMR-SP301-240327 L1720189-01 Air

Collected by
Kyle G

Collected date/time
03/28/24 15:47

Received date/time
03/29/24 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2257585	1	03/31/24 20:03	03/31/24 20:03	JAP	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2259573	50	04/03/24 18:58	04/03/24 18:58	JAP	Mt. Juliet, TN

¹Cp ${}^2\text{Tc}$ 3S_S ${}^4\text{Cn}$ ${}^5\text{Sr}$

6 Qc

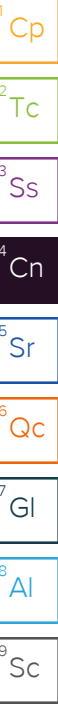
 ${}^7\text{Gf}$ ${}^8\text{Al}$ ${}^9\text{Sc}$

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Kelly Mercer
Project Manager



Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	1.25	2.97	ND	ND		1	WG2257585
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG2257585
Benzene	71-43-2	78.10	10.0	31.9	45.5	145		50	WG2259573
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG2257585
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG2257585
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG2257585
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG2257585
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG2257585
Carbon disulfide	75-15-0	76.10	0.200	0.622	1.01	3.14		1	WG2257585
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG2257585
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG2257585
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG2257585
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG2257585
Chloromethane	74-87-3	50.50	0.200	0.413	0.232	0.479		1	WG2257585
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG2257585
Cyclohexane	110-82-7	84.20	10.0	34.4	115	396		50	WG2259573
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG2257585
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG2257585
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG2257585
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG2257585
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG2257585
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG2257585
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG2257585
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG2257585
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG2257585
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG2257585
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG2257585
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG2257585
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG2257585
1,4-Dioxane	123-91-1	88.10	0.630	2.27	ND	ND		1	WG2257585
Ethanol	64-17-5	46.10	2.50	4.71	6.95	13.1		1	WG2257585
Ethylbenzene	100-41-4	106	0.200	0.867	9.52	41.3		1	WG2257585
4-Ethyltoluene	622-96-8	120	0.200	0.982	6.81	33.4		1	WG2257585
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	0.203	1.14		1	WG2257585
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.436	2.16		1	WG2257585
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG2257585
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG2257585
Heptane	142-82-5	100	0.200	0.818	47.4	194		1	WG2257585
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG2257585
n-Hexane	110-54-3	86.20	31.5	111	185	652		50	WG2259573
Isopropylbenzene	98-82-8	120.20	0.200	0.983	0.443	2.18		1	WG2257585
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG2257585
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG2257585
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	ND	ND		1	WG2257585
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG2257585
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG2257585
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG2257585
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG2257585
2-Propanol	67-63-0	60.10	1.25	3.07	ND	ND		1	WG2257585
Propene	115-07-1	42.10	1.25	2.15	3.79	6.53		1	WG2257585
Styrene	100-42-5	104	0.200	0.851	ND	ND		1	WG2257585
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG2257585
Tetrachloroethylene	127-18-4	166	0.200	1.36	ND	ND		1	WG2257585
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG2257585
Toluene	108-88-3	92.10	0.500	1.88	3.47	13.1		1	WG2257585
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND		1	WG2257585

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG2257585
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG2257585
Trichloroethylene	79-01-6	131	0.200	1.07	ND	ND		1	WG2257585
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	20.3	99.6		1	WG2257585
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	41.6	204		1	WG2257585
2,2,4-Trimethylpentane	540-84-1	114.22	10.0	46.7	1530	7150		50	WG2259573
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG2257585
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG2257585
Vinyl acetate	108-05-4	86.10	0.630	2.22	ND	ND		1	WG2257585
Xylenes, Total	1330-20-7	106.16	0.600	2.61	92.6	402		1	WG2257585
m&p-Xylene	179601-23-1	106	0.400	1.73	69.0	299		1	WG2257585
o-Xylene	95-47-6	106	0.200	0.867	23.6	102		1	WG2257585
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		169		J1		WG2257585
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		93.9				WG2259573

Sample Narrative:

L1720189-01 WG2257585: Surrogate failure due to matrix interference

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4053162-3 03/31/24 14:43

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Acetone	U		0.584	1.25
Allyl chloride	U		0.114	0.200
Benzyl Chloride	U		0.0598	0.200
Bromodichloromethane	U		0.0702	0.200
Bromoform	U		0.0732	0.600
Bromomethane	U		0.0982	0.200
1,3-Butadiene	U		0.104	2.00
Carbon disulfide	U		0.102	0.200
Carbon tetrachloride	U		0.0732	0.200
Chlorobenzene	U		0.0832	0.200
Chloroethane	U		0.0996	0.200
Chloroform	U		0.0717	0.200
Chloromethane	U		0.103	0.200
2-Chlorotoluene	U		0.0828	0.200
Dibromochloromethane	U		0.0727	0.200
1,2-Dibromoethane	U		0.0721	0.200
1,2-Dichlorobenzene	U		0.128	0.200
1,3-Dichlorobenzene	U		0.182	0.200
1,4-Dichlorobenzene	U		0.0557	0.200
1,2-Dichloroethane	U		0.0700	0.200
1,1-Dichloroethane	U		0.0723	0.200
1,1-Dichloroethene	U		0.0762	0.200
cis-1,2-Dichloroethene	U		0.0784	0.200
trans-1,2-Dichloroethene	U		0.0673	0.200
1,2-Dichloropropane	U		0.0760	0.200
cis-1,3-Dichloropropene	U		0.0689	0.200
trans-1,3-Dichloropropene	U		0.0728	0.200
1,4-Dioxane	U		0.0833	0.630
Ethanol	U		0.265	2.50
Ethylbenzene	U		0.0835	0.200
4-Ethyltoluene	U		0.0783	0.200
Trichlorofluoromethane	U		0.0819	0.200
Dichlorodifluoromethane	U		0.137	0.200
1,1,2-Trichlorotrifluoroethane	U		0.0793	0.200
1,2-Dichlorotetrafluoroethane	U		0.0890	0.200
Heptane	U		0.104	0.200
Hexachloro-1,3-butadiene	U		0.105	0.630
Isopropylbenzene	U		0.0777	0.200
Methylene Chloride	U		0.0979	0.200
Methyl Butyl Ketone	U		0.133	1.25

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4053162-3 03/31/24 14:43

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
2-Butanone (MEK)	U		0.0814	1.25
4-Methyl-2-pentanone (MIBK)	U		0.0765	1.25
Methyl methacrylate	U		0.0876	0.200
MTBE	U		0.0647	0.200
Naphthalene	U		0.350	0.630
2-Propanol	U		0.264	1.25
Propene	U		0.0932	1.25
Styrene	U		0.0788	0.200
1,1,2,2-Tetrachloroethane	U		0.0743	0.200
Tetrachloroethylene	U		0.0814	0.200
Tetrahydrofuran	U		0.0734	0.200
Toluene	U		0.0870	0.500
1,2,4-Trichlorobenzene	U		0.148	0.630
1,1,1-Trichloroethane	U		0.0736	0.200
1,1,2-Trichloroethane	U		0.0775	0.200
Trichloroethylene	U		0.0680	0.200
1,2,4-Trimethylbenzene	U		0.0764	0.200
1,3,5-Trimethylbenzene	U		0.0779	0.200
Vinyl chloride	U		0.0949	0.200
Vinyl Bromide	U		0.0852	0.200
Vinyl acetate	U		0.116	0.630
Xylenes, Total	U		0.135	0.600
m&p-Xylene	U		0.135	0.400
o-Xylene	U		0.0828	0.200
(S) 1,4-Bromofluorobenzene	99.5			60.0-140

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4053162-1 03/31/24 13:46 • (LCSD) R4053162-2 03/31/24 14:16

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	3.75	3.50	3.51	93.3	93.6	70.0-130			0.285	25
Allyl chloride	3.75	3.14	3.18	83.7	84.8	70.0-130			1.27	25
Benzyl Chloride	3.75	4.03	4.13	107	110	70.0-152			2.45	25
Bromodichloromethane	3.75	3.81	3.79	102	101	70.0-130			0.526	25
Bromoform	3.75	4.26	4.35	114	116	70.0-130			2.09	25
Bromomethane	3.75	3.47	3.57	92.5	95.2	70.0-130			2.84	25
1,3-Butadiene	3.75	2.99	2.99	79.7	79.7	70.0-130			0.000	25
Carbon disulfide	3.75	3.52	3.58	93.9	95.5	70.0-130			1.69	25

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4053162-1 03/31/24 13:46 • (LCSD) R4053162-2 03/31/24 14:16

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Carbon tetrachloride	3.75	3.74	3.76	99.7	100	70.0-130			0.533	25
Chlorobenzene	3.75	3.77	3.85	101	103	70.0-130			2.10	25
Chloroethane	3.75	3.19	3.29	85.1	87.7	70.0-130			3.09	25
Chloroform	3.75	3.62	3.61	96.5	96.3	70.0-130			0.277	25
Chloromethane	3.75	3.01	3.01	80.3	80.3	70.0-130			0.000	25
2-Chlorotoluene	3.75	3.71	3.78	98.9	101	70.0-130			1.87	25
Dibromochloromethane	3.75	4.09	4.12	109	110	70.0-130			0.731	25
1,2-Dibromoethane	3.75	3.78	3.89	101	104	70.0-130			2.87	25
1,2-Dichlorobenzene	3.75	3.92	4.05	105	108	70.0-130			3.26	25
1,3-Dichlorobenzene	3.75	3.95	4.08	105	109	70.0-130			3.24	25
1,4-Dichlorobenzene	3.75	3.92	4.11	105	110	70.0-130			4.73	25
1,2-Dichloroethane	3.75	3.47	3.53	92.5	94.1	70.0-130			1.71	25
1,1-Dichloroethane	3.75	3.43	3.41	91.5	90.9	70.0-130			0.585	25
1,1-Dichloroethene	3.75	3.33	3.35	88.8	89.3	70.0-130			0.599	25
cis-1,2-Dichloroethene	3.75	3.45	3.42	92.0	91.2	70.0-130			0.873	25
trans-1,2-Dichloroethene	3.75	3.41	3.16	90.9	84.3	70.0-130			7.61	25
1,2-Dichloropropane	3.75	3.51	3.53	93.6	94.1	70.0-130			0.568	25
cis-1,3-Dichloropropene	3.75	3.79	3.84	101	102	70.0-130			1.31	25
trans-1,3-Dichloropropene	3.75	3.73	3.77	99.5	101	70.0-130			1.07	25
1,4-Dioxane	3.75	3.90	4.03	104	107	70.0-140			3.28	25
Ethanol	3.75	3.40	3.20	90.7	85.3	55.0-148			6.06	25
Ethylbenzene	3.75	3.78	3.85	101	103	70.0-130			1.83	25
4-Ethyltoluene	3.75	3.93	3.98	105	106	70.0-130			1.26	25
Trichlorofluoromethane	3.75	3.56	3.55	94.9	94.7	70.0-130			0.281	25
Dichlorodifluoromethane	3.75	3.41	3.39	90.9	90.4	64.0-139			0.588	25
1,1,2-Trichlorotrifluoroethane	3.75	3.57	3.59	95.2	95.7	70.0-130			0.559	25
1,2-Dichlorotetrafluoroethane	3.75	3.42	3.43	91.2	91.5	70.0-130			0.292	25
Heptane	3.75	3.36	3.42	89.6	91.2	70.0-130			1.77	25
Hexachloro-1,3-butadiene	3.75	4.13	4.11	110	110	70.0-151			0.485	25
Isopropylbenzene	3.75	3.85	3.95	103	105	70.0-130			2.56	25
Methylene Chloride	3.75	3.06	3.16	81.6	84.3	70.0-130			3.22	25
Methyl Butyl Ketone	3.75	3.53	3.50	94.1	93.3	70.0-149			0.853	25
2-Butanone (MEK)	3.75	3.59	3.64	95.7	97.1	70.0-130			1.38	25
4-Methyl-2-pentanone (MIBK)	3.75	2.98	3.19	79.5	85.1	70.0-139			6.81	25
Methyl methacrylate	3.75	3.64	3.69	97.1	98.4	70.0-130			1.36	25
MTBE	3.75	3.60	3.62	96.0	96.5	70.0-130			0.554	25
Naphthalene	3.75	4.06	4.15	108	111	70.0-159			2.19	25
2-Propanol	3.75	3.30	3.31	88.0	88.3	70.0-139			0.303	25
Propene	3.75	3.28	3.28	87.5	87.5	64.0-144			0.000	25
Styrene	3.75	4.01	4.08	107	109	70.0-130			1.73	25

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4053162-1 03/31/24 13:46 • (LCSD) R4053162-2 03/31/24 14:16

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
1,1,2,2-Tetrachloroethane	3.75	3.75	3.87	100	103	70.0-130			3.15	25
Tetrachloroethylene	3.75	3.96	3.99	106	106	70.0-130			0.755	25
Tetrahydrofuran	3.75	3.42	3.46	91.2	92.3	70.0-137			1.16	25
Toluene	3.75	3.68	3.75	98.1	100	70.0-130			1.88	25
1,2,4-Trichlorobenzene	3.75	4.07	4.18	109	111	70.0-160			2.67	25
1,1,1-Trichloroethane	3.75	3.62	3.65	96.5	97.3	70.0-130			0.825	25
1,1,2-Trichloroethane	3.75	3.72	3.81	99.2	102	70.0-130			2.39	25
Trichloroethylene	3.75	3.80	3.81	101	102	70.0-130			0.263	25
1,2,4-Trimethylbenzene	3.75	3.99	4.04	106	108	70.0-130			1.25	25
1,3,5-Trimethylbenzene	3.75	3.90	3.96	104	106	70.0-130			1.53	25
Vinyl chloride	3.75	3.29	3.24	87.7	86.4	70.0-130			1.53	25
Vinyl Bromide	3.75	3.63	3.58	96.8	95.5	70.0-130			1.39	25
Vinyl acetate	3.75	3.32	3.35	88.5	89.3	70.0-130			0.900	25
Xylenes, Total	11.3	11.6	11.7	103	104	70.0-130			0.858	25
m&p-Xylene	7.50	7.75	7.81	103	104	70.0-130			0.771	25
o-Xylene	3.75	3.83	3.92	102	105	70.0-130			2.32	25
(S) 1,4-Bromofluorobenzene				96.5	96.9	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4053314-3 04/03/24 10:02

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Benzene	U		0.0715	0.200
Cyclohexane	U		0.0753	0.200
n-Hexane	U		0.206	0.630
2,2,4-Trimethylpentane	U		0.133	0.200
(S) 1,4-Bromofluorobenzene	91.4			60.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4053314-1 04/03/24 08:55 • (LCSD) R4053314-2 04/03/24 09:32

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Benzene	3.75	3.98	4.01	106	107	70.0-130			0.751	25
Cyclohexane	3.75	3.78	3.72	101	99.2	70.0-130			1.60	25
n-Hexane	3.75	3.80	3.86	101	103	70.0-130			1.57	25
2,2,4-Trimethylpentane	3.75	4.17	4.19	111	112	70.0-130			0.478	25
(S) 1,4-Bromofluorobenzene				102	102	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

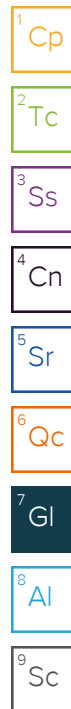
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.
----	--



ACCREDITATIONS & LOCATIONS

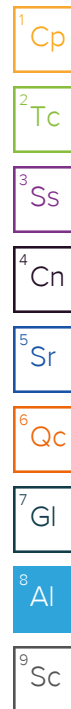
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA -- ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



APPENDIX A2

DUAL-PHASE EXTRACTION EFFLUENT LIQUID ANALYTICAL RESULTS

Pace Project Numbers:

L1701962, L1704368, L1717608

February 21, 2024

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1701962
Samples Received: 02/03/2024
Project Number: 16900 29676-002 AOC
Description: CMR Great Falls - 2023 RFI Soil Sampling
Site: GREAT FALLS, MT
Report To: Abby Small
1999 Broadway Suite 2225
Denver, CO 80202

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Entire Report Reviewed By:



Kelly Mercer
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

16900 29676-002 AOC

SDG:

L1701962

DATE/TIME:

02/21/24 13:33

PAGE:

1 of 28

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Cn: Case Narrative	4
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Al: Accreditations & Locations	27
Sc: Sample Chain of Custody	28

¹ Cp
² Tc
³ Ss
⁴ Cn
⁵ Sr
⁶ Qc
⁷ Gl
⁸ Al
⁹ Sc

SAMPLE SUMMARY

CMR-SP200-013124 L1701962-01 GW

Collected by
Mike Gipson

Collected date/time
01/31/24 15:00

Received date/time
02/03/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2221558	10	02/07/24 13:16	02/07/24 13:16	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2221986	10	02/07/24 23:28	02/07/24 23:28	JCP	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2223615	75	02/08/24 07:02	02/09/24 15:09	JAS	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2225249	300	02/08/24 07:02	02/15/24 12:42	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2225249	60	02/08/24 07:02	02/15/24 09:40	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2225249	60	02/08/24 07:02	02/15/24 11:54	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2220472	50	02/06/24 06:30	02/13/24 19:56	JRM	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2220472	50	02/06/24 06:30	02/20/24 03:24	DSH	Mt. Juliet, TN

¹Cp

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⁹Sc

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

16900 29676-002 AOC

SDG:

L1701962

DATE/TIME:

02/21/24 13:33

PAGE:

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CASE NARRATIVE

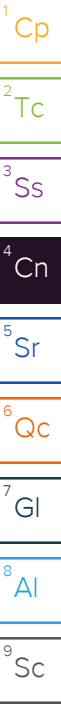
All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Kelly Mercer
Project Manager

Project Narrative

Due to multiple preparation procedures, calculated analytes are not reported in the quality control samples for EPH and VPH Methods.



Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

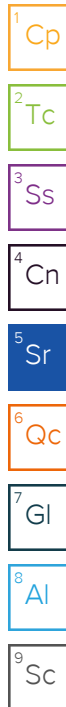
Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	412	<u>J</u>	333	1000	10	02/07/2024 13:16	WG2221558
Unadjusted C9-C12 Aliphatics	28000		333	1000	10	02/07/2024 13:16	WG2221558
Unadjusted C9-C10 Aromatics	6670		333	1000	10	02/07/2024 13:16	WG2221558
Adjusted C5-C8 Aliphatics	401	<u>J</u>	333	1000	10	02/07/2024 13:16	WG2221558
Adjusted C9-C12 Aliphatics	27800		333	1000	10	02/07/2024 13:16	WG2221558
Total VPH	35100		667	2000	10	02/07/2024 13:16	WG2221558
(S) 2,5-Dibromotoluene(FID)	45.5	<u>J2</u>		70.0-130		02/07/2024 13:16	WG2221558
(S) 2,5-Dibromotoluene(PID)	47.2	<u>J2</u>		70.0-130		02/07/2024 13:16	WG2221558

Sample Narrative:

L1701962-01 WG2221558: Surrogate failure due to matrix interference

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U	<u>J3 J4</u>	113	250	10	02/07/2024 23:28	WG2221986
Acrylonitrile	U		6.71	50.0	10	02/07/2024 23:28	WG2221986
Benzene	10.6		0.941	5.00	10	02/07/2024 23:28	WG2221986
Bromobenzene	U		1.18	5.00	10	02/07/2024 23:28	WG2221986
Bromodichloromethane	U		1.36	5.00	10	02/07/2024 23:28	WG2221986
Bromochloromethane	U		1.28	5.00	10	02/07/2024 23:28	WG2221986
Bromoform	U		1.29	5.00	10	02/07/2024 23:28	WG2221986
Bromomethane	U		6.05	25.0	10	02/07/2024 23:28	WG2221986
n-Butylbenzene	U		1.57	5.00	10	02/07/2024 23:28	WG2221986
sec-Butylbenzene	U		1.25	5.00	10	02/07/2024 23:28	WG2221986
tert-Butylbenzene	U		1.27	5.00	10	02/07/2024 23:28	WG2221986
Carbon disulfide	U		0.962	5.00	10	02/07/2024 23:28	WG2221986
Carbon tetrachloride	U		1.28	5.00	10	02/07/2024 23:28	WG2221986
Chlorobenzene	U		1.17	5.00	10	02/07/2024 23:28	WG2221986
Chlorodibromomethane	U		1.40	5.00	10	02/07/2024 23:28	WG2221986
Chloroethane	U		1.92	25.0	10	02/07/2024 23:28	WG2221986
2-Chloroethyl vinyl ether	U		5.75	500	10	02/07/2024 23:28	WG2221986
Chloroform	U		1.11	5.00	10	02/07/2024 23:28	WG2221986
Chloromethane	U		9.60	12.5	10	02/07/2024 23:28	WG2221986
2-Chlorotoluene	U		1.06	5.00	10	02/07/2024 23:28	WG2221986
4-Chlorotoluene	U		1.14	5.00	10	02/07/2024 23:28	WG2221986
1,2-Dibromo-3-Chloropropane	U		2.76	25.0	10	02/07/2024 23:28	WG2221986
1,2-Dibromoethane	U		1.26	5.00	10	02/07/2024 23:28	WG2221986
Dibromomethane	U		1.22	5.00	10	02/07/2024 23:28	WG2221986
1,2-Dichlorobenzene	U		1.07	5.00	10	02/07/2024 23:28	WG2221986
1,3-Dichlorobenzene	U		2.99	5.00	10	02/07/2024 23:28	WG2221986
1,4-Dichlorobenzene	U		1.20	5.00	10	02/07/2024 23:28	WG2221986
Dichlorodifluoromethane	U	<u>J3</u>	3.74	25.0	10	02/07/2024 23:28	WG2221986
1,1-Dichloroethane	U		1.00	5.00	10	02/07/2024 23:28	WG2221986
1,2-Dichloroethane	U		0.819	5.00	10	02/07/2024 23:28	WG2221986
1,1-Dichloroethene	U		1.88	5.00	10	02/07/2024 23:28	WG2221986
cis-1,2-Dichloroethene	U		1.26	5.00	10	02/07/2024 23:28	WG2221986
trans-1,2-Dichloroethene	U		1.49	5.00	10	02/07/2024 23:28	WG2221986
1,2-Dichloropropane	U		1.49	5.00	10	02/07/2024 23:28	WG2221986
1,1-Dichloropropene	U		1.42	5.00	10	02/07/2024 23:28	WG2221986
1,3-Dichloropropane	U		1.09	10.0	10	02/07/2024 23:28	WG2221986
cis-1,3-Dichloropropene	U		1.11	5.00	10	02/07/2024 23:28	WG2221986
trans-1,3-Dichloropropene	U		1.18	5.00	10	02/07/2024 23:28	WG2221986
trans-1,4-Dichloro-2-butene	U		4.67	50.0	10	02/07/2024 23:28	WG2221986
2,2-Dichloropropane	U		1.61	5.00	10	02/07/2024 23:28	WG2221986

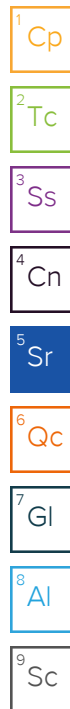


Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Di-isopropyl ether	U		1.05	5.00	10	02/07/2024 23:28	WG2221986
Ethylbenzene	7.00		1.37	5.00	10	02/07/2024 23:28	WG2221986
Hexachloro-1,3-butadiene	U		3.37	10.0	10	02/07/2024 23:28	WG2221986
2-Hexanone	U		7.87	50.0	10	02/07/2024 23:28	WG2221986
n-Hexane	U	J3	7.49	50.0	10	02/07/2024 23:28	WG2221986
Iodomethane	U		5.54	50.0	10	02/07/2024 23:28	WG2221986
Isopropylbenzene	U		1.05	5.00	10	02/07/2024 23:28	WG2221986
p-Isopropyltoluene	26.4		1.20	5.00	10	02/07/2024 23:28	WG2221986
2-Butanone (MEK)	U		11.9	50.0	10	02/07/2024 23:28	WG2221986
Methylene Chloride	U		4.30	25.0	10	02/07/2024 23:28	WG2221986
4-Methyl-2-pentanone (MIBK)	U		4.78	50.0	10	02/07/2024 23:28	WG2221986
Methyl tert-butyl ether	U		1.01	5.00	10	02/07/2024 23:28	WG2221986
Naphthalene	97.5		1.74	25.0	10	02/07/2024 23:28	WG2221986
n-Propylbenzene	U		0.993	5.00	10	02/07/2024 23:28	WG2221986
Styrene	U		1.18	5.00	10	02/07/2024 23:28	WG2221986
1,1,1,2-Tetrachloroethane	U		1.47	5.00	10	02/07/2024 23:28	WG2221986
1,1,2,2-Tetrachloroethane	U		1.33	5.00	10	02/07/2024 23:28	WG2221986
1,1,2-Trichlorotrifluoroethane	U	J3	1.80	5.00	10	02/07/2024 23:28	WG2221986
Tetrachloroethene	U		3.00	5.00	10	02/07/2024 23:28	WG2221986
Toluene	U		2.78	5.00	10	02/07/2024 23:28	WG2221986
1,2,3-Trichlorobenzene	U		1.64	5.00	10	02/07/2024 23:28	WG2221986
1,2,4-Trichlorobenzene	U		4.81	10.0	10	02/07/2024 23:28	WG2221986
1,1,1-Trichloroethane	U	J3	1.49	5.00	10	02/07/2024 23:28	WG2221986
1,1,2-Trichloroethane	U		1.58	5.00	10	02/07/2024 23:28	WG2221986
Trichloroethene	U		1.90	5.00	10	02/07/2024 23:28	WG2221986
Trichlorofluoromethane	U	J3	1.60	25.0	10	02/07/2024 23:28	WG2221986
1,2,3-Trichloropropane	U		2.37	25.0	10	02/07/2024 23:28	WG2221986
1,2,4-Trimethylbenzene	183		3.22	5.00	10	02/07/2024 23:28	WG2221986
1,2,3-Trimethylbenzene	247		1.04	5.00	10	02/07/2024 23:28	WG2221986
1,3,5-Trimethylbenzene	155		1.04	5.00	10	02/07/2024 23:28	WG2221986
Vinyl acetate	U		6.92	50.0	10	02/07/2024 23:28	WG2221986
Vinyl chloride	U		2.34	5.00	10	02/07/2024 23:28	WG2221986
Xylenes, Total	198		1.74	15.0	10	02/07/2024 23:28	WG2221986
(S) Toluene-d8	104			80.0-120		02/07/2024 23:28	WG2221986
(S) 4-Bromofluorobenzene	104			77.0-126		02/07/2024 23:28	WG2221986
(S) 1,2-Dichloroethane-d4	87.1			70.0-130		02/07/2024 23:28	WG2221986

TPH by Method MTDEQ EPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
EPH Screen	1040000		7500	22500	75	02/09/2024 15:09	WG2223615
Unadjusted C9-C18 Aliphatics	539000		60000	180000	300	02/15/2024 12:42	WG2225249
Unadjusted C19-C36 Aliphatics	228000		12000	36000	60	02/15/2024 11:54	WG2225249
Unadjusted C11-C22 Aromatics	252000		12000	36000	60	02/15/2024 09:40	WG2225249
Unadjusted Total Petroleum Hydrocarbons	1020000		60000	180000	300	02/15/2024 12:42	WG2225249
Adjusted C11-C22 Aromatics	252000		12000	36000	60	02/15/2024 09:40	WG2225249
Adjusted Total Petroleum Hydrocarbons	1020000		60000	180000	300	02/15/2024 12:42	WG2225249
(S) o-Terphenyl	0.000	J7		40.0-140		02/09/2024 15:09	WG2223615
(S) o-Terphenyl	0.000	J7		40.0-140		02/15/2024 09:40	WG2225249
(S) 1-Chloro-octadecane	0.000	J7		40.0-140		02/15/2024 12:42	WG2225249
(S) 1-Chloro-octadecane	0.000	J7		40.0-140		02/15/2024 11:54	WG2225249
(S) 2-Fluorobiphenyl	0.000	J7		40.0-140		02/15/2024 09:40	WG2225249
(S) 2-Bromonaphthalene	0.000	J7		40.0-140		02/15/2024 09:40	WG2225249



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acenaphthene	U		4.43	50.0	50	02/13/2024 19:56	WG2220472
Acenaphthylene	U		4.60	50.0	50	02/13/2024 19:56	WG2220472
Anthracene	U		4.02	50.0	50	02/13/2024 19:56	WG2220472
Benidine	U	J3	187	500	50	02/13/2024 19:56	WG2220472
Benzo(a)anthracene	U		9.95	50.0	50	02/13/2024 19:56	WG2220472
Benzo(b)fluoranthene	U		6.50	50.0	50	02/13/2024 19:56	WG2220472
Benzo(k)fluoranthene	U		6.00	50.0	50	02/13/2024 19:56	WG2220472
Benzo(g,h,i)perylene	U	J4	6.05	50.0	50	02/13/2024 19:56	WG2220472
Benzo(a)pyrene	U		1.90	50.0	50	02/13/2024 19:56	WG2220472
Bis(2-chlorethoxy)methane	U		5.80	500	50	02/13/2024 19:56	WG2220472
Bis(2-chloroethyl)ether	U		6.85	500	50	02/13/2024 19:56	WG2220472
2,2-Oxybis(1-Chloropropane)	U		10.5	500	50	02/13/2024 19:56	WG2220472
4-Bromophenyl-phenylether	U	J4	4.39	500	50	02/13/2024 19:56	WG2220472
2-Chloronaphthalene	U		3.24	50.0	50	02/13/2024 19:56	WG2220472
4-Chlorophenyl-phenylether	U		4.63	500	50	02/13/2024 19:56	WG2220472
Chrysene	U		6.50	50.0	50	02/13/2024 19:56	WG2220472
Dibenz(a,h)anthracene	U		3.22	50.0	50	02/13/2024 19:56	WG2220472
3,3-Dichlorobenzidine	U		10.6	500	50	02/13/2024 19:56	WG2220472
2,4-Dinitrotoluene	U		4.92	500	50	02/13/2024 19:56	WG2220472
2,6-Dinitrotoluene	U		12.5	500	50	02/13/2024 19:56	WG2220472
Fluoranthene	U		5.10	50.0	50	02/13/2024 19:56	WG2220472
Fluorene	60.8		4.22	50.0	50	02/13/2024 19:56	WG2220472
Hexachlorobenzene	U	J4	3.78	50.0	50	02/13/2024 19:56	WG2220472
Hexachloro-1,3-butadiene	U		4.84	500	50	02/13/2024 19:56	WG2220472
Hexachlorocyclopentadiene	U		2.99	500	50	02/13/2024 19:56	WG2220472
Hexachloroethane	U		6.35	500	50	02/13/2024 19:56	WG2220472
Indeno(1,2,3-cd)pyrene	U		14.0	50.0	50	02/13/2024 19:56	WG2220472
Isophorone	U		7.15	500	50	02/13/2024 19:56	WG2220472
Naphthalene	49.9	J	7.95	50.0	50	02/13/2024 19:56	WG2220472
Nitrobenzene	U		14.8	500	50	02/13/2024 19:56	WG2220472
n-Nitrosodimethylamine	U		49.9	500	50	02/13/2024 19:56	WG2220472
n-Nitrosodiphenylamine	U		119	500	50	02/13/2024 19:56	WG2220472
n-Nitrosodi-n-propylamine	U		13.1	500	50	02/13/2024 19:56	WG2220472
Phenanthrene	50.3		5.60	50.0	50	02/13/2024 19:56	WG2220472
Benzylbutyl phthalate	U		38.3	150	50	02/13/2024 19:56	WG2220472
Bis(2-Ethylhexyl)phthalate	U		44.8	150	50	02/13/2024 19:56	WG2220472
Di-n-butyl phthalate	U		22.7	150	50	02/13/2024 19:56	WG2220472
Diethyl phthalate	U		14.3	150	50	02/13/2024 19:56	WG2220472
Dimethyl phthalate	U		13.0	150	50	02/13/2024 19:56	WG2220472
Di-n-octyl phthalate	U		46.6	150	50	02/13/2024 19:56	WG2220472
Pyrene	25.8	J	5.35	50.0	50	02/13/2024 19:56	WG2220472
1,2,4-Trichlorobenzene	U		3.49	500	50	02/13/2024 19:56	WG2220472
Aniline	U		82.5	500	50	02/13/2024 19:56	WG2220472
1,2-Diphenylhydrazine	U	N2	5.25	500	50	02/13/2024 19:56	WG2220472
Benzyl alcohol	U		28.2	500	50	02/13/2024 19:56	WG2220472
4-Chloroaniline	U		11.7	500	50	02/13/2024 19:56	WG2220472
4-Chloro-3-methylphenol	U		6.55	500	50	02/13/2024 19:56	WG2220472
2-Chlorophenol	U		6.65	500	50	02/13/2024 19:56	WG2220472
Dibenzofuran	U		4.85	500	50	02/13/2024 19:56	WG2220472
2,4-Dichlorophenol	U		5.10	500	50	02/13/2024 19:56	WG2220472
2,4-Dimethylphenol	U		3.18	500	50	02/13/2024 19:56	WG2220472
4,6-Dinitro-2-methylphenol	U		56.0	500	50	02/13/2024 19:56	WG2220472
2,4-Dinitrophenol	U		297	500	50	02/13/2024 19:56	WG2220472
2-Methylnaphthalene	156		5.85	50.0	50	02/13/2024 19:56	WG2220472
2-Methylphenol	U		4.65	500	50	02/13/2024 19:56	WG2220472
3&4-Methyl Phenol	U		8.40	500	50	02/13/2024 19:56	WG2220472

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Nitroaniline	U		5.10	500	50	02/13/2024 19:56	WG2220472
3-Nitroaniline	U		4.35	500	50	02/13/2024 19:56	WG2220472
4-Nitroaniline	U		4.55	500	50	02/13/2024 19:56	WG2220472
2-Nitrophenol	U		5.85	500	50	02/13/2024 19:56	WG2220472
4-Nitrophenol	U		7.15	500	50	02/13/2024 19:56	WG2220472
Pentachlorophenol	U		15.7	500	50	02/13/2024 19:56	WG2220472
Phenol	U		216	500	50	02/13/2024 19:56	WG2220472
Pyridine	U		31.3	500	50	02/13/2024 19:56	WG2220472
2,4,6-Trichlorophenol	U		5.00	500	50	02/13/2024 19:56	WG2220472
Acetophenone	U		10.4	500	50	02/13/2024 19:56	WG2220472
2-Acetylaminofluorene	U		12.7	500	50	02/20/2024 03:24	WG2220472
4-Aminobiphenyl	U		23.0	500	50	02/20/2024 03:24	WG2220472
Chlorobenzilate	U		192	2500	50	02/20/2024 03:24	WG2220472
Diallate	U		26.2	500	50	02/20/2024 03:24	WG2220472
2,6-Dichlorophenol	U		5.10	500	50	02/20/2024 03:24	WG2220472
Dimethoate	U		253	2500	50	02/20/2024 03:24	WG2220472
P-(Dimethylamino) Azobenzene	U		185	500	50	02/20/2024 03:24	WG2220472
Dimethylbenz (A) Anthracene	U		85.5	500	50	02/20/2024 03:24	WG2220472
3,3-Dimethylbenzidine	U		169	500	50	02/20/2024 03:24	WG2220472
a,a-Dimethylphenethylamine	U	J4	157	2500	50	02/20/2024 03:24	WG2220472
1,3-Dinitrobenzene	U		18.0	500	50	02/20/2024 03:24	WG2220472
Diphenylamine	U		119	500	50	02/13/2024 19:56	WG2220472
Dinoseb	U		401	2500	50	02/20/2024 03:24	WG2220472
Disulfoton	U		13.3	500	50	02/20/2024 03:24	WG2220472
Ethyl methanesulfonate	U		16.3	500	50	02/20/2024 03:24	WG2220472
Ethyl Parathion	U		19.0	500	50	02/20/2024 03:24	WG2220472
Famphur	U		196	1000	50	02/20/2024 03:24	WG2220472
Hexachloropropene	U		7.45	2500	50	02/20/2024 03:24	WG2220472
Hexachlorophene	U		72.0	2500	50	02/20/2024 03:24	WG2220472
Isodrin	U		205	500	50	02/20/2024 03:24	WG2220472
Isosafrole	U		194	500	50	02/20/2024 03:24	WG2220472
Kepone	U		133	1000	50	02/20/2024 03:24	WG2220472
Methapyrilene	U		500	2500	50	02/20/2024 03:24	WG2220472
3-Methylcholanthrene	U		8.20	500	50	02/20/2024 03:24	WG2220472
Methyl methanesulfonate	U		170	2500	50	02/20/2024 03:24	WG2220472
Methyl parathion	U		10.7	500	50	02/20/2024 03:24	WG2220472
1,4-Naphthoquinone	U	J4	278	2500	50	02/20/2024 03:24	WG2220472
1-Naphthylamine	U		14.4	500	50	02/20/2024 03:24	WG2220472
2-Naphthylamine	U		224	500	50	02/20/2024 03:24	WG2220472
5-Nitro-o-toluidine	U		99.5	500	50	02/20/2024 03:24	WG2220472
4-Nitroquinoline 1-oxide	U		102	500	50	02/20/2024 03:24	WG2220472
n-Nitrosodiethylamine	U		179	500	50	02/20/2024 03:24	WG2220472
n-Nitrosodi-n-butylamine	U		196	500	50	02/20/2024 03:24	WG2220472
n-Nitrosomethylethylamine	U		163	500	50	02/20/2024 03:24	WG2220472
n-Nitrosomorpholine	U		163	500	50	02/20/2024 03:24	WG2220472
n-Nitrosopiperidine	U		186	500	50	02/20/2024 03:24	WG2220472
n-Nitrosopyrrolidine	U		169	500	50	02/20/2024 03:24	WG2220472
Pentachlorobenzene	U		207	500	50	02/20/2024 03:24	WG2220472
Pentachloroethane	U		142	2500	50	02/20/2024 03:24	WG2220472
Pentachloronitrobenzene	U		207	500	50	02/20/2024 03:24	WG2220472
Phenacetin	U		233	500	50	02/20/2024 03:24	WG2220472
p-Phenylenediamine	U	J4	19400	345000	50	02/20/2024 03:24	WG2220472
Phorate	U		243	2500	50	02/20/2024 03:24	WG2220472
2-Picoline	U		342	2500	50	02/20/2024 03:24	WG2220472
Pronamide	U		211	500	50	02/20/2024 03:24	WG2220472
Safrole	U		184	500	50	02/20/2024 03:24	WG2220472

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Sulfotep	U		199	2500	50	02/20/2024 03:24	WG2220472
1,2,4,5-Tetrachlorobenzene	U	J4	3.24	500	50	02/13/2024 19:56	WG2220472
2,3,4,6-Tetrachlorophenol	U	J4	11.5	500	50	02/13/2024 19:56	WG2220472
Thionazin	U		203	500	50	02/20/2024 03:24	WG2220472
o-Toluidine	U		177	500	50	02/20/2024 03:24	WG2220472
2,4,5-Trichlorophenol	U		5.45	500	50	02/13/2024 19:56	WG2220472
O,O,O-Triethyl Phosphorothioate	U		146	500	50	02/20/2024 03:24	WG2220472
1,3,5-Trinitrobenzene	U		66.0	500	50	02/20/2024 03:24	WG2220472
(S) 2-Fluorophenol	26.3	J7		10.0-120		02/13/2024 19:56	WG2220472
(S) Phenol-d5	70.3	J7		10.0-120		02/13/2024 19:56	WG2220472
(S) Nitrobenzene-d5	0.000	J7		10.0-127		02/13/2024 19:56	WG2220472
(S) 2-Fluorobiphenyl	0.000	J7		10.0-130		02/13/2024 19:56	WG2220472
(S) 2,4,6-Tribromophenol	46.0	J7		10.0-155		02/13/2024 19:56	WG2220472
(S) p-Terphenyl-d14	50.8	J7		10.0-128		02/13/2024 19:56	WG2220472

Sample Narrative:

L1701962-01 WG2220472: Surrogate failure & dilution due to matrix interference during extraction procedure.

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4033179-3 02/07/24 12:06

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C5-C8 Aliphatics	U		33.3	100
Unadjusted C9-C12 Aliphatics	U		33.3	100
Unadjusted C9-C10 Aromatics	U		33.3	100
Adjusted C5-C8 Aliphatics	U		33.3	100
Adjusted C9-C12 Aliphatics	U		33.3	100
Total VPH	U		66.7	200
(S) 2,5-Dibromotoluene(FID)	87.7			70.0-130
(S) 2,5-Dibromotoluene(PID)	89.3			70.0-130

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4033179-1 02/07/24 09:46 • (LCSD) R4033179-2 02/07/24 10:21

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C5-C8 Aliphatics	1200	1270	1200	106	100	70.0-130			5.67	50
Unadjusted C9-C12 Aliphatics	1400	1360	1240	97.1	88.6	70.0-130			9.23	50
Unadjusted C9-C10 Aromatics	200	215	200	108	100	70.0-130			7.23	50
Total VPH	2800	2850	2640	102	94.3	70.0-130			7.65	50
(S) 2,5-Dibromotoluene(FID)				96.8	85.9	70.0-130				
(S) 2,5-Dibromotoluene(PID)				94.5	84.6	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4031642-3 02/07/24 14:40

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acetone	U		11.3	25.0
Acrylonitrile	U		0.671	5.00
Benzene	U		0.0941	0.500
Bromobenzene	U		0.118	0.500
Bromodichloromethane	U		0.136	0.500
Bromochloromethane	U		0.128	0.500
Bromoform	U		0.129	0.500
Bromomethane	U		0.605	2.50
n-Butylbenzene	U		0.157	0.500
sec-Butylbenzene	U		0.125	0.500
tert-Butylbenzene	U		0.127	0.500
Carbon disulfide	U		0.0962	0.500
Carbon tetrachloride	U		0.128	0.500
Chlorobenzene	U		0.117	0.500
Chlorodibromomethane	U		0.140	0.500
Chloroethane	U		0.192	2.50
2-Chloroethyl vinyl ether	U		0.575	50.0
Chloroform	U		0.111	0.500
Chloromethane	U		0.960	1.25
2-Chlorotoluene	U		0.106	0.500
4-Chlorotoluene	U		0.114	0.500
1,2-Dibromo-3-Chloropropane	U		0.276	2.50
1,2-Dibromoethane	U		0.126	0.500
Dibromomethane	U		0.122	0.500
1,2-Dichlorobenzene	U		0.107	0.500
1,3-Dichlorobenzene	U		0.299	0.500
1,4-Dichlorobenzene	U		0.120	0.500
Dichlorodifluoromethane	U		0.374	2.50
1,1-Dichloroethane	U		0.100	0.500
1,2-Dichloroethane	U		0.0819	0.500
1,1-Dichloroethene	U		0.188	0.500
cis-1,2-Dichloroethene	U		0.126	0.500
trans-1,2-Dichloroethene	U		0.149	0.500
1,2-Dichloropropane	U		0.149	0.500
1,1-Dichloropropene	U		0.142	0.500
1,3-Dichloropropane	U		0.109	1.00
cis-1,3-Dichloropropene	U		0.111	0.500
trans-1,3-Dichloropropene	U		0.118	0.500
trans-1,4-Dichloro-2-butene	U		0.467	5.00
2,2-Dichloropropane	U		0.161	0.500

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4031642-3 02/07/24 14:40

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Di-isopropyl ether	U		0.105	0.500
Ethylbenzene	U		0.137	0.500
Hexachloro-1,3-butadiene	U		0.337	1.00
2-Hexanone	U		0.787	5.00
n-Hexane	U		0.749	5.00
Iodomethane	U		0.554	5.00
Isopropylbenzene	U		0.105	0.500
p-Isopropyltoluene	U		0.120	0.500
2-Butanone (MEK)	U		1.19	5.00
Methylene Chloride	U		0.430	2.50
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00
Methyl tert-butyl ether	U		0.101	0.500
Naphthalene	U		0.174	2.50
n-Propylbenzene	U		0.0993	0.500
Styrene	U		0.118	0.500
1,1,1,2-Tetrachloroethane	U		0.147	0.500
1,1,2,2-Tetrachloroethane	U		0.133	0.500
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500
Tetrachloroethene	U		0.300	0.500
Toluene	U		0.278	0.500
1,2,3-Trichlorobenzene	U		0.164	0.500
1,2,4-Trichlorobenzene	U		0.481	1.00
1,1,1-Trichloroethane	U		0.149	0.500
1,1,2-Trichloroethane	U		0.158	0.500
Trichloroethene	U		0.190	0.500
Trichlorofluoromethane	U		0.160	2.50
1,2,3-Trichloropropane	U		0.237	2.50
1,2,4-Trimethylbenzene	U		0.322	0.500
1,2,3-Trimethylbenzene	U		0.104	0.500
1,3,5-Trimethylbenzene	U		0.104	0.500
Vinyl acetate	U		0.692	5.00
Vinyl chloride	U		0.234	0.500
Xylenes, Total	U		0.174	1.50
(S) Toluene-d8	107			80.0-120
(S) 4-Bromofluorobenzene	96.6			77.0-126
(S) 1,2-Dichloroethane-d4	99.9			70.0-130

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4031642-1 02/07/24 13:43 • (LCSD) R4031642-2 02/07/24 14:02

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	25.0	43.3	23.8	173	95.2	19.0-160	J4	J3	58.1	27
Acrylonitrile	25.0	23.4	19.3	93.6	77.2	55.0-149			19.2	20
Benzene	5.00	5.19	4.61	104	92.2	70.0-123			11.8	20
Bromobenzene	5.00	4.55	4.61	91.0	92.2	73.0-121			1.31	20
Bromodichloromethane	5.00	5.35	4.82	107	96.4	75.0-120			10.4	20
Bromochloromethane	5.00	5.15	4.89	103	97.8	76.0-122			5.18	20
Bromoform	5.00	5.15	4.63	103	92.6	68.0-132			10.6	20
Bromomethane	5.00	6.42	5.74	128	115	10.0-160			11.2	25
n-Butylbenzene	5.00	4.90	4.95	98.0	99.0	73.0-125			1.02	20
sec-Butylbenzene	5.00	4.94	4.71	98.8	94.2	75.0-125			4.77	20
tert-Butylbenzene	5.00	4.93	5.08	98.6	102	76.0-124			3.00	20
Carbon disulfide	5.00	5.48	4.75	110	95.0	61.0-128			14.3	20
Carbon tetrachloride	5.00	5.74	4.86	115	97.2	68.0-126			16.6	20
Chlorobenzene	5.00	5.38	4.77	108	95.4	80.0-121			12.0	20
Chlorodibromomethane	5.00	5.13	4.92	103	98.4	77.0-125			4.18	20
Chloroethane	5.00	4.67	4.36	93.4	87.2	47.0-150			6.87	20
2-Chloroethyl vinyl ether	25.0	21.8	19.5	87.2	78.0	51.0-160			11.1	20
Chloroform	5.00	5.24	4.73	105	94.6	73.0-120			10.2	20
Chloromethane	5.00	4.13	3.79	82.6	75.8	41.0-142			8.59	20
2-Chlorotoluene	5.00	4.89	4.80	97.8	96.0	76.0-123			1.86	20
4-Chlorotoluene	5.00	4.72	4.80	94.4	96.0	75.0-122			1.68	20
1,2-Dibromo-3-Chloropropane	5.00	4.81	4.70	96.2	94.0	58.0-134			2.31	20
1,2-Dibromoethane	5.00	5.17	4.59	103	91.8	80.0-122			11.9	20
Dibromomethane	5.00	5.05	4.52	101	90.4	80.0-120			11.1	20
1,2-Dichlorobenzene	5.00	5.00	5.01	100	100	79.0-121			0.200	20
1,3-Dichlorobenzene	5.00	4.94	4.72	98.8	94.4	79.0-120			4.55	20
1,4-Dichlorobenzene	5.00	4.82	4.84	96.4	96.8	79.0-120			0.414	20
Dichlorodifluoromethane	5.00	5.71	4.27	114	85.4	51.0-149		J3	28.9	20
1,1-Dichloroethane	5.00	4.75	4.24	95.0	84.8	70.0-126			11.3	20
1,2-Dichloroethane	5.00	5.13	4.55	103	91.0	70.0-128			12.0	20
1,1-Dichloroethene	5.00	5.44	4.56	109	91.2	71.0-124			17.6	20
cis-1,2-Dichloroethene	5.00	5.30	4.63	106	92.6	73.0-120			13.5	20
trans-1,2-Dichloroethene	5.00	5.34	4.68	107	93.6	73.0-120			13.2	20
1,2-Dichloropropane	5.00	4.20	4.05	84.0	81.0	77.0-125			3.64	20
1,1-Dichloropropene	5.00	5.24	4.38	105	87.6	74.0-126			17.9	20
1,3-Dichloropropane	5.00	5.01	4.59	100	91.8	80.0-120			8.75	20
cis-1,3-Dichloropropene	5.00	4.77	4.29	95.4	85.8	80.0-123			10.6	20
trans-1,3-Dichloropropene	5.00	5.08	4.64	102	92.8	78.0-124			9.05	20
trans-1,4-Dichloro-2-butene	5.00	4.30	3.72	86.0	74.4	33.0-144			14.5	20
2,2-Dichloropropane	5.00	6.51	6.13	130	123	58.0-130			6.01	20

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4031642-1 02/07/24 13:43 • (LCSD) R4031642-2 02/07/24 14:02

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Di-isopropyl ether	5.00	4.32	3.79	86.4	75.8	58.0-138			13.1	20
Ethylbenzene	5.00	5.38	4.90	108	98.0	79.0-123			9.34	20
Hexachloro-1,3-butadiene	5.00	5.05	4.75	101	95.0	54.0-138			6.12	20
2-Hexanone	25.0	21.4	20.0	85.6	80.0	67.0-149			6.76	20
n-Hexane	5.00	4.04	3.17	80.8	63.4	57.0-133		J3	24.1	20
Iodomethane	25.0	27.8	24.7	111	98.8	33.0-147			11.8	26
Isopropylbenzene	5.00	5.38	4.71	108	94.2	76.0-127			13.3	20
p-Isopropyltoluene	5.00	5.27	5.06	105	101	76.0-125			4.07	20
2-Butanone (MEK)	25.0	24.8	20.9	99.2	83.6	44.0-160			17.1	20
Methylene Chloride	5.00	5.54	4.59	111	91.8	67.0-120			18.8	20
4-Methyl-2-pentanone (MIBK)	25.0	24.6	22.6	98.4	90.4	68.0-142			8.47	20
Methyl tert-butyl ether	5.00	5.02	4.56	100	91.2	68.0-125			9.60	20
Naphthalene	5.00	4.26	4.37	85.2	87.4	54.0-135			2.55	20
n-Propylbenzene	5.00	4.89	4.92	97.8	98.4	77.0-124			0.612	20
Styrene	5.00	4.50	4.36	90.0	87.2	73.0-130			3.16	20
1,1,1,2-Tetrachloroethane	5.00	5.31	4.88	106	97.6	75.0-125			8.44	20
1,1,2,2-Tetrachloroethane	5.00	5.16	5.32	103	106	65.0-130			3.05	20
1,1,2-Trichlorotrifluoroethane	5.00	5.26	4.24	105	84.8	69.0-132		J3	21.5	20
Tetrachloroethene	5.00	5.56	4.79	111	95.8	72.0-132			14.9	20
Toluene	5.00	4.99	4.77	99.8	95.4	79.0-120			4.51	20
1,2,3-Trichlorobenzene	5.00	4.56	4.08	91.2	81.6	50.0-138			11.1	20
1,2,4-Trichlorobenzene	5.00	4.53	4.34	90.6	86.8	57.0-137			4.28	20
1,1,1-Trichloroethane	5.00	5.96	4.83	119	96.6	73.0-124		J3	20.9	20
1,1,2-Trichloroethane	5.00	5.00	4.97	100	99.4	80.0-120			0.602	20
Trichloroethene	5.00	5.25	4.61	105	92.2	78.0-124			13.0	20
Trichlorofluoromethane	5.00	5.72	4.45	114	89.0	59.0-147		J3	25.0	20
1,2,3-Trichloropropane	5.00	4.34	4.88	86.8	97.6	73.0-130			11.7	20
1,2,4-Trimethylbenzene	5.00	4.78	4.74	95.6	94.8	76.0-121			0.840	20
1,2,3-Trimethylbenzene	5.00	4.88	4.61	97.6	92.2	77.0-120			5.69	20
1,3,5-Trimethylbenzene	5.00	4.85	4.83	97.0	96.6	76.0-122			0.413	20
Vinyl acetate	25.0	24.6	25.0	98.4	100	11.0-160			1.61	20
Vinyl chloride	5.00	5.00	4.34	100	86.8	67.0-131			14.1	20
Xylenes, Total	15.0	16.3	15.3	109	102	79.0-123			6.33	20
(S) Toluene-d8				102	105	80.0-120				
(S) 4-Bromofluorobenzene				101	96.3	77.0-126				
(S) 1,2-Dichloroethane-d4				101	99.5	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1702116-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1702116-02 02/07/24 21:54 • (MS) R4031642-4 02/07/24 23:47 • (MSD) R4031642-5 02/08/24 00:06

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Acetone	25.0	U	28.2	35.8	113	143	1	10.0-160			23.7	35
Acrylonitrile	25.0	U	23.0	24.4	92.0	97.6	1	21.0-160			5.91	32
Benzene	5.00	U	4.60	4.14	92.0	82.8	1	17.0-158			10.5	27
Bromobenzene	5.00	U	4.08	4.17	81.6	83.4	1	30.0-149			2.18	28
Bromodichloromethane	5.00	U	4.78	4.47	95.6	89.4	1	31.0-150			6.70	27
Bromochloromethane	5.00	U	4.70	4.80	94.0	96.0	1	38.0-142			2.11	26
Bromoform	5.00	U	4.67	4.92	93.4	98.4	1	29.0-150			5.21	29
Bromomethane	5.00	U	5.14	5.05	103	101	1	10.0-160			1.77	38
n-Butylbenzene	5.00	U	4.37	4.27	87.4	85.4	1	31.0-150			2.31	30
sec-Butylbenzene	5.00	U	4.21	4.14	84.2	82.8	1	33.0-155			1.68	29
tert-Butylbenzene	5.00	U	4.43	4.28	88.6	85.6	1	34.0-153			3.44	28
Carbon disulfide	5.00	U	4.71	4.27	94.2	85.4	1	10.0-156			9.80	28
Carbon tetrachloride	5.00	U	4.44	3.98	88.8	79.6	1	23.0-159			10.9	28
Chlorobenzene	5.00	U	4.72	4.46	94.4	89.2	1	33.0-152			5.66	27
Chlorodibromomethane	5.00	U	4.82	4.83	96.4	96.6	1	37.0-149			0.207	27
Chloroethane	5.00	U	4.07	3.69	81.4	73.8	1	10.0-160			9.79	30
2-Chloroethyl vinyl ether	25.0	U	U	U	0.000	0.000	1	10.0-160	J6	J6	0.000	31
Chloroform	5.00	0.181	4.66	4.33	89.6	83.0	1	29.0-154			7.34	28
Chloromethane	5.00	U	3.43	3.09	68.6	61.8	1	10.0-160			10.4	29
2-Chlorotoluene	5.00	U	4.19	4.19	83.8	83.8	1	32.0-153			0.000	28
4-Chlorotoluene	5.00	U	4.11	4.06	82.2	81.2	1	32.0-150			1.22	28
1,2-Dibromo-3-Chloropropane	5.00	U	5.18	5.40	104	108	1	22.0-151			4.16	34
1,2-Dibromoethane	5.00	U	4.65	4.89	93.0	97.8	1	34.0-147			5.03	27
Dibromomethane	5.00	U	4.37	4.65	87.4	93.0	1	30.0-151			6.21	27
1,2-Dichlorobenzene	5.00	U	4.64	4.66	92.8	93.2	1	34.0-149			0.430	28
1,3-Dichlorobenzene	5.00	U	4.22	4.36	84.4	87.2	1	36.0-146			3.26	27
1,4-Dichlorobenzene	5.00	U	4.33	4.60	86.6	92.0	1	35.0-142			6.05	27
Dichlorodifluoromethane	5.00	U	4.37	3.81	87.4	76.2	1	10.0-160			13.7	29
1,1-Dichloroethane	5.00	U	4.05	3.90	81.0	78.0	1	25.0-158			3.77	27
1,2-Dichloroethane	5.00	U	4.25	4.16	85.0	83.2	1	29.0-151			2.14	27
1,1-Dichloroethene	5.00	U	4.63	4.19	92.6	83.8	1	11.0-160			9.98	29
cis-1,2-Dichloroethene	5.00	U	4.68	4.37	93.6	87.4	1	10.0-160			6.85	27
trans-1,2-Dichloroethene	5.00	U	4.63	4.10	92.6	82.0	1	17.0-153			12.1	27
1,2-Dichloropropane	5.00	U	4.04	3.98	80.8	79.6	1	30.0-156			1.50	27
1,1-Dichloropropene	5.00	U	4.33	3.91	86.6	78.2	1	25.0-158			10.2	27
1,3-Dichloropropane	5.00	U	4.76	4.83	95.2	96.6	1	38.0-147			1.46	27
cis-1,3-Dichloropropene	5.00	U	4.20	4.09	84.0	81.8	1	34.0-149			2.65	28
trans-1,3-Dichloropropene	5.00	U	4.52	4.43	90.4	88.6	1	32.0-149			2.01	28
trans-1,4-Dichloro-2-butene	5.00	U	3.24	3.64	64.8	72.8	1	10.0-157			11.6	37
2,2-Dichloropropane	5.00	U	4.87	4.17	97.4	83.4	1	24.0-152			15.5	29

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L1702116-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1702116-02 02/07/24 21:54 • (MS) R4031642-4 02/07/24 23:47 • (MSD) R4031642-5 02/08/24 00:06

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Di-isopropyl ether	5.00	U	3.85	3.85	77.0	77.0	1	21.0-160			0.000	28
Ethylbenzene	5.00	U	4.55	4.28	91.0	85.6	1	30.0-155			6.12	27
Hexachloro-1,3-butadiene	5.00	U	4.44	4.70	88.8	94.0	1	20.0-154			5.69	34
2-Hexanone	25.0	U	22.5	23.8	90.0	95.2	1	21.0-160			5.62	29
n-Hexane	5.00	U	3.59	3.26	71.8	65.2	1	10.0-153			9.64	28
Iodomethane	25.0	U	23.1	21.7	92.4	86.8	1	10.0-160			6.25	40
Isopropylbenzene	5.00	U	4.54	4.29	90.8	85.8	1	28.0-157			5.66	27
p-Isopropyltoluene	5.00	U	4.27	4.28	85.4	85.6	1	30.0-154			0.234	29
2-Butanone (MEK)	25.0	U	22.4	25.0	89.6	100	1	10.0-160			11.0	32
Methylene Chloride	5.00	U	4.30	4.15	86.0	83.0	1	23.0-144			3.55	28
4-Methyl-2-pentanone (MIBK)	25.0	U	24.4	25.8	97.6	103	1	29.0-160			5.58	29
Methyl tert-butyl ether	5.00	0.348	5.06	5.22	94.2	97.4	1	28.0-150			3.11	29
Naphthalene	5.00	U	5.22	5.21	104	104	1	12.0-156			0.192	35
n-Propylbenzene	5.00	U	4.24	4.12	84.8	82.4	1	31.0-154			2.87	28
Styrene	5.00	U	4.12	4.16	82.4	83.2	1	33.0-155			0.966	28
1,1,1,2-Tetrachloroethane	5.00	U	4.70	4.58	94.0	91.6	1	36.0-151			2.59	29
1,1,2,2-Tetrachloroethane	5.00	U	5.49	5.73	110	115	1	33.0-150			4.28	28
1,1,2-Trichlorotrifluoroethane	5.00	U	4.53	4.11	90.6	82.2	1	23.0-160			9.72	30
Tetrachloroethene	5.00	2.13	6.60	6.19	89.4	81.2	1	10.0-160			6.41	27
Toluene	5.00	U	4.44	4.28	88.8	85.6	1	26.0-154			3.67	28
1,2,3-Trichlorobenzene	5.00	U	4.65	5.03	93.0	101	1	17.0-150			7.85	36
1,2,4-Trichlorobenzene	5.00	U	4.74	4.50	94.8	90.0	1	24.0-150			5.19	33
1,1,1-Trichloroethane	5.00	U	4.62	4.11	92.4	82.2	1	23.0-160			11.7	28
1,1,2-Trichloroethane	5.00	U	4.96	4.97	99.2	99.4	1	35.0-147			0.201	27
Trichloroethene	5.00	0.325	4.53	4.52	84.1	83.9	1	10.0-160			0.221	25
Trichlorofluoromethane	5.00	U	4.29	3.90	85.8	78.0	1	17.0-160			9.52	31
1,2,3-Trichloropropane	5.00	U	4.75	4.81	95.0	96.2	1	34.0-151			1.26	29
1,2,4-Trimethylbenzene	5.00	U	4.26	4.15	85.2	83.0	1	26.0-154			2.62	27
1,2,3-Trimethylbenzene	5.00	U	4.36	4.34	87.2	86.8	1	32.0-149			0.460	28
1,3,5-Trimethylbenzene	5.00	U	4.35	4.13	87.0	82.6	1	28.0-153			5.19	27
Vinyl acetate	25.0	U	25.0	26.4	100	106	1	12.0-160			5.45	31
Vinyl chloride	5.00	U	4.30	3.80	86.0	76.0	1	10.0-160			12.3	27
Xylenes, Total	15.0	U	14.1	13.5	94.0	90.0	1	29.0-154			4.35	28
(S) Toluene-d8					102	104	80.0-120					
(S) 4-Bromofluorobenzene					103	101	77.0-126					
(S) 1,2-Dichloroethane-d4					88.9	88.9	70.0-130					

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Method Blank (MB)

(MB) R4032068-1 02/09/24 14:26

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
EPH Screen	U		100	300
(S) o-Terphenyl	59.8			40.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4032068-2 02/09/24 14:40 • (LCSD) R4032068-3 02/09/24 14:55

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
EPH Screen	3100	1850	1910	59.7	61.6	40.0-140			3.19	25
(S) o-Terphenyl				59.2	58.6	40.0-140				

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Method Blank (MB)

(MB) R4033941-1 02/14/24 09:41

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C9-C18 Aliphatics	U		200	600
Unadjusted C19-C36 Aliphatics	U		200	600
(S) 1-Chloro-octadecane	59.0			40.0-140

Method Blank (MB)

(MB) R4033941-4 02/14/24 10:54

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C11-C22 Aromatics	U		200	600
(S) o-Terphenyl	65.1			40.0-140
(S) 2-Fluorobiphenyl	83.4			40.0-140
(S) 2-Bromonaphthalene	77.3			40.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4033941-2 02/14/24 10:05 • (LCSD) R4033941-3 02/14/24 10:29

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C9-C18 Aliphatics	600	363	356	60.5	59.3	40.0-140			1.95	25
Unadjusted C19-C36 Aliphatics	800	629	626	78.6	78.3	40.0-140			0.478	25
(S) 1-Chloro-octadecane				54.4	52.4	40.0-140				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4033941-5 02/14/24 11:18 • (LCSD) R4033941-6 02/14/24 11:42

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C11-C22 Aromatics	1700	1300	1290	76.5	75.9	40.0-140			0.772	25
(S) o-Terphenyl				68.9	68.0	40.0-140				
(S) 2-Fluorobiphenyl				87.9	84.7	40.0-140				
(S) 2-Bromonaphthalene				77.8	74.3	40.0-140				

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Method Blank (MB)

(MB) R4033384-3 02/13/24 15:35

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acenaphthene	U		0.0886	1.00
Acenaphthylene	U		0.0921	1.00
Anthracene	U		0.0804	1.00
Benzidine	U		3.74	10.0
Benzo(a)anthracene	U		0.199	1.00
Benzo(b)fluoranthene	U		0.130	1.00
Benzo(k)fluoranthene	U		0.120	1.00
Benzo(g,h,i)perylene	U		0.121	1.00
Benzo(a)pyrene	U		0.0381	1.00
Bis(2-chlorethoxy)methane	U		0.116	10.0
Bis(2-chloroethyl)ether	U		0.137	10.0
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0
4-Bromophenyl-phenylether	U		0.0877	10.0
2-Chloronaphthalene	U		0.0648	1.00
4-Chlorophenyl-phenylether	U		0.0926	10.0
Chrysene	U		0.130	1.00
Dibenz(a,h)anthracene	U		0.0644	1.00
3,3-Dichlorobenzidine	U		0.212	10.0
2,4-Dinitrotoluene	U		0.0983	10.0
2,6-Dinitrotoluene	U		0.250	10.0
Fluoranthene	U		0.102	1.00
Fluorene	U		0.0844	1.00
Hexachlorobenzene	U		0.0755	1.00
Hexachloro-1,3-butadiene	U		0.0968	10.0
Hexachlorocyclopentadiene	U		0.0598	10.0
Hexachloroethane	U		0.127	10.0
Indeno(1,2,3-cd)pyrene	U		0.279	1.00
Isophorone	U		0.143	10.0
Naphthalene	U		0.159	1.00
Nitrobenzene	U		0.297	10.0
n-Nitrosodimethylamine	U		0.998	10.0
n-Nitrosodiphenylamine	U		2.37	10.0
n-Nitrosodi-n-propylamine	U		0.261	10.0
Phenanthrene	U		0.112	1.00
Benzylbutyl phthalate	U		0.765	3.00
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00
Di-n-butyl phthalate	U		0.453	3.00
Diethyl phthalate	U		0.287	3.00
Dimethyl phthalate	U		0.260	3.00
Di-n-octyl phthalate	U		0.932	3.00

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Method Blank (MB)

(MB) R4033384-3 02/13/24 15:35

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Pyrene	U		0.107	1.00
1,2,4-Trichlorobenzene	U		0.0698	10.0
Aniline	U		1.65	10.0
1,2-Diphenylhydrazine	U	N2	0.105	10.0
Benzyl alcohol	U		0.563	10.0
4-Chloroaniline	U		0.234	10.0
4-Chloro-3-methylphenol	U		0.131	10.0
2-Chlorophenol	U		0.133	10.0
Dibenzofuran	U		0.0970	10.0
2,4-Dichlorophenol	U		0.102	10.0
2,4-Dimethylphenol	U		0.0636	10.0
4,6-Dinitro-2-methylphenol	U		1.12	10.0
2,4-Dinitrophenol	U		5.93	10.0
2-Methylnaphthalene	U		0.117	1.00
2-Methylphenol	U		0.0929	10.0
3&4-Methyl Phenol	U		0.168	10.0
2-Nitroaniline	U		0.102	10.0
3-Nitroaniline	U		0.0869	10.0
4-Nitroaniline	U		0.0910	10.0
2-Nitrophenol	U		0.117	10.0
4-Nitrophenol	U		0.143	10.0
Pentachlorophenol	U		0.313	10.0
Phenol	U		4.33	10.0
Pyridine	U		0.627	10.0
2,4,6-Trichlorophenol	U		0.100	10.0
Acetophenone	U		0.208	10.0
Diphenylamine	U		2.37	10.0
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0
2,3,4,6-Tetrachlorophenol	U		0.231	10.0
2,4,5-Trichlorophenol	U		0.109	10.0
(S) 2-Fluorophenol	30.0			10.0-120
(S) Phenol-d5	19.7			10.0-120
(S) Nitrobenzene-d5	47.2			10.0-127
(S) 2-Fluorobiphenyl	51.5			10.0-130
(S) 2,4,6-Tribromophenol	34.6			10.0-155
(S) p-Terphenyl-d14	59.4			10.0-128

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Method Blank (MB)

(MB) R4036067-2 02/19/24 22:52

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
2-Acetylaminofluorene	U		0.253	10.0
4-Aminobiphenyl	U		0.461	10.0
Chlorobenzilate	U		3.84	50.0
Diallate	U		0.524	10.0
2,6-Dichlorophenol	U		0.102	10.0
Dimethoate	U		5.05	50.0
P-(Dimethylamino) Azobenzene	U		3.69	10.0
Dimethylbenz (A) Anthracene	U		1.71	10.0
3,3-Dimethylbenzidine	U		3.39	10.0
a,a-Dimethylphenethylamine	U		3.13	50.0
1,3-Dinitrobenzene	U		0.359	10.0
Diphenylamine	U		2.37	10.0
Dinoseb	U		8.01	50.0
Disulfoton	U		0.267	10.0
Ethyl methanesulfonate	U		0.326	10.0
Ethyl Parathion	U		0.379	10.0
Famphur	U		3.92	20.0
Hexachloropropene	U		0.149	50.0
Hexachlorophene	U		1.44	50.0
Isodrin	U		4.11	10.0
Isosafrole	U		3.88	10.0
Kepone	U		2.66	20.0
Methapyrilene	U		10.0	50.0
3-Methylcholanthrene	U		0.164	10.0
Methyl methanesulfonate	U		3.40	50.0
Methyl parathion	U		0.213	10.0
1,4-Naphthoquinone	U		5.56	50.0
1-Naphthylamine	U		0.289	10.0
2-Naphthylamine	U		4.48	10.0
5-Nitro-o-toluidine	U		1.99	10.0
4-Nitroquinoline 1-oxide	U		2.03	10.0
n-Nitrosodiethylamine	U		3.57	10.0
n-Nitrosodi-n-butylamine	U		3.91	10.0
n-Nitrosomethylethylamine	U		3.25	10.0
n-Nitrosomorpholine	U		3.25	10.0
n-Nitrosopiperidine	U		3.72	10.0
n-Nitrosopyrrolidine	U		3.39	10.0
Pentachlorobenzene	U		4.15	10.0
Pentachloroethane	U		2.83	50.0
Pentachloronitrobenzene	U		4.15	10.0

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Method Blank (MB)

(MB) R4036067-2 02/19/24 22:52

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Phenacetin	U		4.66	10.0
p-Phenylenediamine	U		387	6900
Phorate	U		4.86	50.0
2-Picoline	U		6.83	50.0
Pronamide	U		4.21	10.0
Safrole	U		3.68	10.0
Sulfotep	U		3.99	50.0
Thionazin	U		4.07	10.0
o-Toluidine	U		3.53	10.0
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0
1,3,5-Trinitrobenzene	U		1.32	10.0

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4033384-1 02/13/24 14:52 • (LCSD) R4033384-2 02/13/24 15:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acenaphthene	50.0	24.8	28.5	49.6	57.0	41.0-120			13.9	22
Acenaphthylene	50.0	25.8	28.9	51.6	57.8	43.0-120			11.3	22
Anthracene	50.0	27.1	29.2	54.2	58.4	45.0-120			7.46	20
Benzdine	100	40.0	23.1	40.0	23.1	10.0-120		J3	53.6	36
Benzo(a)anthracene	50.0	27.0	27.9	54.0	55.8	47.0-120			3.28	20
Benzo(b)fluoranthene	50.0	25.3	26.0	50.6	52.0	46.0-120			2.73	20
Benzo(k)fluoranthene	50.0	25.5	26.3	51.0	52.6	46.0-120			3.09	21
Benzo(g,h,i)perylene	50.0	23.1	27.1	46.2	54.2	48.0-121	J4		15.9	20
Benzo(a)pyrene	50.0	25.8	26.8	51.6	53.6	47.0-120			3.80	20
Bis(2-chlorethoxy)methane	50.0	22.6	26.2	45.2	52.4	33.0-120			14.8	24
Bis(2-chloroethyl)ether	50.0	25.7	30.4	51.4	60.8	23.0-120			16.8	33
2,2-Oxybis(1-Chloropropane)	50.0	22.5	26.2	45.0	52.4	28.0-120			15.2	31
4-Bromophenyl-phenylether	50.0	22.3	22.0	44.6	44.0	45.0-120	J4	J4	1.35	20
2-Chloronaphthalene	50.0	23.0	26.2	46.0	52.4	37.0-120			13.0	25
4-Chlorophenyl-phenylether	50.0	23.6	25.8	47.2	51.6	44.0-120			8.91	20
Chrysene	50.0	25.7	27.1	51.4	54.2	48.0-120			5.30	20
Dibenz(a,h)anthracene	50.0	25.0	26.9	50.0	53.8	47.0-120			7.32	20
3,3-Dichlorobenzidine	100	57.1	59.6	57.1	59.6	44.0-120			4.28	20
2,4-Dinitrotoluene	50.0	26.9	28.7	53.8	57.4	49.0-124			6.47	20
2,6-Dinitrotoluene	50.0	24.2	26.4	48.4	52.8	46.0-120			8.70	21
Fluoranthene	50.0	28.6	30.8	57.2	61.6	51.0-120			7.41	20
Fluorene	50.0	25.5	29.0	51.0	58.0	47.0-120			12.8	20

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Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4033384-1 02/13/24 14:52 • (LCSD) R4033384-2 02/13/24 15:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Hexachlorobenzene	50.0	21.5	21.8	43.0	43.6	44.0-120	J4	J4	1.39	20
Hexachloro-1,3-butadiene	50.0	16.2	17.9	32.4	35.8	19.0-120			9.97	32
Hexachlorocyclopentadiene	50.0	12.5	12.1	25.0	24.2	15.0-120			3.25	31
Hexachloroethane	50.0	24.3	28.9	48.6	57.8	15.0-120			17.3	37
Indeno(1,2,3-cd)pyrene	50.0	25.8	27.8	51.6	55.6	49.0-122			7.46	20
Isophorone	50.0	23.0	26.6	46.0	53.2	36.0-120			14.5	23
Naphthalene	50.0	20.7	23.5	41.4	47.0	27.0-120			12.7	27
Nitrobenzene	50.0	21.2	25.5	42.4	51.0	27.0-120			18.4	29
n-Nitrosodimethylamine	50.0	21.0	28.5	42.0	57.0	10.0-120			30.3	40
n-Nitrosodiphenylamine	50.0	26.0	28.2	52.0	56.4	47.0-120			8.12	20
n-Nitrosodi-n-propylamine	50.0	26.7	32.3	53.4	64.6	31.0-120			19.0	28
Phenanthrene	50.0	26.5	28.4	53.0	56.8	46.0-120			6.92	20
Benzylbutyl phthalate	50.0	32.2	32.6	64.4	65.2	43.0-121			1.23	20
Bis(2-Ethylhexyl)phthalate	50.0	31.5	32.3	63.0	64.6	43.0-122			2.51	20
Di-n-butyl phthalate	50.0	30.0	32.0	60.0	64.0	49.0-121			6.45	20
Diethyl phthalate	50.0	28.1	31.0	56.2	62.0	48.0-122			9.81	20
Dimethyl phthalate	50.0	27.2	29.2	54.4	58.4	48.0-120			7.09	20
Di-n-octyl phthalate	50.0	31.4	32.0	62.8	64.0	42.0-125			1.89	20
Pyrene	50.0	26.0	27.0	52.0	54.0	47.0-120			3.77	20
1,2,4-Trichlorobenzene	50.0	18.9	21.2	37.8	42.4	24.0-120			11.5	29
Aniline	50.0	24.0	26.4	48.0	52.8	13.0-120			9.52	31
1,2-Diphenylhydrazine	50.0	29.1	34.6	58.2	69.2	41.0-126	N2	N2	17.3	20
Benzyl alcohol	50.0	20.3	24.3	40.6	48.6	25.0-120			17.9	26
4-Chloroaniline	50.0	25.1	27.6	50.2	55.2	25.0-120			9.49	25
4-Chloro-3-methylphenol	50.0	23.3	25.0	46.6	50.0	40.0-120			7.04	21
2-Chlorophenol	50.0	21.3	25.2	42.6	50.4	25.0-120			16.8	35
Dibenzofuran	50.0	24.5	26.7	49.0	53.4	44.0-120			8.59	22
2,4-Dichlorophenol	50.0	21.2	23.0	42.4	46.0	36.0-120			8.14	26
2,4-Dimethylphenol	50.0	19.3	23.3	38.6	46.6	33.0-120			18.8	26
4,6-Dinitro-2-methylphenol	50.0	27.8	28.4	55.6	56.8	38.0-138			2.14	25
2,4-Dinitrophenol	50.0	24.8	27.5	49.6	55.0	10.0-120			10.3	39
2-Methylnaphthalene	50.0	21.3	23.5	42.6	47.0	33.0-120			9.82	25
2-Methylphenol	50.0	18.9	22.2	37.8	44.4	28.0-120			16.1	29
3&4-Methyl Phenol	50.0	20.1	23.8	40.2	47.6	31.0-120			16.9	30
2-Nitroaniline	50.0	26.6	29.4	53.2	58.8	43.0-120			10.0	22
3-Nitroaniline	50.0	25.9	28.1	51.8	56.2	38.0-120			8.15	21
4-Nitroaniline	50.0	30.8	34.7	61.6	69.4	18.0-160			11.9	21
2-Nitrophenol	50.0	19.6	22.8	39.2	45.6	31.0-120			15.1	29
4-Nitrophenol	50.0	12.6	13.3	25.2	26.6	10.0-120			5.41	33
Pentachlorophenol	50.0	20.2	21.2	40.4	42.4	23.0-120			4.83	25

¹Cp

²Tc

³Ss

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⁶Qc

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⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4033384-1 02/13/24 14:52 • (LCSD) R4033384-2 02/13/24 15:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Phenol	50.0	9.01	10.6	18.0	21.2	10.0-120			16.2	36
Pyridine	50.0	14.6	14.6	29.2	29.2	10.0-120			0.000	38
2,4,6-Trichlorophenol	50.0	23.1	25.2	46.2	50.4	42.0-120			8.70	23
Acetophenone	50.0	23.5	27.6	47.0	55.2	29.0-120			16.0	28
Diphenylamine	50.0	26.0	28.2	52.0	56.4	35.0-120			8.12	20
1,2,4,5-Tetrachlorobenzene	50.0	0.130	0.106	0.260	0.212	31.0-121	J4	J4	20.3	27
2,3,4,6-Tetrachlorophenol	50.0	0.388	0.346	0.776	0.692	42.0-132	J4	J4	11.4	22
2,4,5-Trichlorophenol	50.0	23.9	26.3	47.8	52.6	44.0-120			9.56	22
(S) 2-Fluorophenol				28.0	35.2	10.0-120				
(S) Phenol-d5				17.1	20.3	10.0-120				
(S) Nitrobenzene-d5				34.6	41.6	10.0-127				
(S) 2-Fluorobiphenyl				43.6	49.6	10.0-130				
(S) 2,4,6-Tribromophenol				37.0	36.8	10.0-155				
(S) p-Terphenyl-d14				41.6	49.5	10.0-128				

Laboratory Control Sample (LCS)

(LCS) R4036067-1 02/19/24 22:32

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
2-Acetylaminofluorene	50.0	44.1	88.2	32.0-120	
4-Aminobiphenyl	50.0	23.2	46.4	20.0-120	
Chlorobenzilate	50.0	31.7	63.4	29.0-128	
Diallate	50.0	29.5	59.0	30.0-120	
2,6-Dichlorophenol	50.0	27.8	55.6	19.0-136	
Dimethoate	50.0	35.1	70.2	11.0-134	
P-(Dimethylamino) Azobenzene	50.0	33.5	67.0	27.0-120	
Dimethylbenz (A) Anthracene	50.0	8.80	17.6	14.0-124	
3,3-Dimethylbenzidine	50.0	19.4	38.8	13.0-120	
a,a-Dimethylphenethylamine	50.0	0.000	0.000	10.0-129	J4
1,3-Dinitrobenzene	50.0	30.5	61.0	34.0-120	
Diphenylamine	50.0	29.7	59.4	35.0-120	
Dinoseb	50.0	35.6	71.2	39.0-120	
Disulfoton	50.0	28.3	56.6	32.0-120	
Ethyl methanesulfonate	50.0	23.1	46.2	10.0-120	
Ethyl Parathion	50.0	38.1	76.2	46.0-130	
Famphur	50.0	41.0	82.0	32.0-120	
Hexachloropropene	50.0	26.1	52.2	10.0-120	
Hexachlorophene	100	51.5	51.5	10.0-120	

Cp

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Cn

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Qc

Gl

Al

Sc

Laboratory Control Sample (LCS)

(LCS) R4036067-1 02/19/24 22:32

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Isodrin	50.0	26.9	53.8	22.0-157	
Isosafrole	50.0	25.6	51.2	25.0-133	
Kepone	50.0	28.3	56.6	10.0-120	
Methapyrilene	50.0	5.05	10.1	10.0-120	
3-Methylcholanthrene	50.0	29.6	59.2	30.0-160	
Methyl methanesulfonate	50.0	20.3	40.6	10.0-120	
Methyl parathion	50.0	46.8	93.6	42.0-120	
1,4-Naphthoquinone	50.0	2.10	4.20	50.0-150	J4
1-Naphthylamine	50.0	19.2	38.4	19.0-120	
2-Naphthylamine	50.0	8.70	17.4	10.0-120	
5-Nitro-o-toluidine	50.0	35.4	70.8	34.0-120	
4-Nitroquinoline 1-oxide	50.0	32.2	64.4	10.0-159	
n-Nitrosodiethylamine	50.0	24.3	48.6	10.0-120	
n-Nitrosodi-n-butylamine	50.0	36.5	73.0	13.0-143	
n-Nitrosomethylethylamine	50.0	19.8	39.6	10.0-120	
n-Nitrosomorpholine	50.0	22.9	45.8	10.0-120	
n-Nitrosopiperidine	50.0	22.7	45.4	10.0-160	
n-Nitrosopyrrolidine	50.0	24.6	49.2	10.0-124	
Pentachlorobenzene	50.0	26.7	53.4	25.0-120	
Pentachloroethane	50.0	25.7	51.4	10.0-120	
Pentachloronitrobenzene	50.0	36.5	73.0	34.0-132	
Phenacetin	50.0	35.9	71.8	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	37.9	75.8	13.0-160	
2-Picoline	50.0	19.7	39.4	10.0-120	
Pronamide	50.0	32.0	64.0	38.0-130	
Safrole	50.0	26.1	52.2	21.0-120	
Sulfotep	50.0	42.9	85.8	52.0-120	
Thionazin	50.0	39.3	78.6	38.0-121	
o-Toluidine	50.0	26.9	53.8	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	29.7	59.4	11.0-135	
1,3,5-Trinitrobenzene	50.0	43.5	87.0	37.0-147	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

J	The identification of the analyte is acceptable; the reported value is an estimate.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
J7	Surrogate recovery cannot be used for control limit evaluation due to dilution.
N2	Analyte reported using a calibration and validation based on Azobenzene (CAS 103-33-3). 1,2-Diphenylhydrazine decomposes into Azobenzene during the analysis.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

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⁹ Sc

ACCREDITATIONS & LOCATIONS

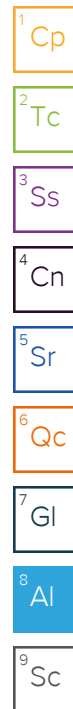
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP, LLC EMLAP	100789
A2LA -- ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



February 20, 2024

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1704368

Samples Received: 02/09/2024

Project Number:

Description: AOC-16

Report To:

Abby Small

1999 Broadway Suite 2225

Denver, CO 80202

¹Cp

²Tc

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Entire Report Reviewed By:



Kelly Mercer

Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

SDG:

L1704368

DATE/TIME:

02/20/24 11:35

PAGE:

1 of 34

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¹ Cp
² Tc
³ Ss
⁴ Cn
⁵ Sr
⁶ Qc
⁷ Gl
⁸ Al
⁹ Sc

SAMPLE SUMMARY

CMR-SP200-240208 L1704368-01 GW

Collected by
Kyle G

Collected date/time
02/08/24 11:25

Received date/time
02/09/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2225136	1	02/13/24 13:24	02/13/24 13:24	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2224381	1	02/12/24 04:06	02/12/24 04:06	DYW	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2227110	1	02/15/24 19:25	02/15/24 19:25	JCP	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2227694	1	02/16/24 05:31	02/19/24 08:39	JDG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2227694	1	02/16/24 05:31	02/19/24 09:13	JDG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2227694	5	02/16/24 05:31	02/19/24 11:28	JDG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2224421	5	02/13/24 20:48	02/14/24 17:22	AMS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2224421	5	02/13/24 20:48	02/16/24 07:23	DSH	Mt. Juliet, TN

¹Cp

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CMR-DS01-240208 L1704368-02 GW

Collected by
Kyle G

Collected date/time
02/08/24 00:00

Received date/time
02/09/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2225136	1	02/13/24 16:57	02/13/24 16:57	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2224381	1	02/12/24 04:25	02/12/24 04:25	DYW	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2227110	1	02/15/24 19:46	02/15/24 19:46	JCP	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2227694	1	02/16/24 05:31	02/19/24 09:03	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2227694	1	02/16/24 05:31	02/19/24 09:36	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2227694	5	02/16/24 05:31	02/19/24 11:52	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2224421	5	02/13/24 20:48	02/14/24 17:44	AMS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2224421	5	02/13/24 20:48	02/16/24 07:44	DSH	Mt. Juliet, TN

⁶Qc

⁷Gl

⁸Al

⁹Sc

TRIP BLANK L1704368-03 GW

Collected by
Kyle G

Collected date/time
02/08/24 00:00

Received date/time
02/09/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2225136	1	02/13/24 12:49	02/13/24 12:49	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2224381	1	02/12/24 00:39	02/12/24 00:39	JAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2224708	1	02/12/24 21:52	02/12/24 21:52	KSD	Mt. Juliet, TN

CASE NARRATIVE

All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Kelly Mercer
Project Manager

Project Narrative

Due to multiple preparation procedures, calculated analytes are not reported in the quality control samples for EPH and VPH Methods.

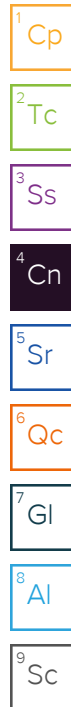
Sample Delivery Group (SDG) Narrative

2-chloroethylvinyl ether degrades under acidic conditions. Associated results were performed from an acid-preserved sample. Compound results not determined.

<u>Lab Sample ID</u>	<u>Project Sample ID</u>	<u>Method</u>
L1704368-01	CMR-SP200-240208	8260B
L1704368-02	CMR-DS01-240208	8260B
L1704368-03	TRIP BLANK	8260B

Analyzed from headspace vial.

<u>Lab Sample ID</u>	<u>Project Sample ID</u>	<u>Method</u>
L1704368-03	TRIP BLANK	8260B



Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

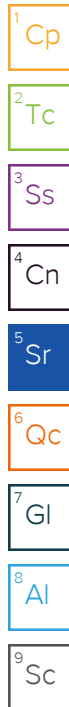
Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	97.9	J	33.3	100	1	02/13/2024 13:24	WG2225136
Unadjusted C9-C12 Aliphatics	2110		33.3	100	1	02/13/2024 13:24	WG2225136
Unadjusted C9-C10 Aromatics	500		33.3	100	1	02/13/2024 13:24	WG2225136
Adjusted C5-C8 Aliphatics	95.2	J	33.3	100	1	02/13/2024 13:24	WG2225136
Adjusted C9-C12 Aliphatics	2080		33.3	100	1	02/13/2024 13:24	WG2225136
Total VPH	2710		66.7	200	1	02/13/2024 13:24	WG2225136
(S) 2,5-Dibromotoluene(FID)	65.1	J2		70.0-130		02/13/2024 13:24	WG2225136
(S) 2,5-Dibromotoluene(PID)	66.7	J2		70.0-130		02/13/2024 13:24	WG2225136

Sample Narrative:

L1704368-01 WG2225136: Surrogate failure due to matrix interference.

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		11.3	25.0	1	02/12/2024 04:06	WG2224381
Acrylonitrile	U		0.671	5.00	1	02/15/2024 19:25	WG2227110
Benzene	2.51		0.0941	0.500	1	02/12/2024 04:06	WG2224381
Bromobenzene	U		0.118	0.500	1	02/12/2024 04:06	WG2224381
Bromodichloromethane	U		0.136	0.500	1	02/12/2024 04:06	WG2224381
Bromochloromethane	U		0.128	0.500	1	02/12/2024 04:06	WG2224381
Bromoform	U		0.129	0.500	1	02/12/2024 04:06	WG2224381
Bromomethane	U		0.605	2.50	1	02/12/2024 04:06	WG2224381
n-Butylbenzene	U		0.157	0.500	1	02/12/2024 04:06	WG2224381
sec-Butylbenzene	0.662		0.125	0.500	1	02/12/2024 04:06	WG2224381
tert-Butylbenzene	U		0.127	0.500	1	02/12/2024 04:06	WG2224381
Carbon disulfide	U		0.0962	0.500	1	02/12/2024 04:06	WG2224381
Carbon tetrachloride	U		0.128	0.500	1	02/12/2024 04:06	WG2224381
Chlorobenzene	U		0.117	0.500	1	02/12/2024 04:06	WG2224381
Chlorodibromomethane	U		0.140	0.500	1	02/12/2024 04:06	WG2224381
Chloroethane	U		0.192	2.50	1	02/12/2024 04:06	WG2224381
2-Chloroethyl vinyl ether	U		0.575	50.0	1	02/15/2024 19:25	WG2227110
Chloroform	U		0.111	0.500	1	02/12/2024 04:06	WG2224381
Chloromethane	U		0.960	1.25	1	02/15/2024 19:25	WG2227110
2-Chlorotoluene	U		0.106	0.500	1	02/12/2024 04:06	WG2224381
4-Chlorotoluene	U		0.114	0.500	1	02/12/2024 04:06	WG2224381
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	02/12/2024 04:06	WG2224381
1,2-Dibromoethane	U		0.126	0.500	1	02/12/2024 04:06	WG2224381
Dibromomethane	U		0.122	0.500	1	02/12/2024 04:06	WG2224381
1,2-Dichlorobenzene	U		0.107	0.500	1	02/12/2024 04:06	WG2224381
1,3-Dichlorobenzene	U		0.299	0.500	1	02/12/2024 04:06	WG2224381
1,4-Dichlorobenzene	U		0.120	0.500	1	02/12/2024 04:06	WG2224381
Dichlorodifluoromethane	U		0.374	2.50	1	02/15/2024 19:25	WG2227110
1,1-Dichloroethane	U		0.100	0.500	1	02/12/2024 04:06	WG2224381
1,2-Dichloroethane	U		0.0819	0.500	1	02/12/2024 04:06	WG2224381
1,1-Dichloroethene	U		0.188	0.500	1	02/12/2024 04:06	WG2224381
cis-1,2-Dichloroethene	U		0.126	0.500	1	02/12/2024 04:06	WG2224381
trans-1,2-Dichloroethene	U		0.149	0.500	1	02/12/2024 04:06	WG2224381
1,2-Dichloropropane	U		0.149	0.500	1	02/15/2024 19:25	WG2227110
1,1-Dichloropropene	U		0.142	0.500	1	02/12/2024 04:06	WG2224381
1,3-Dichloropropane	U		0.109	1.00	1	02/12/2024 04:06	WG2224381
cis-1,3-Dichloropropene	U		0.111	0.500	1	02/12/2024 04:06	WG2224381
trans-1,3-Dichloropropene	U		0.118	0.500	1	02/12/2024 04:06	WG2224381
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	02/15/2024 19:25	WG2227110
2,2-Dichloropropane	U		0.161	0.500	1	02/12/2024 04:06	WG2224381

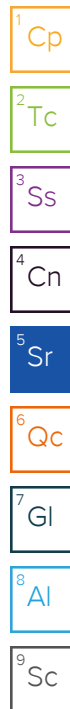


Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Di-isopropyl ether	U		0.105	0.500	1	02/15/2024 19:25	WG2227110
Ethylbenzene	2.56		0.137	0.500	1	02/12/2024 04:06	WG2224381
Hexachloro-1,3-butadiene	U		0.337	1.00	1	02/12/2024 04:06	WG2224381
2-Hexanone	U		0.787	5.00	1	02/15/2024 19:25	WG2227110
n-Hexane	U		0.749	5.00	1	02/15/2024 19:25	WG2227110
Iodomethane	U		0.554	5.00	1	02/12/2024 04:06	WG2224381
Isopropylbenzene	0.709		0.105	0.500	1	02/12/2024 04:06	WG2224381
p-Isopropyltoluene	0.491	J2	0.120	0.500	1	02/12/2024 04:06	WG2224381
2-Butanone (MEK)	2.07	J2	1.19	5.00	1	02/12/2024 04:06	WG2224381
Methylene Chloride	U		0.430	2.50	1	02/12/2024 04:06	WG2224381
4-Methyl-2-pentanone (MIBK)	3.07	J2	0.478	5.00	1	02/12/2024 04:06	WG2224381
Methyl tert-butyl ether	U		0.101	0.500	1	02/12/2024 04:06	WG2224381
Naphthalene	10.3		0.174	2.50	1	02/12/2024 04:06	WG2224381
n-Propylbenzene	1.23		0.0993	0.500	1	02/12/2024 04:06	WG2224381
Styrene	U		0.118	0.500	1	02/12/2024 04:06	WG2224381
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	02/12/2024 04:06	WG2224381
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	02/12/2024 04:06	WG2224381
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	02/12/2024 04:06	WG2224381
Tetrachloroethene	U		0.300	0.500	1	02/12/2024 04:06	WG2224381
Toluene	2.67		0.278	0.500	1	02/12/2024 04:06	WG2224381
1,2,3-Trichlorobenzene	U		0.164	0.500	1	02/12/2024 04:06	WG2224381
1,2,4-Trichlorobenzene	U		0.481	1.00	1	02/12/2024 04:06	WG2224381
1,1,1-Trichloroethane	U		0.149	0.500	1	02/12/2024 04:06	WG2224381
1,1,2-Trichloroethane	U		0.158	0.500	1	02/12/2024 04:06	WG2224381
Trichloroethene	U		0.190	0.500	1	02/12/2024 04:06	WG2224381
Trichlorofluoromethane	U		0.160	2.50	1	02/12/2024 04:06	WG2224381
1,2,3-Trichloropropane	U		0.237	2.50	1	02/12/2024 04:06	WG2224381
1,2,4-Trimethylbenzene	16.7		0.322	0.500	1	02/12/2024 04:06	WG2224381
1,2,3-Trimethylbenzene	24.2		0.104	0.500	1	02/12/2024 04:06	WG2224381
1,3,5-Trimethylbenzene	13.4		0.104	0.500	1	02/12/2024 04:06	WG2224381
Vinyl acetate	U		0.692	5.00	1	02/15/2024 19:25	WG2227110
Vinyl chloride	U		0.234	0.500	1	02/12/2024 04:06	WG2224381
Xylenes, Total	30.9		0.174	1.50	1	02/12/2024 04:06	WG2224381
(S) Toluene-d8	99.3			80.0-120		02/12/2024 04:06	WG2224381
(S) Toluene-d8	93.4			80.0-120		02/15/2024 19:25	WG2227110
(S) 4-Bromofluorobenzene	105			77.0-126		02/12/2024 04:06	WG2224381
(S) 4-Bromofluorobenzene	113			77.0-126		02/15/2024 19:25	WG2227110
(S) 1,2-Dichloroethane-d4	101			70.0-130		02/12/2024 04:06	WG2224381
(S) 1,2-Dichloroethane-d4	98.1			70.0-130		02/15/2024 19:25	WG2227110

TPH by Method MTDEQ EPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C9-C18 Aliphatics	10900		1000	3000	5	02/19/2024 11:28	WG2227694
Unadjusted C19-C36 Aliphatics	4780		200	600	1	02/19/2024 08:39	WG2227694
Unadjusted C11-C22 Aromatics	4390		200	600	1	02/19/2024 09:13	WG2227694
Unadjusted Total Petroleum Hydrocarbons	20100		1000	3000	5	02/19/2024 11:28	WG2227694
Adjusted C11-C22 Aromatics	4390		200	600	1	02/19/2024 09:13	WG2227694
Adjusted Total Petroleum Hydrocarbons	20100		1000	3000	5	02/19/2024 11:28	WG2227694
(S) o-Terphenyl	51.7			40.0-140		02/19/2024 09:13	WG2227694
(S) 1-Chloro-octadecane	28.6	J2		40.0-140		02/19/2024 11:28	WG2227694
(S) 1-Chloro-octadecane	29.9	J2		40.0-140		02/19/2024 08:39	WG2227694
(S) 2-Fluorobiphenyl	89.2			40.0-140		02/19/2024 09:13	WG2227694
(S) 2-Bromonaphthalene	88.6			40.0-140		02/19/2024 09:13	WG2227694



TPH by Method MTDEQ EPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
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Sample Narrative:

L1704368-01 WG2227694: Dilution and surrogate failure due to matrix interference.

L1704368-01 WG2227694: Surrogate failure due to matrix interference.

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acenaphthene	U		0.443	5.00	5	02/14/2024 17:22	WG2224421
Acenaphthylene	U	J3	0.461	5.00	5	02/14/2024 17:22	WG2224421
Anthracene	U		0.402	5.00	5	02/14/2024 17:22	WG2224421
Benzdine	U	J3 J4	18.7	50.0	5	02/14/2024 17:22	WG2224421
Benzo(a)anthracene	U		0.995	5.00	5	02/14/2024 17:22	WG2224421
Benzo(b)fluoranthene	U		0.650	5.00	5	02/14/2024 17:22	WG2224421
Benzo(k)fluoranthene	U		0.600	5.00	5	02/14/2024 17:22	WG2224421
Benzo(g,h,i)perylene	U		0.605	5.00	5	02/14/2024 17:22	WG2224421
Benzo(a)pyrene	U		0.191	5.00	5	02/14/2024 17:22	WG2224421
Bis(2-chlorethoxy)methane	U	J3	0.580	50.0	5	02/14/2024 17:22	WG2224421
Bis(2-chloroethyl)ether	U	J3	0.685	50.0	5	02/14/2024 17:22	WG2224421
2,2-Oxybis(1-Chloropropane)	U	J3	1.05	50.0	5	02/14/2024 17:22	WG2224421
4-Bromophenyl-phenylether	U		0.439	50.0	5	02/14/2024 17:22	WG2224421
2-Chloronaphthalene	U	J3	0.324	5.00	5	02/14/2024 17:22	WG2224421
4-Chlorophenyl-phenylether	U		0.463	50.0	5	02/14/2024 17:22	WG2224421
Chrysene	U		0.650	5.00	5	02/14/2024 17:22	WG2224421
Dibenz(a,h)anthracene	U		0.322	5.00	5	02/14/2024 17:22	WG2224421
3,3-Dichlorobenzidine	U		1.06	50.0	5	02/14/2024 17:22	WG2224421
2,4-Dinitrotoluene	U		0.491	50.0	5	02/14/2024 17:22	WG2224421
2,6-Dinitrotoluene	U		1.25	50.0	5	02/14/2024 17:22	WG2224421
Fluoranthene	U		0.510	5.00	5	02/14/2024 17:22	WG2224421
Fluorene	U		0.422	5.00	5	02/14/2024 17:22	WG2224421
Hexachlorobenzene	U		0.378	5.00	5	02/14/2024 17:22	WG2224421
Hexachloro-1,3-butadiene	U		0.484	50.0	5	02/14/2024 17:22	WG2224421
Hexachlorocyclopentadiene	U	J3	0.299	50.0	5	02/14/2024 17:22	WG2224421
Hexachloroethane	U		0.635	50.0	5	02/14/2024 17:22	WG2224421
Indeno(1,2,3-cd)pyrene	U		1.40	5.00	5	02/14/2024 17:22	WG2224421
Isophorone	U	J3	0.715	50.0	5	02/14/2024 17:22	WG2224421
Naphthalene	1.74	J J3	0.795	5.00	5	02/14/2024 17:22	WG2224421
Nitrobenzene	U		1.48	50.0	5	02/14/2024 17:22	WG2224421
n-Nitrosodimethylamine	U		4.99	50.0	5	02/14/2024 17:22	WG2224421
n-Nitrosodiphenylamine	U		11.9	50.0	5	02/14/2024 17:22	WG2224421
n-Nitrosodi-n-propylamine	U	J3	1.31	50.0	5	02/14/2024 17:22	WG2224421
Phenanthrene	U		0.560	5.00	5	02/14/2024 17:22	WG2224421
Benzylbutyl phthalate	U		3.83	15.0	5	02/14/2024 17:22	WG2224421
Bis(2-Ethylhexyl)phthalate	U		4.48	15.0	5	02/14/2024 17:22	WG2224421
Di-n-butyl phthalate	U		2.27	15.0	5	02/14/2024 17:22	WG2224421
Diethyl phthalate	U		1.43	15.0	5	02/14/2024 17:22	WG2224421
Dimethyl phthalate	U		1.30	15.0	5	02/14/2024 17:22	WG2224421
Di-n-octyl phthalate	U		4.66	15.0	5	02/14/2024 17:22	WG2224421
Pyrene	0.664	J	0.535	5.00	5	02/14/2024 17:22	WG2224421
1,2,4-Trichlorobenzene	U	J3	0.349	50.0	5	02/14/2024 17:22	WG2224421
Aniline	U	J3	8.25	50.0	5	02/14/2024 17:22	WG2224421
1,2-Diphenylhydrazine	U	N2	0.525	50.0	5	02/14/2024 17:22	WG2224421
Benzyl alcohol	U	J3	2.82	50.0	5	02/14/2024 17:22	WG2224421
4-Chloroaniline	U	J3	1.17	50.0	5	02/14/2024 17:22	WG2224421
4-Chloro-3-methylphenol	U	J3	0.655	50.0	5	02/14/2024 17:22	WG2224421
2-Chlorophenol	U	J3	0.665	50.0	5	02/14/2024 17:22	WG2224421

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

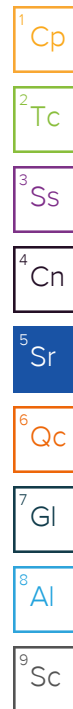
7Gl

8Al

9Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Dibenzofuran	U		0.485	50.0	5	02/14/2024 17:22	WG2224421
2,4-Dichlorophenol	U	J3	0.510	50.0	5	02/14/2024 17:22	WG2224421
2,4-Dimethylphenol	24.2	J J3	0.318	50.0	5	02/14/2024 17:22	WG2224421
4,6-Dinitro-2-methylphenol	U		5.60	50.0	5	02/14/2024 17:22	WG2224421
2,4-Dinitrophenol	U		29.7	50.0	5	02/14/2024 17:22	WG2224421
2-Methylnaphthalene	U	J3	0.585	5.00	5	02/14/2024 17:22	WG2224421
2-Methylphenol	U	J3	0.465	50.0	5	02/14/2024 17:22	WG2224421
3&4-Methyl Phenol	0.870	J J3	0.840	50.0	5	02/14/2024 17:22	WG2224421
2-Nitroaniline	U		0.510	50.0	5	02/14/2024 17:22	WG2224421
3-Nitroaniline	U	J3	0.435	50.0	5	02/14/2024 17:22	WG2224421
4-Nitroaniline	U		0.455	50.0	5	02/14/2024 17:22	WG2224421
2-Nitrophenol	U	J3	0.585	50.0	5	02/14/2024 17:22	WG2224421
4-Nitrophenol	U		0.715	50.0	5	02/14/2024 17:22	WG2224421
Pentachlorophenol	U		1.57	50.0	5	02/14/2024 17:22	WG2224421
Phenol	U	J3	21.7	50.0	5	02/14/2024 17:22	WG2224421
Pyridine	U	J3 J4	3.13	50.0	5	02/14/2024 17:22	WG2224421
2,4,6-Trichlorophenol	U	J3	0.500	50.0	5	02/14/2024 17:22	WG2224421
Acetophenone	U	J3	1.04	50.0	5	02/14/2024 17:22	WG2224421
2-Acetylaminofluorene	U		1.27	50.0	5	02/16/2024 07:23	WG2224421
4-Aminobiphenyl	U		2.30	50.0	5	02/16/2024 07:23	WG2224421
Chlorobenzilate	U		19.2	250	5	02/16/2024 07:23	WG2224421
Diallate	U		2.62	50.0	5	02/16/2024 07:23	WG2224421
2,6-Dichlorophenol	U		0.510	50.0	5	02/16/2024 07:23	WG2224421
Dimethoate	U		25.3	250	5	02/16/2024 07:23	WG2224421
P-(Dimethylamino) Azobenzene	U		18.5	50.0	5	02/16/2024 07:23	WG2224421
Dimethylbenz (A) Anthracene	U		8.55	50.0	5	02/16/2024 07:23	WG2224421
3,3-Dimethylbenzidine	U		16.9	50.0	5	02/16/2024 07:23	WG2224421
a,a-Dimethylphenethylamine	U	J4	15.7	250	5	02/16/2024 07:23	WG2224421
1,3-Dinitrobenzene	U		1.80	50.0	5	02/16/2024 07:23	WG2224421
Diphenylamine	U		11.9	50.0	5	02/14/2024 17:22	WG2224421
Dinoseb	U		40.1	250	5	02/16/2024 07:23	WG2224421
Disulfoton	U		1.33	50.0	5	02/16/2024 07:23	WG2224421
Ethyl methanesulfonate	U		1.63	50.0	5	02/16/2024 07:23	WG2224421
Ethyl Parathion	U		1.90	50.0	5	02/16/2024 07:23	WG2224421
Famphur	U		19.6	100	5	02/16/2024 07:23	WG2224421
Hexachloropropene	U		0.745	250	5	02/16/2024 07:23	WG2224421
Hexachlorophene	U		7.20	250	5	02/16/2024 07:23	WG2224421
Isodrin	U		20.5	50.0	5	02/16/2024 07:23	WG2224421
Isosafrole	U		19.4	50.0	5	02/16/2024 07:23	WG2224421
Kepone	U		13.3	100	5	02/16/2024 07:23	WG2224421
Methapyrilene	U		50.0	250	5	02/16/2024 07:23	WG2224421
3-Methylcholanthrene	U		0.820	50.0	5	02/16/2024 07:23	WG2224421
Methyl methanesulfonate	U		17.0	250	5	02/16/2024 07:23	WG2224421
Methyl parathion	U	J4	1.07	50.0	5	02/16/2024 07:23	WG2224421
1,4-Naphthoquinone	U	J4	27.8	250	5	02/16/2024 07:23	WG2224421
1-Naphthylamine	U		1.44	50.0	5	02/16/2024 07:23	WG2224421
2-Naphthylamine	U		22.4	50.0	5	02/16/2024 07:23	WG2224421
5-Nitro-o-toluidine	U		9.95	50.0	5	02/16/2024 07:23	WG2224421
4-Nitroquinoline 1-oxide	U		10.2	50.0	5	02/16/2024 07:23	WG2224421
n-Nitrosodiethylamine	U		17.9	50.0	5	02/16/2024 07:23	WG2224421
n-Nitrosodi-n-butylamine	U		19.6	50.0	5	02/16/2024 07:23	WG2224421
n-Nitrosomethylethylamine	U		16.3	50.0	5	02/16/2024 07:23	WG2224421
n-Nitrosomorpholine	U		16.3	50.0	5	02/16/2024 07:23	WG2224421
n-Nitrosopiperidine	U		18.6	50.0	5	02/16/2024 07:23	WG2224421
n-Nitrosopyrrolidine	U		16.9	50.0	5	02/16/2024 07:23	WG2224421
Pentachlorobenzene	U		20.8	50.0	5	02/16/2024 07:23	WG2224421



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Pentachloroethane	U		14.1	250	5	02/16/2024 07:23	WG2224421
Pentachloronitrobenzene	U		20.8	50.0	5	02/16/2024 07:23	WG2224421
Phenacetin	U		23.3	50.0	5	02/16/2024 07:23	WG2224421
p-Phenylenediamine	U	J4	1940	34500	5	02/16/2024 07:23	WG2224421
Phorate	U		24.3	250	5	02/16/2024 07:23	WG2224421
2-Picoline	U		34.2	250	5	02/16/2024 07:23	WG2224421
Pronamide	U		21.1	50.0	5	02/16/2024 07:23	WG2224421
Safrole	U		18.4	50.0	5	02/16/2024 07:23	WG2224421
Sulfotep	U		19.9	250	5	02/16/2024 07:23	WG2224421
1,2,4,5-Tetrachlorobenzene	U		0.324	50.0	5	02/14/2024 17:22	WG2224421
2,3,4,6-Tetrachlorophenol	U		1.15	50.0	5	02/14/2024 17:22	WG2224421
Thionazin	U		20.4	50.0	5	02/16/2024 07:23	WG2224421
o-Toluidine	U		17.7	50.0	5	02/16/2024 07:23	WG2224421
2,4,5-Trichlorophenol	U		0.545	50.0	5	02/14/2024 17:22	WG2224421
O,O,O-Triethyl Phosphorothioate	U		14.6	50.0	5	02/16/2024 07:23	WG2224421
1,3,5-Trinitrobenzene	U		6.60	50.0	5	02/16/2024 07:23	WG2224421
(S) 2-Fluorophenol	25.2			10.0-120		02/14/2024 17:22	WG2224421
(S) Phenol-d5	21.8			10.0-120		02/14/2024 17:22	WG2224421
(S) Nitrobenzene-d5	55.8			10.0-127		02/14/2024 17:22	WG2224421
(S) 2-Fluorobiphenyl	33.5			10.0-130		02/14/2024 17:22	WG2224421
(S) 2,4,6-Tribromophenol	44.1			10.0-155		02/14/2024 17:22	WG2224421
(S) p-Terphenyl-d14	22.4			10.0-128		02/14/2024 17:22	WG2224421

Sample Narrative:

L1704368-01 WG2224421: Dilution due to matrix.

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

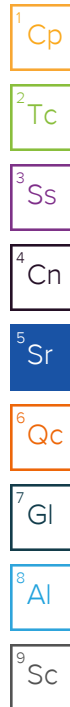
Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	134		33.3	100	1	02/13/2024 16:57	WG2225136
Unadjusted C9-C12 Aliphatics	2270		33.3	100	1	02/13/2024 16:57	WG2225136
Unadjusted C9-C10 Aromatics	544		33.3	100	1	02/13/2024 16:57	WG2225136
Adjusted C5-C8 Aliphatics	131		33.3	100	1	02/13/2024 16:57	WG2225136
Adjusted C9-C12 Aliphatics	2230		33.3	100	1	02/13/2024 16:57	WG2225136
Total VPH	2950		66.7	200	1	02/13/2024 16:57	WG2225136
(S) 2,5-Dibromotoluene(FID)	48.8	J2		70.0-130		02/13/2024 16:57	WG2225136
(S) 2,5-Dibromotoluene(PID)	52.3	J2		70.0-130		02/13/2024 16:57	WG2225136

Sample Narrative:

L1704368-02 WG2225136: Surrogate failure due to matrix interference.

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		11.3	25.0	1	02/12/2024 04:25	WG2224381
Acrylonitrile	U		0.671	5.00	1	02/15/2024 19:46	WG2227110
Benzene	2.03		0.0941	0.500	1	02/12/2024 04:25	WG2224381
Bromobenzene	U		0.118	0.500	1	02/12/2024 04:25	WG2224381
Bromodichloromethane	U		0.136	0.500	1	02/12/2024 04:25	WG2224381
Bromochloromethane	U		0.128	0.500	1	02/12/2024 04:25	WG2224381
Bromoform	U		0.129	0.500	1	02/12/2024 04:25	WG2224381
Bromomethane	U		0.605	2.50	1	02/12/2024 04:25	WG2224381
n-Butylbenzene	U		0.157	0.500	1	02/12/2024 04:25	WG2224381
sec-Butylbenzene	0.711		0.125	0.500	1	02/12/2024 04:25	WG2224381
tert-Butylbenzene	U		0.127	0.500	1	02/12/2024 04:25	WG2224381
Carbon disulfide	U		0.0962	0.500	1	02/12/2024 04:25	WG2224381
Carbon tetrachloride	U		0.128	0.500	1	02/12/2024 04:25	WG2224381
Chlorobenzene	U		0.117	0.500	1	02/12/2024 04:25	WG2224381
Chlorodibromomethane	U		0.140	0.500	1	02/12/2024 04:25	WG2224381
Chloroethane	U		0.192	2.50	1	02/12/2024 04:25	WG2224381
2-Chloroethyl vinyl ether	U		0.575	50.0	1	02/15/2024 19:46	WG2227110
Chloroform	U		0.111	0.500	1	02/12/2024 04:25	WG2224381
Chloromethane	U		0.960	1.25	1	02/15/2024 19:46	WG2227110
2-Chlorotoluene	U		0.106	0.500	1	02/12/2024 04:25	WG2224381
4-Chlorotoluene	U		0.114	0.500	1	02/12/2024 04:25	WG2224381
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	02/12/2024 04:25	WG2224381
1,2-Dibromoethane	U		0.126	0.500	1	02/12/2024 04:25	WG2224381
Dibromomethane	U		0.122	0.500	1	02/12/2024 04:25	WG2224381
1,2-Dichlorobenzene	U		0.107	0.500	1	02/12/2024 04:25	WG2224381
1,3-Dichlorobenzene	U		0.299	0.500	1	02/12/2024 04:25	WG2224381
1,4-Dichlorobenzene	U		0.120	0.500	1	02/12/2024 04:25	WG2224381
Dichlorodifluoromethane	U		0.374	2.50	1	02/15/2024 19:46	WG2227110
1,1-Dichloroethane	U		0.100	0.500	1	02/12/2024 04:25	WG2224381
1,2-Dichloroethane	U		0.0819	0.500	1	02/12/2024 04:25	WG2224381
1,1-Dichloroethene	U		0.188	0.500	1	02/12/2024 04:25	WG2224381
cis-1,2-Dichloroethene	U		0.126	0.500	1	02/12/2024 04:25	WG2224381
trans-1,2-Dichloroethene	U		0.149	0.500	1	02/12/2024 04:25	WG2224381
1,2-Dichloropropane	U		0.149	0.500	1	02/15/2024 19:46	WG2227110
1,1-Dichloropropene	U		0.142	0.500	1	02/12/2024 04:25	WG2224381
1,3-Dichloropropane	U		0.109	1.00	1	02/12/2024 04:25	WG2224381
cis-1,3-Dichloropropene	U		0.111	0.500	1	02/12/2024 04:25	WG2224381
trans-1,3-Dichloropropene	U		0.118	0.500	1	02/12/2024 04:25	WG2224381
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	02/15/2024 19:46	WG2227110
2,2-Dichloropropane	U		0.161	0.500	1	02/12/2024 04:25	WG2224381

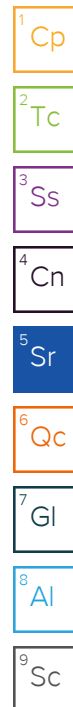


Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Di-isopropyl ether	U		0.105	0.500	1	02/15/2024 19:46	WG2227110
Ethylbenzene	2.54		0.137	0.500	1	02/12/2024 04:25	WG2224381
Hexachloro-1,3-butadiene	U		0.337	1.00	1	02/12/2024 04:25	WG2224381
2-Hexanone	U		0.787	5.00	1	02/15/2024 19:46	WG2227110
n-Hexane	U		0.749	5.00	1	02/15/2024 19:46	WG2227110
Iodomethane	U		0.554	5.00	1	02/12/2024 04:25	WG2224381
Isopropylbenzene	0.728		0.105	0.500	1	02/12/2024 04:25	WG2224381
p-Isopropyltoluene	0.583		0.120	0.500	1	02/12/2024 04:25	WG2224381
2-Butanone (MEK)	1.29	J	1.19	5.00	1	02/12/2024 04:25	WG2224381
Methylene Chloride	U		0.430	2.50	1	02/12/2024 04:25	WG2224381
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	02/12/2024 04:25	WG2224381
Methyl tert-butyl ether	U		0.101	0.500	1	02/12/2024 04:25	WG2224381
Naphthalene	9.95		0.174	2.50	1	02/12/2024 04:25	WG2224381
n-Propylbenzene	1.29		0.0993	0.500	1	02/12/2024 04:25	WG2224381
Styrene	U		0.118	0.500	1	02/12/2024 04:25	WG2224381
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	02/12/2024 04:25	WG2224381
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	02/12/2024 04:25	WG2224381
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	02/12/2024 04:25	WG2224381
Tetrachloroethene	U		0.300	0.500	1	02/12/2024 04:25	WG2224381
Toluene	2.67		0.278	0.500	1	02/12/2024 04:25	WG2224381
1,2,3-Trichlorobenzene	U		0.164	0.500	1	02/12/2024 04:25	WG2224381
1,2,4-Trichlorobenzene	U		0.481	1.00	1	02/12/2024 04:25	WG2224381
1,1,1-Trichloroethane	U		0.149	0.500	1	02/12/2024 04:25	WG2224381
1,1,2-Trichloroethane	U		0.158	0.500	1	02/12/2024 04:25	WG2224381
Trichloroethene	U		0.190	0.500	1	02/12/2024 04:25	WG2224381
Trichlorofluoromethane	U		0.160	2.50	1	02/12/2024 04:25	WG2224381
1,2,3-Trichloropropane	U		0.237	2.50	1	02/12/2024 04:25	WG2224381
1,2,4-Trimethylbenzene	17.7		0.322	0.500	1	02/12/2024 04:25	WG2224381
1,2,3-Trimethylbenzene	24.7		0.104	0.500	1	02/12/2024 04:25	WG2224381
1,3,5-Trimethylbenzene	13.8		0.104	0.500	1	02/12/2024 04:25	WG2224381
Vinyl acetate	U		0.692	5.00	1	02/15/2024 19:46	WG2227110
Vinyl chloride	U		0.234	0.500	1	02/12/2024 04:25	WG2224381
Xylenes, Total	32.1		0.174	1.50	1	02/12/2024 04:25	WG2224381
(S) Toluene-d8	101			80.0-120		02/12/2024 04:25	WG2224381
(S) Toluene-d8	95.8			80.0-120		02/15/2024 19:46	WG2227110
(S) 4-Bromofluorobenzene	109			77.0-126		02/12/2024 04:25	WG2224381
(S) 4-Bromofluorobenzene	113			77.0-126		02/15/2024 19:46	WG2227110
(S) 1,2-Dichloroethane-d4	95.4			70.0-130		02/12/2024 04:25	WG2224381
(S) 1,2-Dichloroethane-d4	95.9			70.0-130		02/15/2024 19:46	WG2227110

TPH by Method MTDEQ EPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C9-C18 Aliphatics	10000		1000	3000	5	02/19/2024 11:52	WG2227694
Unadjusted C19-C36 Aliphatics	4290		200	600	1	02/19/2024 09:03	WG2227694
Unadjusted C11-C22 Aromatics	3970		200	600	1	02/19/2024 09:36	WG2227694
Unadjusted Total Petroleum Hydrocarbons	18300		1000	3000	5	02/19/2024 11:52	WG2227694
Adjusted C11-C22 Aromatics	3970		200	600	1	02/19/2024 09:36	WG2227694
Adjusted Total Petroleum Hydrocarbons	18300		1000	3000	5	02/19/2024 11:52	WG2227694
(S) o-Terphenyl	43.8			40.0-140		02/19/2024 09:36	WG2227694
(S) 1-Chloro-octadecane	19.5	J2		40.0-140		02/19/2024 11:52	WG2227694
(S) 1-Chloro-octadecane	19.5	J2		40.0-140		02/19/2024 09:03	WG2227694
(S) 2-Fluorobiphenyl	83.6			40.0-140		02/19/2024 09:36	WG2227694
(S) 2-Bromonaphthalene	83.7			40.0-140		02/19/2024 09:36	WG2227694



TPH by Method MTDEQ EPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
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Sample Narrative:

L1704368-02 WG2227694: Surrogate failure due to matrix interference

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acenaphthene	U		0.443	5.00	5	02/14/2024 17:44	WG2224421
Acenaphthylene	U	J3	0.461	5.00	5	02/14/2024 17:44	WG2224421
Anthracene	U		0.402	5.00	5	02/14/2024 17:44	WG2224421
Benzdine	U	J3 J4	18.7	50.0	5	02/14/2024 17:44	WG2224421
Benzo(a)anthracene	U		0.995	5.00	5	02/14/2024 17:44	WG2224421
Benzo(b)fluoranthene	U		0.650	5.00	5	02/14/2024 17:44	WG2224421
Benzo(k)fluoranthene	U		0.600	5.00	5	02/14/2024 17:44	WG2224421
Benzo(g,h,i)perylene	U		0.605	5.00	5	02/14/2024 17:44	WG2224421
Benzo(a)pyrene	U		0.191	5.00	5	02/14/2024 17:44	WG2224421
Bis(2-chlorethoxy)methane	U	J3	0.580	50.0	5	02/14/2024 17:44	WG2224421
Bis(2-chloroethyl)ether	U	J3	0.685	50.0	5	02/14/2024 17:44	WG2224421
2,2-Oxybis(1-Chloropropane)	U	J3	1.05	50.0	5	02/14/2024 17:44	WG2224421
4-Bromophenyl-phenylether	U		0.439	50.0	5	02/14/2024 17:44	WG2224421
2-Chloronaphthalene	U	J3	0.324	5.00	5	02/14/2024 17:44	WG2224421
4-Chlorophenyl-phenylether	U		0.463	50.0	5	02/14/2024 17:44	WG2224421
Chrysene	U		0.650	5.00	5	02/14/2024 17:44	WG2224421
Dibenz(a,h)anthracene	U		0.322	5.00	5	02/14/2024 17:44	WG2224421
3,3-Dichlorobenzidine	U		1.06	50.0	5	02/14/2024 17:44	WG2224421
2,4-Dinitrotoluene	U		0.491	50.0	5	02/14/2024 17:44	WG2224421
2,6-Dinitrotoluene	U		1.25	50.0	5	02/14/2024 17:44	WG2224421
Fluoranthene	U		0.510	5.00	5	02/14/2024 17:44	WG2224421
Fluorene	U		0.422	5.00	5	02/14/2024 17:44	WG2224421
Hexachlorobenzene	U		0.378	5.00	5	02/14/2024 17:44	WG2224421
Hexachloro-1,3-butadiene	U		0.484	50.0	5	02/14/2024 17:44	WG2224421
Hexachlorocyclopentadiene	U	J3	0.299	50.0	5	02/14/2024 17:44	WG2224421
Hexachloroethane	U		0.635	50.0	5	02/14/2024 17:44	WG2224421
Indeno(1,2,3-cd)pyrene	U		1.40	5.00	5	02/14/2024 17:44	WG2224421
Isophorone	U	J3	0.715	50.0	5	02/14/2024 17:44	WG2224421
Naphthalene	1.74	J J3	0.795	5.00	5	02/14/2024 17:44	WG2224421
Nitrobenzene	U		1.48	50.0	5	02/14/2024 17:44	WG2224421
n-Nitrosodimethylamine	U		4.99	50.0	5	02/14/2024 17:44	WG2224421
n-Nitrosodiphenylamine	U		11.9	50.0	5	02/14/2024 17:44	WG2224421
n-Nitrosodi-n-propylamine	U	J3	1.31	50.0	5	02/14/2024 17:44	WG2224421
Phenanthrene	U		0.560	5.00	5	02/14/2024 17:44	WG2224421
Benzylbutyl phthalate	U		3.83	15.0	5	02/14/2024 17:44	WG2224421
Bis(2-Ethylhexyl)phthalate	U		4.48	15.0	5	02/14/2024 17:44	WG2224421
Di-n-butyl phthalate	U		2.27	15.0	5	02/14/2024 17:44	WG2224421
Diethyl phthalate	U		1.43	15.0	5	02/14/2024 17:44	WG2224421
Dimethyl phthalate	U		1.30	15.0	5	02/14/2024 17:44	WG2224421
Di-n-octyl phthalate	U		4.66	15.0	5	02/14/2024 17:44	WG2224421
Pyrene	U		0.535	5.00	5	02/14/2024 17:44	WG2224421
1,2,4-Trichlorobenzene	U	J3	0.349	50.0	5	02/14/2024 17:44	WG2224421
Aniline	U	J3	8.25	50.0	5	02/14/2024 17:44	WG2224421
1,2-Diphenylhydrazine	U	N2	0.525	50.0	5	02/14/2024 17:44	WG2224421
Benzyl alcohol	U	J3	2.82	50.0	5	02/14/2024 17:44	WG2224421
4-Chloroaniline	U	J3	1.17	50.0	5	02/14/2024 17:44	WG2224421
4-Chloro-3-methylphenol	U	J3	0.655	50.0	5	02/14/2024 17:44	WG2224421
2-Chlorophenol	U	J3	0.665	50.0	5	02/14/2024 17:44	WG2224421
Dibenzofuran	U		0.485	50.0	5	02/14/2024 17:44	WG2224421

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2,4-Dichlorophenol	U	J3	0.510	50.0	5	02/14/2024 17:44	WG2224421
2,4-Dimethylphenol	25.5	J J3	0.318	50.0	5	02/14/2024 17:44	WG2224421
4,6-Dinitro-2-methylphenol	U		5.60	50.0	5	02/14/2024 17:44	WG2224421
2,4-Dinitrophenol	U		29.7	50.0	5	02/14/2024 17:44	WG2224421
2-Methylnaphthalene	1.09	J J3	0.585	5.00	5	02/14/2024 17:44	WG2224421
2-Methylphenol	U	J3	0.465	50.0	5	02/14/2024 17:44	WG2224421
3&4-Methyl Phenol	U	J3	0.840	50.0	5	02/14/2024 17:44	WG2224421
2-Nitroaniline	U		0.510	50.0	5	02/14/2024 17:44	WG2224421
3-Nitroaniline	U	J3	0.435	50.0	5	02/14/2024 17:44	WG2224421
4-Nitroaniline	U		0.455	50.0	5	02/14/2024 17:44	WG2224421
2-Nitrophenol	U	J3	0.585	50.0	5	02/14/2024 17:44	WG2224421
4-Nitrophenol	U		0.715	50.0	5	02/14/2024 17:44	WG2224421
Pentachlorophenol	U		1.57	50.0	5	02/14/2024 17:44	WG2224421
Phenol	U	J3	21.7	50.0	5	02/14/2024 17:44	WG2224421
Pyridine	U	J3 J4	3.13	50.0	5	02/14/2024 17:44	WG2224421
2,4,6-Trichlorophenol	U	J3	0.500	50.0	5	02/14/2024 17:44	WG2224421
Acetophenone	U	J3	1.04	50.0	5	02/14/2024 17:44	WG2224421
2-Acetylaminofluorene	U		1.27	50.0	5	02/16/2024 07:44	WG2224421
4-Aminobiphenyl	U		2.30	50.0	5	02/16/2024 07:44	WG2224421
Chlorobenzilate	U		19.2	250	5	02/16/2024 07:44	WG2224421
Diallate	U		2.62	50.0	5	02/16/2024 07:44	WG2224421
2,6-Dichlorophenol	U		0.510	50.0	5	02/16/2024 07:44	WG2224421
Dimethoate	U		25.3	250	5	02/16/2024 07:44	WG2224421
P-(Dimethylamino) Azobenzene	U		18.5	50.0	5	02/16/2024 07:44	WG2224421
Dimethylbenz (A) Anthracene	U		8.55	50.0	5	02/16/2024 07:44	WG2224421
3,3-Dimethylbenzidine	U		16.9	50.0	5	02/16/2024 07:44	WG2224421
a,a-Dimethylphenethylamine	U	J4	15.7	250	5	02/16/2024 07:44	WG2224421
1,3-Dinitrobenzene	U		1.80	50.0	5	02/16/2024 07:44	WG2224421
Diphenylamine	U		11.9	50.0	5	02/14/2024 17:44	WG2224421
Dinoseb	U		40.1	250	5	02/16/2024 07:44	WG2224421
Disulfoton	U		1.33	50.0	5	02/16/2024 07:44	WG2224421
Ethyl methanesulfonate	U		1.63	50.0	5	02/16/2024 07:44	WG2224421
Ethyl Parathion	U		1.90	50.0	5	02/16/2024 07:44	WG2224421
Famphur	U		19.6	100	5	02/16/2024 07:44	WG2224421
Hexachloropropene	U		0.745	250	5	02/16/2024 07:44	WG2224421
Hexachlorophene	U		7.20	250	5	02/16/2024 07:44	WG2224421
Isodrin	U		20.5	50.0	5	02/16/2024 07:44	WG2224421
Isosafrole	U		19.4	50.0	5	02/16/2024 07:44	WG2224421
Kepone	U		13.3	100	5	02/16/2024 07:44	WG2224421
Methapyrilene	U		50.0	250	5	02/16/2024 07:44	WG2224421
3-Methylcholanthrene	U		0.820	50.0	5	02/16/2024 07:44	WG2224421
Methyl methanesulfonate	U		17.0	250	5	02/16/2024 07:44	WG2224421
Methyl parathion	U	J4	1.07	50.0	5	02/16/2024 07:44	WG2224421
1,4-Naphthoquinone	U	J4	27.8	250	5	02/16/2024 07:44	WG2224421
1-Naphthylamine	U		1.44	50.0	5	02/16/2024 07:44	WG2224421
2-Naphthylamine	U		22.4	50.0	5	02/16/2024 07:44	WG2224421
5-Nitro-o-toluidine	U		9.95	50.0	5	02/16/2024 07:44	WG2224421
4-Nitroquinoline 1-oxide	U		10.2	50.0	5	02/16/2024 07:44	WG2224421
n-Nitrosodiethylamine	U		17.9	50.0	5	02/16/2024 07:44	WG2224421
n-Nitrosodi-n-butylamine	U		19.6	50.0	5	02/16/2024 07:44	WG2224421
n-Nitrosomethylethylamine	U		16.3	50.0	5	02/16/2024 07:44	WG2224421
n-Nitrosomorpholine	U		16.3	50.0	5	02/16/2024 07:44	WG2224421
n-Nitrosopiperidine	U		18.6	50.0	5	02/16/2024 07:44	WG2224421
n-Nitrosopyrrolidine	U		16.9	50.0	5	02/16/2024 07:44	WG2224421
Pentachlorobenzene	U		20.8	50.0	5	02/16/2024 07:44	WG2224421
Pentachloroethane	U		14.1	250	5	02/16/2024 07:44	WG2224421

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Pentachloronitrobenzene	U		20.8	50.0	5	02/16/2024 07:44	WG2224421
Phenacetin	U		23.3	50.0	5	02/16/2024 07:44	WG2224421
p-Phenylenediamine	U	J4	1940	34500	5	02/16/2024 07:44	WG2224421
Phorate	U		24.3	250	5	02/16/2024 07:44	WG2224421
2-Picoline	U		34.2	250	5	02/16/2024 07:44	WG2224421
Pronamide	U		21.1	50.0	5	02/16/2024 07:44	WG2224421
Safrole	U		18.4	50.0	5	02/16/2024 07:44	WG2224421
Sulfotep	U		19.9	250	5	02/16/2024 07:44	WG2224421
1,2,4,5-Tetrachlorobenzene	U		0.324	50.0	5	02/14/2024 17:44	WG2224421
2,3,4,6-Tetrachlorophenol	U		1.15	50.0	5	02/14/2024 17:44	WG2224421
Thionazin	U		20.4	50.0	5	02/16/2024 07:44	WG2224421
o-Toluidine	U		17.7	50.0	5	02/16/2024 07:44	WG2224421
2,4,5-Trichlorophenol	U		0.545	50.0	5	02/14/2024 17:44	WG2224421
O,O,O-Triethyl Phosphorothioate	U		14.6	50.0	5	02/16/2024 07:44	WG2224421
1,3,5-Trinitrobenzene	U		6.60	50.0	5	02/16/2024 07:44	WG2224421
(S) 2-Fluorophenol	25.5			10.0-120		02/14/2024 17:44	WG2224421
(S) Phenol-d5	20.1			10.0-120		02/14/2024 17:44	WG2224421
(S) Nitrobenzene-d5	36.9			10.0-127		02/14/2024 17:44	WG2224421
(S) 2-Fluorobiphenyl	34.0			10.0-130		02/14/2024 17:44	WG2224421
(S) 2,4,6-Tribromophenol	45.7			10.0-155		02/14/2024 17:44	WG2224421
(S) p-Terphenyl-d14	24.4			10.0-128		02/14/2024 17:44	WG2224421

Sample Narrative:

L1704368-02 WG2224421: Dilution due to matrix.

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	U		33.3	100	1	02/13/2024 12:49	WG2225136
Unadjusted C9-C12 Aliphatics	U		33.3	100	1	02/13/2024 12:49	WG2225136
Unadjusted C9-C10 Aromatics	U		33.3	100	1	02/13/2024 12:49	WG2225136
Adjusted C5-C8 Aliphatics	U		33.3	100	1	02/13/2024 12:49	WG2225136
Adjusted C9-C12 Aliphatics	U		33.3	100	1	02/13/2024 12:49	WG2225136
Total VPH	U		66.7	200	1	02/13/2024 12:49	WG2225136
(S) 2,5-Dibromotoluene(FID)	79.3			70.0-130		02/13/2024 12:49	WG2225136
(S) 2,5-Dibromotoluene(PID)	81.3			70.0-130		02/13/2024 12:49	WG2225136

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		11.3	25.0	1	02/12/2024 00:39	WG2224381
Acrylonitrile	U		0.671	5.00	1	02/12/2024 21:52	WG2224708
Benzene	U		0.0941	0.500	1	02/12/2024 00:39	WG2224381
Bromobenzene	U		0.118	0.500	1	02/12/2024 00:39	WG2224381
Bromodichloromethane	U		0.136	0.500	1	02/12/2024 00:39	WG2224381
Bromochloromethane	U		0.128	0.500	1	02/12/2024 00:39	WG2224381
Bromoform	U		0.129	0.500	1	02/12/2024 00:39	WG2224381
Bromomethane	U		0.605	2.50	1	02/12/2024 00:39	WG2224381
n-Butylbenzene	U		0.157	0.500	1	02/12/2024 00:39	WG2224381
sec-Butylbenzene	U		0.125	0.500	1	02/12/2024 00:39	WG2224381
tert-Butylbenzene	U		0.127	0.500	1	02/12/2024 00:39	WG2224381
Carbon disulfide	U		0.0962	0.500	1	02/12/2024 00:39	WG2224381
Carbon tetrachloride	U		0.128	0.500	1	02/12/2024 00:39	WG2224381
Chlorobenzene	U		0.117	0.500	1	02/12/2024 00:39	WG2224381
Chlorodibromomethane	U		0.140	0.500	1	02/12/2024 00:39	WG2224381
Chloroethane	U		0.192	2.50	1	02/12/2024 00:39	WG2224381
2-Chloroethyl vinyl ether	U		0.575	50.0	1	02/12/2024 21:52	WG2224708
Chloroform	U		0.111	0.500	1	02/12/2024 00:39	WG2224381
Chloromethane	U		0.960	1.25	1	02/12/2024 21:52	WG2224708
2-Chlorotoluene	U		0.106	0.500	1	02/12/2024 00:39	WG2224381
4-Chlorotoluene	U		0.114	0.500	1	02/12/2024 00:39	WG2224381
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	02/12/2024 00:39	WG2224381
1,2-Dibromoethane	U		0.126	0.500	1	02/12/2024 00:39	WG2224381
Dibromomethane	U		0.122	0.500	1	02/12/2024 00:39	WG2224381
1,2-Dichlorobenzene	U		0.107	0.500	1	02/12/2024 00:39	WG2224381
1,3-Dichlorobenzene	U		0.299	0.500	1	02/12/2024 00:39	WG2224381
1,4-Dichlorobenzene	U		0.120	0.500	1	02/12/2024 00:39	WG2224381
Dichlorodifluoromethane	U		0.374	2.50	1	02/12/2024 21:52	WG2224708
1,1-Dichloroethane	U		0.100	0.500	1	02/12/2024 00:39	WG2224381
1,2-Dichloroethane	U		0.0819	0.500	1	02/12/2024 00:39	WG2224381
1,1-Dichloroethene	U		0.188	0.500	1	02/12/2024 00:39	WG2224381
cis-1,2-Dichloroethene	U		0.126	0.500	1	02/12/2024 00:39	WG2224381
trans-1,2-Dichloroethene	U		0.149	0.500	1	02/12/2024 00:39	WG2224381
1,2-Dichloropropane	U		0.149	0.500	1	02/12/2024 21:52	WG2224708
1,1-Dichloropropene	U		0.142	0.500	1	02/12/2024 00:39	WG2224381
1,3-Dichloropropane	U		0.109	1.00	1	02/12/2024 00:39	WG2224381
cis-1,3-Dichloropropene	U		0.111	0.500	1	02/12/2024 00:39	WG2224381
trans-1,3-Dichloropropene	U		0.118	0.500	1	02/12/2024 00:39	WG2224381
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	02/12/2024 21:52	WG2224708
2,2-Dichloropropane	U		0.161	0.500	1	02/12/2024 00:39	WG2224381
Di-isopropyl ether	U		0.105	0.500	1	02/12/2024 21:52	WG2224708
Ethylbenzene	U		0.137	0.500	1	02/12/2024 00:39	WG2224381
Hexachloro-1,3-butadiene	U		0.337	1.00	1	02/12/2024 00:39	WG2224381

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Hexanone	U		0.787	5.00	1	02/12/2024 21:52	WG2224708
n-Hexane	U		0.749	5.00	1	02/12/2024 21:52	WG2224708
Iodomethane	U		0.554	5.00	1	02/12/2024 00:39	WG2224381
Isopropylbenzene	U		0.105	0.500	1	02/12/2024 00:39	WG2224381
p-Isopropyltoluene	U		0.120	0.500	1	02/12/2024 00:39	WG2224381
2-Butanone (MEK)	U		1.19	5.00	1	02/12/2024 00:39	WG2224381
Methylene Chloride	U		0.430	2.50	1	02/12/2024 00:39	WG2224381
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	02/12/2024 00:39	WG2224381
Methyl tert-butyl ether	U		0.101	0.500	1	02/12/2024 00:39	WG2224381
Naphthalene	U		0.174	2.50	1	02/12/2024 00:39	WG2224381
n-Propylbenzene	U		0.0993	0.500	1	02/12/2024 00:39	WG2224381
Styrene	U		0.118	0.500	1	02/12/2024 00:39	WG2224381
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	02/12/2024 00:39	WG2224381
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	02/12/2024 00:39	WG2224381
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	02/12/2024 00:39	WG2224381
Tetrachloroethene	U		0.300	0.500	1	02/12/2024 00:39	WG2224381
Toluene	U		0.278	0.500	1	02/12/2024 00:39	WG2224381
1,2,3-Trichlorobenzene	U		0.164	0.500	1	02/12/2024 00:39	WG2224381
1,2,4-Trichlorobenzene	U		0.481	1.00	1	02/12/2024 00:39	WG2224381
1,1,1-Trichloroethane	U		0.149	0.500	1	02/12/2024 00:39	WG2224381
1,1,2-Trichloroethane	U		0.158	0.500	1	02/12/2024 00:39	WG2224381
Trichloroethene	U		0.190	0.500	1	02/12/2024 00:39	WG2224381
Trichlorofluoromethane	U		0.160	2.50	1	02/12/2024 00:39	WG2224381
1,2,3-Trichloropropane	U		0.237	2.50	1	02/12/2024 00:39	WG2224381
1,2,4-Trimethylbenzene	U		0.322	0.500	1	02/12/2024 00:39	WG2224381
1,2,3-Trimethylbenzene	U		0.104	0.500	1	02/12/2024 00:39	WG2224381
1,3,5-Trimethylbenzene	U		0.104	0.500	1	02/12/2024 00:39	WG2224381
Vinyl acetate	U	J3	0.692	5.00	1	02/12/2024 21:52	WG2224708
Vinyl chloride	U		0.234	0.500	1	02/12/2024 00:39	WG2224381
Xylenes, Total	U		0.174	1.50	1	02/12/2024 00:39	WG2224381
(S) Toluene-d8	103			80.0-120		02/12/2024 00:39	WG2224381
(S) Toluene-d8	106			80.0-120		02/12/2024 21:52	WG2224708
(S) 4-Bromofluorobenzene	93.2			77.0-126		02/12/2024 00:39	WG2224381
(S) 4-Bromofluorobenzene	95.9			77.0-126		02/12/2024 21:52	WG2224708
(S) 1,2-Dichloroethane-d4	99.2			70.0-130		02/12/2024 00:39	WG2224381
(S) 1,2-Dichloroethane-d4	104			70.0-130		02/12/2024 21:52	WG2224708

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4034291-3 02/13/24 12:14

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C5-C8 Aliphatics	U		33.3	100
Unadjusted C9-C12 Aliphatics	U		33.3	100
Unadjusted C9-C10 Aromatics	U		33.3	100
Adjusted C5-C8 Aliphatics	U		33.3	100
Adjusted C9-C12 Aliphatics	U		33.3	100
Total VPH	U		66.7	200
(S) 2,5-Dibromotoluene(FID)	76.3			70.0-130
(S) 2,5-Dibromotoluene(PID)	78.0			70.0-130

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4034291-1 02/13/24 09:54 • (LCSD) R4034291-2 02/13/24 10:29

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C5-C8 Aliphatics	1200	994	975	82.8	81.3	70.0-130			1.93	50
Unadjusted C9-C12 Aliphatics	1400	1400	1380	100	98.6	70.0-130			1.44	50
Unadjusted C9-C10 Aromatics	200	207	203	104	102	70.0-130			1.95	50
Total VPH	2800	2600	2560	92.9	91.4	70.0-130			1.55	50
(S) 2,5-Dibromotoluene(FID)				84.8	77.6	70.0-130				
(S) 2,5-Dibromotoluene(PID)				82.6	76.2	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4032599-2 02/11/24 23:32

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acetone	U		11.3	25.0
Benzene	U		0.0941	0.500
Bromobenzene	U		0.118	0.500
Bromodichloromethane	U		0.136	0.500
Bromochloromethane	U		0.128	0.500
Bromoform	U		0.129	0.500
Bromomethane	U		0.605	2.50
n-Butylbenzene	U		0.157	0.500
sec-Butylbenzene	U		0.125	0.500
tert-Butylbenzene	U		0.127	0.500
Carbon disulfide	U		0.0962	0.500
Carbon tetrachloride	U		0.128	0.500
Chlorobenzene	U		0.117	0.500
Chlorodibromomethane	U		0.140	0.500
Chloroethane	U		0.192	2.50
Chloroform	U		0.111	0.500
2-Chlorotoluene	U		0.106	0.500
4-Chlorotoluene	U		0.114	0.500
1,2-Dibromo-3-Chloropropane	U		0.276	2.50
1,2-Dibromoethane	U		0.126	0.500
Dibromomethane	U		0.122	0.500
1,2-Dichlorobenzene	U		0.107	0.500
1,3-Dichlorobenzene	U		0.299	0.500
1,4-Dichlorobenzene	U		0.120	0.500
1,1-Dichloroethane	U		0.100	0.500
1,2-Dichloroethane	U		0.0819	0.500
1,1-Dichloroethene	U		0.188	0.500
cis-1,2-Dichloroethene	U		0.126	0.500
trans-1,2-Dichloroethene	U		0.149	0.500
1,1-Dichloropropene	U		0.142	0.500
1,3-Dichloropropane	U		0.109	1.00
cis-1,3-Dichloropropene	U		0.111	0.500
trans-1,3-Dichloropropene	U		0.118	0.500
2,2-Dichloropropane	U		0.161	0.500
Ethylbenzene	U		0.137	0.500
Hexachloro-1,3-butadiene	U		0.337	1.00
Iodomethane	U		0.554	5.00
Isopropylbenzene	U		0.105	0.500
p-Isopropyltoluene	U		0.120	0.500
2-Butanone (MEK)	U		1.19	5.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4032599-2 02/11/24 23:32

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Methylene Chloride	U		0.430	2.50
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00
Methyl tert-butyl ether	U		0.101	0.500
Naphthalene	U		0.174	2.50
n-Propylbenzene	U		0.0993	0.500
Styrene	U		0.118	0.500
1,1,1,2-Tetrachloroethane	U		0.147	0.500
1,1,2,2-Tetrachloroethane	U		0.133	0.500
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500
Tetrachloroethene	U		0.300	0.500
Toluene	U		0.278	0.500
1,2,3-Trichlorobenzene	U		0.164	0.500
1,2,4-Trichlorobenzene	U		0.481	1.00
1,1,1-Trichloroethane	U		0.149	0.500
1,1,2-Trichloroethane	U		0.158	0.500
Trichloroethene	U		0.190	0.500
Trichlorofluoromethane	U		0.160	2.50
1,2,3-Trichloropropane	U		0.237	2.50
1,2,4-Trimethylbenzene	U		0.322	0.500
1,2,3-Trimethylbenzene	U		0.104	0.500
1,3,5-Trimethylbenzene	U		0.104	0.500
Vinyl chloride	U		0.234	0.500
Xylenes, Total	U		0.174	1.50
(S) Toluene-d8	107			80.0-120
(S) 4-Bromofluorobenzene	94.3			77.0-126
(S) 1,2-Dichloroethane-d4	96.4			70.0-130

Laboratory Control Sample (LCS)

(LCS) R4032599-1 02/11/24 22:36

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acetone	25.0	27.0	108	19.0-160	
Benzene	5.00	4.64	92.8	70.0-123	
Bromobenzene	5.00	4.49	89.8	73.0-121	
Bromodichloromethane	5.00	5.18	104	75.0-120	
Bromochloromethane	5.00	4.85	97.0	76.0-122	
Bromoform	5.00	5.09	102	68.0-132	
Bromomethane	5.00	5.54	111	10.0-160	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R4032599-1 02/11/24 22:36

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
n-Butylbenzene	5.00	4.69	93.8	73.0-125	
sec-Butylbenzene	5.00	4.45	89.0	75.0-125	
tert-Butylbenzene	5.00	4.78	95.6	76.0-124	
Carbon disulfide	5.00	4.72	94.4	61.0-128	
Carbon tetrachloride	5.00	5.18	104	68.0-126	
Chlorobenzene	5.00	4.79	95.8	80.0-121	
Chlorodibromomethane	5.00	4.89	97.8	77.0-125	
Chloroethane	5.00	4.21	84.2	47.0-150	
Chloroform	5.00	4.99	99.8	73.0-120	
2-Chlorotoluene	5.00	4.73	94.6	76.0-123	
4-Chlorotoluene	5.00	4.44	88.8	75.0-122	
1,2-Dibromo-3-Chloropropane	5.00	4.45	89.0	58.0-134	
1,2-Dibromoethane	5.00	4.89	97.8	80.0-122	
Dibromomethane	5.00	4.59	91.8	80.0-120	
1,2-Dichlorobenzene	5.00	4.83	96.6	79.0-121	
1,3-Dichlorobenzene	5.00	4.75	95.0	79.0-120	
1,4-Dichlorobenzene	5.00	4.95	99.0	79.0-120	
1,1-Dichloroethane	5.00	4.49	89.8	70.0-126	
1,2-Dichloroethane	5.00	4.87	97.4	70.0-128	
1,1-Dichloroethene	5.00	4.79	95.8	71.0-124	
cis-1,2-Dichloroethene	5.00	4.67	93.4	73.0-120	
trans-1,2-Dichloroethene	5.00	4.73	94.6	73.0-120	
1,1-Dichloropropene	5.00	4.66	93.2	74.0-126	
1,3-Dichloropropane	5.00	4.64	92.8	80.0-120	
cis-1,3-Dichloropropene	5.00	4.48	89.6	80.0-123	
trans-1,3-Dichloropropene	5.00	4.78	95.6	78.0-124	
2,2-Dichloropropane	5.00	5.43	109	58.0-130	
Ethylbenzene	5.00	4.96	99.2	79.0-123	
Hexachloro-1,3-butadiene	5.00	4.66	93.2	54.0-138	
Iodomethane	25.0	24.9	99.6	33.0-147	
Isopropylbenzene	5.00	4.76	95.2	76.0-127	
p-Isopropyltoluene	5.00	4.72	94.4	76.0-125	
2-Butanone (MEK)	25.0	22.3	89.2	44.0-160	
Methylene Chloride	5.00	4.41	88.2	67.0-120	
4-Methyl-2-pentanone (MIBK)	25.0	22.6	90.4	68.0-142	
Methyl tert-butyl ether	5.00	4.68	93.6	68.0-125	
Naphthalene	5.00	4.01	80.2	54.0-135	
n-Propylbenzene	5.00	4.63	92.6	77.0-124	
Styrene	5.00	4.20	84.0	73.0-130	
1,1,1,2-Tetrachloroethane	5.00	5.14	103	75.0-125	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R4032599-1 02/11/24 22:36

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
1,1,2,2-Tetrachloroethane	5.00	4.95	99.0	65.0-130	
1,1,2-Trichlorotrifluoroethane	5.00	4.97	99.4	69.0-132	
Tetrachloroethene	5.00	4.78	95.6	72.0-132	
Toluene	5.00	4.63	92.6	79.0-120	
1,2,3-Trichlorobenzene	5.00	4.19	83.8	50.0-138	
1,2,4-Trichlorobenzene	5.00	4.21	84.2	57.0-137	
1,1,1-Trichloroethane	5.00	5.44	109	73.0-124	
1,1,2-Trichloroethane	5.00	4.77	95.4	80.0-120	
Trichloroethene	5.00	4.96	99.2	78.0-124	
Trichlorofluoromethane	5.00	5.23	105	59.0-147	
1,2,3-Trichloropropane	5.00	4.86	97.2	73.0-130	
1,2,4-Trimethylbenzene	5.00	4.27	85.4	76.0-121	
1,2,3-Trimethylbenzene	5.00	4.52	90.4	77.0-120	
1,3,5-Trimethylbenzene	5.00	4.61	92.2	76.0-122	
Vinyl chloride	5.00	4.05	81.0	67.0-131	
Xylenes, Total	15.0	15.0	100	79.0-123	
(S) Toluene-d8			102	80.0-120	
(S) 4-Bromofluorobenzene			97.9	77.0-126	
(S) 1,2-Dichloroethane-d4			104	70.0-130	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4032981-3 02/12/24 21:15

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acrylonitrile	U		0.671	5.00
2-Chloroethyl vinyl ether	U		0.575	50.0
Chloromethane	U		0.960	1.25
Dichlorodifluoromethane	U		0.374	2.50
1,2-Dichloropropane	U		0.149	0.500
trans-1,4-Dichloro-2-butene	U		0.467	5.00
Di-isopropyl ether	U		0.105	0.500
2-Hexanone	U		0.787	5.00
n-Hexane	U		0.749	5.00
Vinyl acetate	U		0.692	5.00
(S) Toluene-d8	106			80.0-120
(S) 4-Bromofluorobenzene	94.9			77.0-126
(S) 1,2-Dichloroethane-d4	103			70.0-130

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4032981-1 02/12/24 20:18 • (LCSD) R4032981-2 02/12/24 20:37

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acrylonitrile	25.0	20.0	20.9	80.0	83.6	55.0-149			4.40	20
2-Chloroethyl vinyl ether	25.0	20.4	21.1	81.6	84.4	51.0-160			3.37	20
Chloromethane	5.00	4.08	4.14	81.6	82.8	41.0-142			1.46	20
Dichlorodifluoromethane	5.00	6.22	5.75	124	115	51.0-149			7.85	20
1,2-Dichloropropane	5.00	4.20	4.09	84.0	81.8	77.0-125			2.65	20
trans-1,4-Dichloro-2-butene	5.00	3.91	3.50	78.2	70.0	33.0-144			11.1	20
Di-isopropyl ether	5.00	3.94	3.86	78.8	77.2	58.0-138			2.05	20
2-Hexanone	25.0	20.5	21.3	82.0	85.2	67.0-149			3.83	20
n-Hexane	5.00	4.07	4.21	81.4	84.2	57.0-133			3.38	20
Vinyl acetate	25.0	19.5	24.1	78.0	96.4	11.0-160		J3	21.1	20
(S) Toluene-d8				105	106	80.0-120				
(S) 4-Bromofluorobenzene				96.7	96.2	77.0-126				
(S) 1,2-Dichloroethane-d4				99.2	98.4	70.0-130				

Cp

Tc

Ss

Cn

Sr

Qc

Gl

Al

Sc

Method Blank (MB)

(MB) R4034886-3 02/15/24 16:54

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acrylonitrile	U		0.671	5.00
2-Chloroethyl vinyl ether	U		0.575	50.0
Chloromethane	U		0.960	1.25
Dichlorodifluoromethane	U		0.374	2.50
1,2-Dichloropropane	U		0.149	0.500
trans-1,4-Dichloro-2-butene	U		0.467	5.00
Di-isopropyl ether	U		0.105	0.500
2-Hexanone	U		0.787	5.00
n-Hexane	U		0.749	5.00
Vinyl acetate	U		0.692	5.00
(S) Toluene-d8	102			80.0-120
(S) 4-Bromofluorobenzene	92.3			77.0-126
(S) 1,2-Dichloroethane-d4	102			70.0-130

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4034886-1 02/15/24 15:52 • (LCSD) R4034886-2 02/15/24 16:13

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acrylonitrile	25.0	26.2	25.5	105	102	55.0-149			2.71	20
2-Chloroethyl vinyl ether	25.0	24.4	24.5	97.6	98.0	51.0-160			0.409	20
Chloromethane	5.00	5.72	5.68	114	114	41.0-142			0.702	20
Dichlorodifluoromethane	5.00	5.08	5.45	102	109	51.0-149			7.03	20
1,2-Dichloropropane	5.00	5.38	5.32	108	106	77.0-125			1.12	20
trans-1,4-Dichloro-2-butene	5.00	4.85	5.45	97.0	109	33.0-144			11.7	20
Di-isopropyl ether	5.00	5.14	5.26	103	105	58.0-138			2.31	20
2-Hexanone	25.0	24.7	24.1	98.8	96.4	67.0-149			2.46	20
n-Hexane	5.00	5.89	5.94	118	119	57.0-133			0.845	20
Vinyl acetate	25.0	30.8	36.6	123	146	11.0-160			17.2	20
(S) Toluene-d8				95.8	97.5	80.0-120				
(S) 4-Bromofluorobenzene				89.9	88.8	77.0-126				
(S) 1,2-Dichloroethane-d4				99.7	99.8	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4035276-1 02/19/24 07:27

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C9-C18 Aliphatics	U		200	600
Unadjusted C19-C36 Aliphatics	U		200	600
(S) 1-Chloro-octadecane	51.4			40.0-140

Method Blank (MB)

(MB) R4035317-1 02/19/24 07:30

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C11-C22 Aromatics	U		200	600
(S) o-Terphenyl	60.6			40.0-140
(S) 2-Fluorobiphenyl	82.0			40.0-140
(S) 2-Bromonaphthalene	85.6			40.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4035276-2 02/19/24 07:51 • (LCSD) R4035276-3 02/19/24 08:15

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C9-C18 Aliphatics	600	369	367	61.5	61.2	40.0-140			0.543	25
Unadjusted C19-C36 Aliphatics	800	662	665	82.8	83.1	40.0-140			0.452	25
(S) 1-Chloro-octadecane				53.6	55.3	40.0-140				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4035317-2 02/19/24 07:53 • (LCSD) R4035317-3 02/19/24 08:15

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C11-C22 Aromatics	1700	1450	1390	85.3	81.8	40.0-140			4.23	25
(S) o-Terphenyl				79.9	77.5	40.0-140				
(S) 2-Fluorobiphenyl				91.1	90.4	40.0-140				
(S) 2-Bromonaphthalene				97.9	97.0	40.0-140				

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

Method Blank (MB)

(MB) R4034151-3 02/14/24 12:19

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acenaphthene	U		0.0886	1.00
Acenaphthylene	U		0.0921	1.00
Anthracene	U		0.0804	1.00
Benzidine	U		3.74	10.0
Benzo(a)anthracene	U		0.199	1.00
Benzo(b)fluoranthene	U		0.130	1.00
Benzo(k)fluoranthene	U		0.120	1.00
Benzo(g,h,i)perylene	U		0.121	1.00
Benzo(a)pyrene	U		0.0381	1.00
Bis(2-chlorethoxy)methane	U		0.116	10.0
Bis(2-chloroethyl)ether	U		0.137	10.0
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0
4-Bromophenyl-phenylether	U		0.0877	10.0
2-Chloronaphthalene	U		0.0648	1.00
4-Chlorophenyl-phenylether	U		0.0926	10.0
Chrysene	U		0.130	1.00
Dibenz(a,h)anthracene	U		0.0644	1.00
3,3-Dichlorobenzidine	U		0.212	10.0
2,4-Dinitrotoluene	U		0.0983	10.0
2,6-Dinitrotoluene	U		0.250	10.0
Fluoranthene	U		0.102	1.00
Fluorene	U		0.0844	1.00
Hexachlorobenzene	U		0.0755	1.00
Hexachloro-1,3-butadiene	U		0.0968	10.0
Hexachlorocyclopentadiene	U		0.0598	10.0
Hexachloroethane	U		0.127	10.0
Indeno(1,2,3-cd)pyrene	U		0.279	1.00
Isophorone	U		0.143	10.0
Naphthalene	U		0.159	1.00
Nitrobenzene	U		0.297	10.0
n-Nitrosodimethylamine	U		0.998	10.0
n-Nitrosodiphenylamine	U		2.37	10.0
n-Nitrosodi-n-propylamine	U		0.261	10.0
Phenanthrene	U		0.112	1.00
Benzylbutyl phthalate	U		0.765	3.00
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00
Di-n-butyl phthalate	U		0.453	3.00
Diethyl phthalate	U		0.287	3.00
Dimethyl phthalate	U		0.260	3.00
Di-n-octyl phthalate	U		0.932	3.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4034151-3 02/14/24 12:19

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Pyrene	U		0.107	1.00
1,2,4-Trichlorobenzene	U		0.0698	10.0
Aniline	U		1.65	10.0
1,2-Diphenylhydrazine	U	N2	0.105	10.0
Benzyl alcohol	U		0.563	10.0
4-Chloroaniline	U		0.234	10.0
4-Chloro-3-methylphenol	U		0.131	10.0
2-Chlorophenol	U		0.133	10.0
Dibenzofuran	U		0.0970	10.0
2,4-Dichlorophenol	U		0.102	10.0
2,4-Dimethylphenol	U		0.0636	10.0
4,6-Dinitro-2-methylphenol	U		1.12	10.0
2,4-Dinitrophenol	U		5.93	10.0
2-Methylnaphthalene	U		0.117	1.00
2-Methylphenol	U		0.0929	10.0
3&4-Methyl Phenol	U		0.168	10.0
2-Nitroaniline	U		0.102	10.0
3-Nitroaniline	U		0.0869	10.0
4-Nitroaniline	U		0.0910	10.0
2-Nitrophenol	U		0.117	10.0
4-Nitrophenol	U		0.143	10.0
Pentachlorophenol	U		0.313	10.0
Phenol	U		4.33	10.0
Pyridine	U		0.627	10.0
2,4,6-Trichlorophenol	U		0.100	10.0
Acetophenone	U		0.208	10.0
Diphenylamine	U		2.37	10.0
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0
2,3,4,6-Tetrachlorophenol	U		0.231	10.0
2,4,5-Trichlorophenol	U		0.109	10.0
(S) 2-Fluorophenol	26.2			10.0-120
(S) Phenol-d5	19.8			10.0-120
(S) Nitrobenzene-d5	52.4			10.0-127
(S) 2-Fluorobiphenyl	53.5			10.0-130
(S) 2,4,6-Tribromophenol	52.0			10.0-155
(S) p-Terphenyl-d14	63.7			10.0-128

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4034822-2 02/16/24 01:04

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
2-Acetylaminofluorene	U		0.253	10.0
4-Aminobiphenyl	U		0.461	10.0
Chlorobenzilate	U		3.84	50.0
Diallate	U		0.524	10.0
2,6-Dichlorophenol	U		0.102	10.0
Dimethoate	U		5.05	50.0
P-(Dimethylamino) Azobenzene	U		3.69	10.0
Dimethylbenz (A) Anthracene	U		1.71	10.0
3,3-Dimethylbenzidine	U		3.39	10.0
a,a-Dimethylphenethylamine	U		3.13	50.0
1,3-Dinitrobenzene	U		0.359	10.0
Diphenylamine	U		2.37	10.0
Dinoseb	U		8.01	50.0
Disulfoton	U		0.267	10.0
Ethyl methanesulfonate	U		0.326	10.0
Ethyl Parathion	U		0.379	10.0
Famphur	U		3.92	20.0
Hexachloropropene	U		0.149	50.0
Hexachlorophene	U		1.44	50.0
Isodrin	U		4.11	10.0
Isosafrole	U		3.88	10.0
Kepone	U		2.66	20.0
Methapyrilene	U		10.0	50.0
3-Methylcholanthrene	U		0.164	10.0
Methyl methanesulfonate	U		3.40	50.0
Methyl parathion	U		0.213	10.0
1,4-Naphthoquinone	U		5.56	50.0
1-Naphthylamine	U		0.289	10.0
2-Naphthylamine	U		4.48	10.0
5-Nitro-o-toluidine	U		1.99	10.0
4-Nitroquinoline 1-oxide	U		2.03	10.0
n-Nitrosodiethylamine	U		3.57	10.0
n-Nitrosodi-n-butylamine	U		3.91	10.0
n-Nitrosomethylethylamine	U		3.25	10.0
n-Nitrosomorpholine	U		3.25	10.0
n-Nitrosopiperidine	U		3.72	10.0
n-Nitrosopyrrolidine	U		3.39	10.0
Pentachlorobenzene	U		4.15	10.0
Pentachloroethane	U		2.83	50.0
Pentachloronitrobenzene	U		4.15	10.0

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Cp

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Ss

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Cn

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Sr

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Qc

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Gl

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Al

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Sc

Method Blank (MB)

(MB) R4034822-2 02/16/24 01:04

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Phenacetin	U		4.66	10.0
p-Phenylenediamine	U		387	6900
Phorate	U		4.86	50.0
2-Picoline	U		6.83	50.0
Pronamide	U		4.21	10.0
Safrole	U		3.68	10.0
Sulfotep	U		3.99	50.0
Thionazin	U		4.07	10.0
o-Toluidine	U		3.53	10.0
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0
1,3,5-Trinitrobenzene	U		1.32	10.0

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4034151-1 02/14/24 11:36 • (LCSD) R4034151-2 02/14/24 11:57

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acenaphthene	50.0	28.6	35.4	57.2	70.8	41.0-120			21.3	22
Acenaphthylene	50.0	30.6	38.5	61.2	77.0	43.0-120		J3	22.9	22
Anthracene	50.0	33.6	36.7	67.2	73.4	45.0-120			8.82	20
Benzdine	100	1.72	8.49	1.72	8.49	10.0-120	J4	J3 J4	133	36
Benzo(a)anthracene	50.0	34.3	34.6	68.6	69.2	47.0-120			0.871	20
Benzo(b)fluoranthene	50.0	32.8	33.9	65.6	67.8	46.0-120			3.30	20
Benzo(k)fluoranthene	50.0	33.4	33.4	66.8	66.8	46.0-120			0.000	21
Benzo(g,h,i)perylene	50.0	34.1	34.8	68.2	69.6	48.0-121			2.03	20
Benzo(a)pyrene	50.0	34.1	34.6	68.2	69.2	47.0-120			1.46	20
Bis(2-chlorethoxy)methane	50.0	24.6	31.9	49.2	63.8	33.0-120		J3	25.8	24
Bis(2-chloroethyl)ether	50.0	23.5	33.9	47.0	67.8	23.0-120		J3	36.2	33
2,2-Oxybis(1-Chloropropane)	50.0	22.8	32.1	45.6	64.2	28.0-120		J3	33.9	31
4-Bromophenyl-phenylether	50.0	32.7	37.8	65.4	75.6	45.0-120			14.5	20
2-Chloronaphthalene	50.0	26.7	35.4	53.4	70.8	37.0-120		J3	28.0	25
4-Chlorophenyl-phenylether	50.0	32.3	38.8	64.6	77.6	44.0-120			18.3	20
Chrysene	50.0	33.9	34.0	67.8	68.0	48.0-120			0.295	20
Dibenz(a,h)anthracene	50.0	36.2	36.7	72.4	73.4	47.0-120			1.37	20
3,3-Dichlorobenzidine	100	75.7	78.6	75.7	78.6	44.0-120			3.76	20
2,4-Dinitrotoluene	50.0	36.4	40.0	72.8	80.0	49.0-124			9.42	20
2,6-Dinitrotoluene	50.0	32.8	38.4	65.6	76.8	46.0-120			15.7	21
Fluoranthene	50.0	35.6	36.5	71.2	73.0	51.0-120			2.50	20
Fluorene	50.0	30.9	37.2	61.8	74.4	47.0-120			18.5	20

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Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4034151-1 02/14/24 11:36 • (LCSD) R4034151-2 02/14/24 11:57

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Hexachlorobenzene	50.0	32.2	35.7	64.4	71.4	44.0-120			10.3	20
Hexachloro-1,3-butadiene	50.0	19.5	26.2	39.0	52.4	19.0-120			29.3	32
Hexachlorocyclopentadiene	50.0	11.9	18.5	23.8	37.0	15.0-120		J3	43.4	31
Hexachloroethane	50.0	20.5	28.7	41.0	57.4	15.0-120			33.3	37
Indeno(1,2,3-cd)pyrene	50.0	35.8	35.9	71.6	71.8	49.0-122			0.279	20
Isophorone	50.0	25.0	32.1	50.0	64.2	36.0-120		J3	24.9	23
Naphthalene	50.0	23.1	30.4	46.2	60.8	27.0-120		J3	27.3	27
Nitrobenzene	50.0	23.9	30.9	47.8	61.8	27.0-120			25.5	29
n-Nitrosodimethylamine	50.0	15.2	22.7	30.4	45.4	10.0-120			39.6	40
n-Nitrosodiphenylamine	50.0	32.6	36.8	65.2	73.6	47.0-120			12.1	20
n-Nitrosodi-n-propylamine	50.0	24.5	34.5	49.0	69.0	31.0-120		J3	33.9	28
Phenanthrene	50.0	32.5	36.4	65.0	72.8	46.0-120			11.3	20
Benzylbutyl phthalate	50.0	33.2	32.9	66.4	65.8	43.0-121			0.908	20
Bis(2-Ethylhexyl)phthalate	50.0	33.2	33.2	66.4	66.4	43.0-122			0.000	20
Di-n-butyl phthalate	50.0	35.7	37.2	71.4	74.4	49.0-121			4.12	20
Diethyl phthalate	50.0	35.9	39.7	71.8	79.4	48.0-122			10.1	20
Dimethyl phthalate	50.0	34.0	39.5	68.0	79.0	48.0-120			15.0	20
Di-n-octyl phthalate	50.0	32.9	33.2	65.8	66.4	42.0-125			0.908	20
Pyrene	50.0	32.4	33.4	64.8	66.8	47.0-120			3.04	20
1,2,4-Trichlorobenzene	50.0	22.2	30.0	44.4	60.0	24.0-120		J3	29.9	29
Aniline	50.0	7.22	13.1	14.4	26.2	13.0-120		J3	57.9	31
1,2-Diphenylhydrazine	50.0	32.1	37.7	64.2	75.4	41.0-126	N2	N2	16.0	20
Benzyl alcohol	50.0	17.9	27.5	35.8	55.0	25.0-120		J3	42.3	26
4-Chloroaniline	50.0	18.3	26.4	36.6	52.8	25.0-120		J3	36.2	25
4-Chloro-3-methylphenol	50.0	21.5	31.3	43.0	62.6	40.0-120		J3	37.1	21
2-Chlorophenol	50.0	16.4	28.0	32.8	56.0	25.0-120		J3	52.3	35
Dibenzofuran	50.0	30.1	37.1	60.2	74.2	44.0-120			20.8	22
2,4-Dichlorophenol	50.0	21.4	31.8	42.8	63.6	36.0-120		J3	39.1	26
2,4-Dimethylphenol	50.0	20.1	29.3	40.2	58.6	33.0-120		J3	37.2	26
4,6-Dinitro-2-methylphenol	50.0	35.8	37.3	71.6	74.6	38.0-138			4.10	25
2,4-Dinitrophenol	50.0	25.8	24.4	51.6	48.8	10.0-120			5.58	39
2-Methylnaphthalene	50.0	24.0	31.5	48.0	63.0	33.0-120		J3	27.0	25
2-Methylphenol	50.0	15.8	25.6	31.6	51.2	28.0-120		J3	47.3	29
3&4-Methyl Phenol	50.0	16.7	27.9	33.4	55.8	31.0-120		J3	50.2	30
2-Nitroaniline	50.0	31.8	39.1	63.6	78.2	43.0-120			20.6	22
3-Nitroaniline	50.0	28.6	35.9	57.2	71.8	38.0-120		J3	22.6	21
4-Nitroaniline	50.0	35.3	39.9	70.6	79.8	18.0-160			12.2	21
2-Nitrophenol	50.0	23.3	32.8	46.6	65.6	31.0-120		J3	33.9	29
4-Nitrophenol	50.0	12.7	14.0	25.4	28.0	10.0-120			9.74	33
Pentachlorophenol	50.0	26.6	25.0	53.2	50.0	23.0-120			6.20	25

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4034151-1 02/14/24 11:36 • (LCSD) R4034151-2 02/14/24 11:57

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Phenol	50.0	8.41	13.7	16.8	27.4	10.0-120		J3	47.9	36
Pyridine	50.0	3.14	5.42	6.28	10.8	10.0-120	J4	J3	53.3	38
2,4,6-Trichlorophenol	50.0	27.9	35.9	55.8	71.8	42.0-120		J3	25.1	23
Acetophenone	50.0	23.0	31.9	46.0	63.8	29.0-120		J3	32.4	28
Diphenylamine	50.0	32.6	36.8	65.2	73.6	35.0-120			12.1	20
1,2,4,5-Tetrachlorobenzene	50.0	24.7	31.9	49.4	63.8	31.0-121			25.4	27
2,3,4,6-Tetrachlorophenol	50.0	34.1	38.7	68.2	77.4	42.0-132			12.6	22
2,4,5-Trichlorophenol	50.0	29.4	36.5	58.8	73.0	44.0-120			21.5	22
(S) 2-Fluorophenol				22.6	38.8	10.0-120				
(S) Phenol-d5				16.6	26.2	10.0-120				
(S) Nitrobenzene-d5				43.9	59.6	10.0-127				
(S) 2-Fluorobiphenyl				54.9	71.6	10.0-130				
(S) 2,4,6-Tribromophenol				68.5	76.5	10.0-155				
(S) p-Terphenyl-d14				65.8	66.5	10.0-128				

Laboratory Control Sample (LCS)

(LCS) R4034822-1 02/16/24 00:43

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Acetylaminofluorene	50.0	55.0	110	32.0-120	
4-Aminobiphenyl	50.0	33.2	66.4	20.0-120	
Chlorobenzilate	50.0	37.3	74.6	29.0-128	
Diallate	50.0	43.1	86.2	30.0-120	
2,6-Dichlorophenol	50.0	31.0	62.0	19.0-136	
Dimethoate	50.0	51.0	102	11.0-134	
P-(Dimethylamino) Azobenzene	50.0	48.7	97.4	27.0-120	
Dimethylbenz (A) Anthracene	50.0	39.0	78.0	14.0-124	
3,3-Dimethylbenzidine	50.0	10.3	20.6	13.0-120	
a,a-Dimethylphenethylamine	50.0	0.104	0.208	10.0-129	J4
1,3-Dinitrobenzene	50.0	34.9	69.8	34.0-120	
Diphenylamine	50.0	37.5	75.0	35.0-120	
Dinoseb	50.0	39.4	78.8	39.0-120	
Disulfoton	50.0	51.5	103	32.0-120	
Ethyl methanesulfonate	50.0	28.4	56.8	10.0-120	
Ethyl Parathion	50.0	52.8	106	46.0-130	
Famphur	50.0	50.8	102	32.0-120	
Hexachloropropene	50.0	24.9	49.8	10.0-120	
Hexachlorophene	100	34.1	34.1	10.0-120	

Cp

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Laboratory Control Sample (LCS)

(LCS) R4034822-1 02/16/24 00:43

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Isodrin	50.0	44.3	88.6	22.0-157	
Isosafrole	50.0	34.6	69.2	25.0-133	
Kepone	50.0	30.5	61.0	10.0-120	
Methapyrilene	50.0	7.79	15.6	10.0-120	
3-Methylcholanthrene	50.0	41.6	83.2	30.0-160	
Methyl methanesulfonate	50.0	23.7	47.4	10.0-120	
Methyl parathion	50.0	62.3	125	42.0-120	J4
1,4-Naphthoquinone	50.0	2.43	4.86	50.0-150	J4
1-Naphthylamine	50.0	28.0	56.0	19.0-120	
2-Naphthylamine	50.0	22.8	45.6	10.0-120	
5-Nitro-o-toluidine	50.0	44.2	88.4	34.0-120	
4-Nitroquinoline 1-oxide	50.0	33.6	67.2	10.0-159	
n-Nitrosodiethylamine	50.0	31.2	62.4	10.0-120	
n-Nitrosodi-n-butylamine	50.0	45.8	91.6	13.0-143	
n-Nitrosomethylethylamine	50.0	24.9	49.8	10.0-120	
n-Nitrosomorpholine	50.0	32.6	65.2	10.0-120	
n-Nitrosopiperidine	50.0	39.2	78.4	10.0-160	
n-Nitrosopyrrolidine	50.0	32.5	65.0	10.0-124	
Pentachlorobenzene	50.0	27.6	55.2	25.0-120	
Pentachloroethane	50.0	26.5	53.0	10.0-120	
Pentachloronitrobenzene	50.0	41.9	83.8	34.0-132	
Phenacetin	50.0	43.7	87.4	34.0-127	
p-Phenylenediamine	50.0	0.127	0.254	50.0-150	J4
Phorate	50.0	57.7	115	13.0-160	
2-Picoline	50.0	6.23	12.5	10.0-120	
Pronamide	50.0	42.5	85.0	38.0-130	
Safrole	50.0	31.1	62.2	21.0-120	
Sulfotep	50.0	58.6	117	52.0-120	
Thionazin	50.0	52.1	104	38.0-121	
o-Toluidine	50.0	20.8	41.6	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	34.1	68.2	11.0-135	
1,3,5-Trinitrobenzene	50.0	55.1	110	37.0-147	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

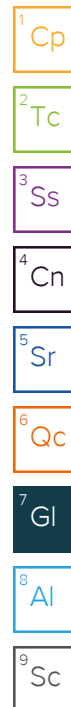
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
N2	Analyte reported using a calibration and validation based on Azobenzene (CAS 103-33-3). 1,2-Diphenylhydrazine decomposes into Azobenzene during the analysis.



ACCREDITATIONS & LOCATIONS

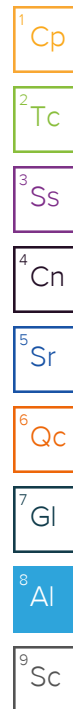
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1,6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1,4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA -- ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



Ramboll US Consulting, Inc. - Denver

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Denver, CO 80202

Billing Information:

Troy Wyss
PO Box 4229
Indianapolis, IN 46242

Report to:
Abby Small

Email To:
asmall@ramboll.com; rdeshpande@ramboll.com

Project Description:
CMR Great Falls - 2023 RFI Soil Sampling

City/State
Collected: Great Falls, MT

Please Circle:
PT MT CT ET

Phone: 303-382-5474

Client Project #

Lab Project #
ENVIRONCO-CALU MONTH

Collected by (print):
Kyle Groves

Site/Facility ID #
GREAT FALLS, MT

P.O. #

Collected by (signature):
Kyle A. Groves

Rush? (Lab MUST Be Notified)

Quote #

Same Day Five Day
Next Day 5 Day (Rad Only)
Two Day 10 Day (Rad Only)
Three Day

Date Results Needed

Immediately
Packed on Ice N Y ☒

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time
-----------	-----------	----------	-------	------	------

CMR-SP200-240208	G	GW		02/08/24	11 25
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CMR-DS01-240208	G	GW		02/08/24	
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TRIP BLANK

GW

* Matrix:
SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - Waste Water
DW - Drinking Water
OT - Other

Remarks:

Samples returned via:
UPS ☒ FedEx ☐ Courier ☐

Tracking # 7155 0310 2353

Relinquished by (Signature):
Kyle A. Groves
Date: 02/08/24 Time: 1530

Received by (Signature)

Trip Blank Received: Yes/No
HCL / MeOH
TBR

Relinquished by (Signature):

Received by (Signature)

Temp: °C Bottles Received:
23.0-2.38 21

Relinquished by (Signature):

Received for lab by (Signature)

Date: 2/9/24 Time: 9:00

Sample Receipt Checklist
COC Seal Present/Intact: ☒ NP Y N
COC Signed/Accurate: ☒ Y N
Bottles arrive intact: ☒ Y N
Correct bottles used: ☒ Y N
Sufficient volume sent: ☒ Y N
If Applicable
VOA Zero Headspace: ☒ Y N
Preservation Correct/Checked: ☒ Y N
RAD Screen <0.5 mR/hr: ☒ Y N

PH-10BDH5021 TRC-2352362
CR6-20221V

Hold: Condition:
NCF / OK

Analysis / Container / Preservative

Chain of Custody Page ___ of ___

Pace
PEOPLE ADVANCING SCIENCE

MT JULIET, TN

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody
constitutes acknowledgment and acceptance of the
Pace Terms and Conditions found at:
https://info.pacelabs.com/hubs/pas-standard-terms.pdf

SDG # 1704388
A170

Acctnum: ENVIRONCO

Template: T245953

Prelogin: P1052030

PM: 841 - Kelly Mercer

PB: BW 1/31

Shipped Via: FedEx Ground

Remarks Sample # (lab only)

-01
-02
-03

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1717608
Samples Received: 03/21/2024
Project Number:
Description: CMR Great Falls - 2023 RFI Soil Sampling
Site: GREAT FALLS, MT
Report To: Abby Small
1999 Broadway Suite 2225
Denver, CO 80202

Entire Report Reviewed By:



Kelly Mercer
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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¹ Cp
² Tc
³ Ss
⁴ Cn
⁵ Sr
⁶ Qc
⁷ Gl
⁸ Al
⁹ Sc

SAMPLE SUMMARY

CMR-SP200-240320 L1717608-01 GW

Collected by
Corey Leugue

Collected date/time
03/20/24 10:55

Received date/time
03/21/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2255284	10	03/28/24 12:58	03/28/24 12:58	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2255992	1	03/29/24 13:07	03/29/24 13:07	DYW	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2253139	5	03/25/24 17:25	03/27/24 14:20	JAS	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2254474	10	03/25/24 17:25	03/29/24 09:11	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2254474	2	03/25/24 17:25	03/28/24 13:57	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2253821	1	03/27/24 07:54	03/30/24 20:45	DSH	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2253821	1	03/27/24 07:54	04/02/24 14:20	DSH	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

SDG:

L1717608

DATE/TIME:

04/09/24 13:53

PAGE:

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CASE NARRATIVE

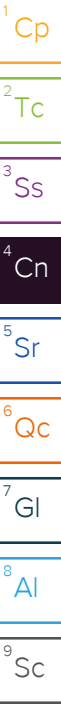
All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Kelly Mercer
Project Manager

Project Narrative

Due to multiple preparation procedures, calculated analytes are not reported in the quality control samples for EPH and VPH Methods.



Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

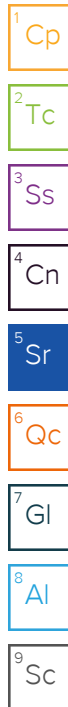
Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	U		333	1000	10	03/28/2024 12:58	WG2255284
Unadjusted C9-C12 Aliphatics	6630		333	1000	10	03/28/2024 12:58	WG2255284
Unadjusted C9-C10 Aromatics	1990		333	1000	10	03/28/2024 12:58	WG2255284
Adjusted C5-C8 Aliphatics	U		333	1000	10	03/28/2024 12:58	WG2255284
Adjusted C9-C12 Aliphatics	6610		333	1000	10	03/28/2024 12:58	WG2255284
Total VPH	8620		667	2000	10	03/28/2024 12:58	WG2255284
(S) 2,5-Dibromotoluene(FID)	81.8			70.0-130		03/28/2024 12:58	WG2255284
(S) 2,5-Dibromotoluene(PID)	63.3	J2		70.0-130		03/28/2024 12:58	WG2255284

Sample Narrative:

L1717608-01 WG2255284: Surrogate failure due to matrix interference

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	28.4		11.3	25.0	1	03/29/2024 13:07	WG2255992
Acrylonitrile	U		0.671	5.00	1	03/29/2024 13:07	WG2255992
Benzene	1.31		0.0941	0.500	1	03/29/2024 13:07	WG2255992
Bromobenzene	U		0.118	0.500	1	03/29/2024 13:07	WG2255992
Bromodichloromethane	U		0.136	0.500	1	03/29/2024 13:07	WG2255992
Bromochloromethane	U		0.128	0.500	1	03/29/2024 13:07	WG2255992
Bromoform	U		0.129	0.500	1	03/29/2024 13:07	WG2255992
Bromomethane	U		0.605	2.50	1	03/29/2024 13:07	WG2255992
n-Butylbenzene	U		0.157	0.500	1	03/29/2024 13:07	WG2255992
sec-Butylbenzene	0.742		0.125	0.500	1	03/29/2024 13:07	WG2255992
tert-Butylbenzene	U		0.127	0.500	1	03/29/2024 13:07	WG2255992
Carbon disulfide	U		0.0962	0.500	1	03/29/2024 13:07	WG2255992
Carbon tetrachloride	U		0.128	0.500	1	03/29/2024 13:07	WG2255992
Chlorobenzene	U		0.117	0.500	1	03/29/2024 13:07	WG2255992
Chlorodibromomethane	U		0.140	0.500	1	03/29/2024 13:07	WG2255992
Chloroethane	U		0.192	2.50	1	03/29/2024 13:07	WG2255992
2-Chloroethyl vinyl ether	U		0.575	50.0	1	03/29/2024 13:07	WG2255992
Chloroform	U		0.111	0.500	1	03/29/2024 13:07	WG2255992
Chloromethane	U		0.960	1.25	1	03/29/2024 13:07	WG2255992
2-Chlorotoluene	1.08		0.106	0.500	1	03/29/2024 13:07	WG2255992
4-Chlorotoluene	U		0.114	0.500	1	03/29/2024 13:07	WG2255992
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	03/29/2024 13:07	WG2255992
1,2-Dibromoethane	U		0.126	0.500	1	03/29/2024 13:07	WG2255992
Dibromomethane	U		0.122	0.500	1	03/29/2024 13:07	WG2255992
1,2-Dichlorobenzene	U		0.107	0.500	1	03/29/2024 13:07	WG2255992
1,3-Dichlorobenzene	U		0.299	0.500	1	03/29/2024 13:07	WG2255992
1,4-Dichlorobenzene	U		0.120	0.500	1	03/29/2024 13:07	WG2255992
Dichlorodifluoromethane	U		0.374	2.50	1	03/29/2024 13:07	WG2255992
1,1-Dichloroethane	U		0.100	0.500	1	03/29/2024 13:07	WG2255992
1,2-Dichloroethane	U		0.0819	0.500	1	03/29/2024 13:07	WG2255992
1,1-Dichloroethene	U		0.188	0.500	1	03/29/2024 13:07	WG2255992
cis-1,2-Dichloroethene	U		0.126	0.500	1	03/29/2024 13:07	WG2255992
trans-1,2-Dichloroethene	U		0.149	0.500	1	03/29/2024 13:07	WG2255992
1,2-Dichloropropane	U		0.149	0.500	1	03/29/2024 13:07	WG2255992
1,1-Dichloropropene	U		0.142	0.500	1	03/29/2024 13:07	WG2255992
1,3-Dichloropropane	U		0.109	1.00	1	03/29/2024 13:07	WG2255992
cis-1,3-Dichloropropene	U		0.111	0.500	1	03/29/2024 13:07	WG2255992
trans-1,3-Dichloropropene	U		0.118	0.500	1	03/29/2024 13:07	WG2255992
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	03/29/2024 13:07	WG2255992
2,2-Dichloropropane	U		0.161	0.500	1	03/29/2024 13:07	WG2255992



Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Di-isopropyl ether	U		0.105	0.500	1	03/29/2024 13:07	WG2255992
Ethylbenzene	6.22		0.137	0.500	1	03/29/2024 13:07	WG2255992
Hexachloro-1,3-butadiene	U		0.337	1.00	1	03/29/2024 13:07	WG2255992
2-Hexanone	U		0.787	5.00	1	03/29/2024 13:07	WG2255992
n-Hexane	U		0.749	5.00	1	03/29/2024 13:07	WG2255992
Iodomethane	1.04	B J	0.554	5.00	1	03/29/2024 13:07	WG2255992
Isopropylbenzene	1.24		0.105	0.500	1	03/29/2024 13:07	WG2255992
p-Isopropyltoluene	U		0.120	0.500	1	03/29/2024 13:07	WG2255992
2-Butanone (MEK)	4.35	U J	1.19	5.00	1	03/29/2024 13:07	WG2255992
Methylene Chloride	U		0.430	2.50	1	03/29/2024 13:07	WG2255992
4-Methyl-2-pentanone (MIBK)	4.72	U J	0.478	5.00	1	03/29/2024 13:07	WG2255992
Methyl tert-butyl ether	U		0.101	0.500	1	03/29/2024 13:07	WG2255992
Naphthalene	13.0		0.174	2.50	1	03/29/2024 13:07	WG2255992
n-Propylbenzene	1.37		0.0993	0.500	1	03/29/2024 13:07	WG2255992
Styrene	U		0.118	0.500	1	03/29/2024 13:07	WG2255992
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	03/29/2024 13:07	WG2255992
1,1,2,2-Tetrachloroethane	5.94		0.133	0.500	1	03/29/2024 13:07	WG2255992
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	03/29/2024 13:07	WG2255992
Tetrachloroethene	U		0.300	0.500	1	03/29/2024 13:07	WG2255992
Toluene	4.39		0.278	0.500	1	03/29/2024 13:07	WG2255992
1,2,3-Trichlorobenzene	U		0.164	0.500	1	03/29/2024 13:07	WG2255992
1,2,4-Trichlorobenzene	U		0.481	1.00	1	03/29/2024 13:07	WG2255992
1,1,1-Trichloroethane	U		0.149	0.500	1	03/29/2024 13:07	WG2255992
1,1,2-Trichloroethane	U		0.158	0.500	1	03/29/2024 13:07	WG2255992
Trichloroethene	U		0.190	0.500	1	03/29/2024 13:07	WG2255992
Trichlorofluoromethane	U		0.160	2.50	1	03/29/2024 13:07	WG2255992
1,2,3-Trichloropropane	U		0.237	2.50	1	03/29/2024 13:07	WG2255992
1,2,4-Trimethylbenzene	7.45		0.322	0.500	1	03/29/2024 13:07	WG2255992
1,2,3-Trimethylbenzene	19.8		0.104	0.500	1	03/29/2024 13:07	WG2255992
1,3,5-Trimethylbenzene	10.6		0.104	0.500	1	03/29/2024 13:07	WG2255992
Vinyl acetate	U		0.692	5.00	1	03/29/2024 13:07	WG2255992
Vinyl chloride	U		0.234	0.500	1	03/29/2024 13:07	WG2255992
Xylenes, Total	15.3		0.174	1.50	1	03/29/2024 13:07	WG2255992
(S) Toluene-d8	103			80.0-120		03/29/2024 13:07	WG2255992
(S) 4-Bromofluorobenzene	119			77.0-126		03/29/2024 13:07	WG2255992
(S) 1,2-Dichloroethane-d4	94.1			70.0-130		03/29/2024 13:07	WG2255992

TPH by Method MTDEQ EPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
EPH Screen	58300		500	1500	5	03/27/2024 14:20	WG2253139
Unadjusted C9-C18 Aliphatics	34100		2000	6000	10	03/29/2024 09:11	WG2254474
Unadjusted C19-C36 Aliphatics	10200		2000	6000	10	03/29/2024 09:11	WG2254474
Unadjusted C11-C22 Aromatics	10500		400	1200	2	03/28/2024 13:57	WG2254474
Unadjusted Total Petroleum Hydrocarbons	54800		2000	6000	10	03/29/2024 09:11	WG2254474
Adjusted C11-C22 Aromatics	10500		400	1200	2	03/28/2024 13:57	WG2254474
Adjusted Total Petroleum Hydrocarbons	54800		2000	6000	10	03/29/2024 09:11	WG2254474
(S) o-Terphenyl	67.2			40.0-140		03/27/2024 14:20	WG2253139
(S) o-Terphenyl	65.7			40.0-140		03/28/2024 13:57	WG2254474
(S) 1-Chloro-octadecane	51.3			40.0-140		03/29/2024 09:11	WG2254474
(S) 2-Fluorobiphenyl	121			40.0-140		03/28/2024 13:57	WG2254474
(S) 2-Bromonaphthalene	102			40.0-140		03/28/2024 13:57	WG2254474

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

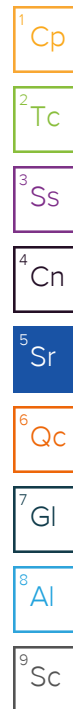
7 Gl

8 Al

9 Sc

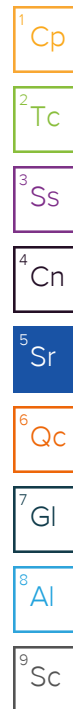
Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acenaphthene	U		0.0886	1.00	1	03/30/2024 20:45	WG2253821
Acenaphthylene	U		0.0921	1.00	1	03/30/2024 20:45	WG2253821
Anthracene	U		0.0804	1.00	1	03/30/2024 20:45	WG2253821
Benzdine	U	J4	3.74	10.0	1	03/30/2024 20:45	WG2253821
Benzo(a)anthracene	U		0.199	1.00	1	03/30/2024 20:45	WG2253821
Benzo(b)fluoranthene	U		0.130	1.00	1	03/30/2024 20:45	WG2253821
Benzo(k)fluoranthene	U		0.120	1.00	1	03/30/2024 20:45	WG2253821
Benzo(g,h,i)perylene	U		0.121	1.00	1	03/30/2024 20:45	WG2253821
Benzo(a)pyrene	U		0.0381	1.00	1	03/30/2024 20:45	WG2253821
Bis(2-chlorethoxy)methane	U		0.116	10.0	1	03/30/2024 20:45	WG2253821
Bis(2-chloroethyl)ether	U		0.137	10.0	1	03/30/2024 20:45	WG2253821
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0	1	03/30/2024 20:45	WG2253821
4-Bromophenyl-phenylether	U		0.0877	10.0	1	03/30/2024 20:45	WG2253821
2-Chloronaphthalene	U		0.0648	1.00	1	03/30/2024 20:45	WG2253821
4-Chlorophenyl-phenylether	U		0.0926	10.0	1	03/30/2024 20:45	WG2253821
Chrysene	U		0.130	1.00	1	03/30/2024 20:45	WG2253821
Dibenz(a,h)anthracene	U		0.0644	1.00	1	03/30/2024 20:45	WG2253821
3,3-Dichlorobenzidine	U		0.212	10.0	1	03/30/2024 20:45	WG2253821
2,4-Dinitrotoluene	U		0.0983	10.0	1	03/30/2024 20:45	WG2253821
2,6-Dinitrotoluene	U		0.250	10.0	1	03/30/2024 20:45	WG2253821
Fluoranthene	U		0.102	1.00	1	03/30/2024 20:45	WG2253821
Fluorene	U		0.0844	1.00	1	03/30/2024 20:45	WG2253821
Hexachlorobenzene	U		0.0755	1.00	1	03/30/2024 20:45	WG2253821
Hexachloro-1,3-butadiene	U		0.0968	10.0	1	03/30/2024 20:45	WG2253821
Hexachlorocyclopentadiene	U		0.0598	10.0	1	03/30/2024 20:45	WG2253821
Hexachloroethane	U		0.127	10.0	1	03/30/2024 20:45	WG2253821
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	03/30/2024 20:45	WG2253821
Isophorone	U		0.143	10.0	1	03/30/2024 20:45	WG2253821
Naphthalene	1.18		0.159	1.00	1	03/30/2024 20:45	WG2253821
Nitrobenzene	U		0.297	10.0	1	03/30/2024 20:45	WG2253821
n-Nitrosodimethylamine	U		0.998	10.0	1	03/30/2024 20:45	WG2253821
n-Nitrosodiphenylamine	U		2.37	10.0	1	03/30/2024 20:45	WG2253821
n-Nitrosodi-n-propylamine	U		0.261	10.0	1	03/30/2024 20:45	WG2253821
Phenanthrene	0.972	J4	0.112	1.00	1	03/30/2024 20:45	WG2253821
Benzylbutyl phthalate	U		0.765	3.00	1	03/30/2024 20:45	WG2253821
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00	1	03/30/2024 20:45	WG2253821
Di-n-butyl phthalate	U		0.453	3.00	1	03/30/2024 20:45	WG2253821
Diethyl phthalate	U		0.287	3.00	1	03/30/2024 20:45	WG2253821
Dimethyl phthalate	U		0.260	3.00	1	03/30/2024 20:45	WG2253821
Di-n-octyl phthalate	U		0.932	3.00	1	03/30/2024 20:45	WG2253821
Pyrene	0.343	J4	0.107	1.00	1	03/30/2024 20:45	WG2253821
1,2,4-Trichlorobenzene	U		0.0698	10.0	1	03/30/2024 20:45	WG2253821
Aniline	U		1.65	10.0	1	03/30/2024 20:45	WG2253821
1,2-Diphenylhydrazine	U	N2	0.105	10.0	1	03/30/2024 20:45	WG2253821
Benzyl alcohol	U		0.563	10.0	1	03/30/2024 20:45	WG2253821
4-Chloroaniline	U		0.234	10.0	1	03/30/2024 20:45	WG2253821
4-Chloro-3-methylphenol	U		0.131	10.0	1	03/30/2024 20:45	WG2253821
2-Chlorophenol	U		0.133	10.0	1	03/30/2024 20:45	WG2253821
Dibenzofuran	U		0.0970	10.0	1	03/30/2024 20:45	WG2253821
2,4-Dichlorophenol	U		0.102	10.0	1	03/30/2024 20:45	WG2253821
2,4-Dimethylphenol	15.3		0.0636	10.0	1	03/30/2024 20:45	WG2253821
4,6-Dinitro-2-methylphenol	U		1.12	10.0	1	03/30/2024 20:45	WG2253821
2,4-Dinitrophenol	U		5.93	10.0	1	03/30/2024 20:45	WG2253821
2-Methylnaphthalene	1.88		0.117	1.00	1	03/30/2024 20:45	WG2253821
2-Methylphenol	U		0.0929	10.0	1	03/30/2024 20:45	WG2253821
3&4-Methyl Phenol	U		0.168	10.0	1	03/30/2024 20:45	WG2253821



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Nitroaniline	U		0.102	10.0	1	03/30/2024 20:45	WG2253821
3-Nitroaniline	U		0.0869	10.0	1	03/30/2024 20:45	WG2253821
4-Nitroaniline	U		0.0910	10.0	1	03/30/2024 20:45	WG2253821
2-Nitrophenol	U		0.117	10.0	1	03/30/2024 20:45	WG2253821
4-Nitrophenol	U		0.143	10.0	1	03/30/2024 20:45	WG2253821
Pentachlorophenol	U		0.313	10.0	1	03/30/2024 20:45	WG2253821
Phenol	U		4.33	10.0	1	03/30/2024 20:45	WG2253821
Pyridine	U	J4	0.627	10.0	1	03/30/2024 20:45	WG2253821
2,4,6-Trichlorophenol	U		0.100	10.0	1	03/30/2024 20:45	WG2253821
Acetophenone	2.93	J	0.208	10.0	1	03/30/2024 20:45	WG2253821
2-Acetylaminofluorene	U		0.253	10.0	1	04/02/2024 14:20	WG2253821
4-Aminobiphenyl	U		0.461	10.0	1	04/02/2024 14:20	WG2253821
Chlorobenzilate	U		3.84	50.0	1	04/02/2024 14:20	WG2253821
Diallate	U		0.524	10.0	1	04/02/2024 14:20	WG2253821
2,6-Dichlorophenol	U		0.102	10.0	1	04/02/2024 14:20	WG2253821
Dimethoate	U		5.05	50.0	1	04/02/2024 14:20	WG2253821
P-(Dimethylamino) Azobenzene	U		3.69	10.0	1	04/02/2024 14:20	WG2253821
Dimethylbenz (A) Anthracene	U		1.71	10.0	1	04/02/2024 14:20	WG2253821
3,3-Dimethylbenzidine	U		3.39	10.0	1	04/02/2024 14:20	WG2253821
a,a-Dimethylphenethylamine	U	J4	3.13	50.0	1	04/02/2024 14:20	WG2253821
1,3-Dinitrobenzene	U		0.359	10.0	1	04/02/2024 14:20	WG2253821
Diphenylamine	U		2.37	10.0	1	03/30/2024 20:45	WG2253821
Dinoseb	U		8.01	50.0	1	04/02/2024 14:20	WG2253821
Disulfoton	U		0.267	10.0	1	04/02/2024 14:20	WG2253821
Ethyl methanesulfonate	U		0.326	10.0	1	04/02/2024 14:20	WG2253821
Ethyl Parathion	U		0.379	10.0	1	04/02/2024 14:20	WG2253821
Famphur	U		3.92	20.0	1	04/02/2024 14:20	WG2253821
Hexachloropropene	U		0.149	50.0	1	04/02/2024 14:20	WG2253821
Hexachlorophene	U		1.44	50.0	1	04/02/2024 14:20	WG2253821
Isodrin	U		4.11	10.0	1	04/02/2024 14:20	WG2253821
Isosafrole	3.89	J	3.88	10.0	1	04/02/2024 14:20	WG2253821
Kepone	U	J4	2.66	20.0	1	04/02/2024 14:20	WG2253821
Methapyrilene	U		10.0	50.0	1	04/02/2024 14:20	WG2253821
3-Methylcholanthrene	U		0.164	10.0	1	04/02/2024 14:20	WG2253821
Methyl methanesulfonate	U		3.40	50.0	1	04/02/2024 14:20	WG2253821
Methyl parathion	U		0.213	10.0	1	04/02/2024 14:20	WG2253821
1,4-Naphthoquinone	U	J4	5.56	50.0	1	04/02/2024 14:20	WG2253821
1-Naphthylamine	U		0.289	10.0	1	04/02/2024 14:20	WG2253821
2-Naphthylamine	U		4.48	10.0	1	04/02/2024 14:20	WG2253821
5-Nitro-o-toluidine	U		1.99	10.0	1	04/02/2024 14:20	WG2253821
4-Nitroquinoline 1-oxide	U		2.03	10.0	1	04/02/2024 14:20	WG2253821
n-Nitrosodiethylamine	U		3.57	10.0	1	04/02/2024 14:20	WG2253821
n-Nitrosodi-n-butylamine	U		3.91	10.0	1	04/02/2024 14:20	WG2253821
n-Nitrosomethylethylamine	U		3.25	10.0	1	04/02/2024 14:20	WG2253821
n-Nitrosomorpholine	U		3.25	10.0	1	04/02/2024 14:20	WG2253821
n-Nitrosopiperidine	U		3.72	10.0	1	04/02/2024 14:20	WG2253821
n-Nitrosopyrrolidine	U		3.39	10.0	1	04/02/2024 14:20	WG2253821
Pentachlorobenzene	U		4.15	10.0	1	04/02/2024 14:20	WG2253821
Pentachloroethane	U		2.83	50.0	1	04/02/2024 14:20	WG2253821
Pentachloronitrobenzene	U		4.15	10.0	1	04/02/2024 14:20	WG2253821
Phenacetin	U		4.66	10.0	1	04/02/2024 14:20	WG2253821
p-Phenylenediamine	U	J4	387	6900	1	04/02/2024 14:20	WG2253821
Phorate	U		4.86	50.0	1	04/02/2024 14:20	WG2253821
2-Picoline	U		6.83	50.0	1	04/02/2024 14:20	WG2253821
Pronamide	U		4.21	10.0	1	04/02/2024 14:20	WG2253821
Safrole	U		3.68	10.0	1	04/02/2024 14:20	WG2253821



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Sulfotep	U		3.99	50.0	1	04/02/2024 14:20	WG2253821
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0	1	03/30/2024 20:45	WG2253821
2,3,4,6-Tetrachlorophenol	U		0.231	10.0	1	03/30/2024 20:45	WG2253821
Thionazin	U		4.07	10.0	1	04/02/2024 14:20	WG2253821
o-Toluidine	7.94	J	3.53	10.0	1	04/02/2024 14:20	WG2253821
2,4,5-Trichlorophenol	U		0.109	10.0	1	03/30/2024 20:45	WG2253821
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0	1	04/02/2024 14:20	WG2253821
1,3,5-Trinitrobenzene	U		1.32	10.0	1	04/02/2024 14:20	WG2253821
(S) 2-Fluorophenol	12.0			10.0-120		03/30/2024 20:45	WG2253821
(S) Phenol-d5	10.8			10.0-120		03/30/2024 20:45	WG2253821
(S) Nitrobenzene-d5	64.4			10.0-127		03/30/2024 20:45	WG2253821
(S) 2-Fluorobiphenyl	33.4			10.0-130		03/30/2024 20:45	WG2253821
(S) 2,4,6-Tribromophenol	34.2			10.0-155		03/30/2024 20:45	WG2253821
(S) p-Terphenyl-d14	19.6			10.0-128		03/30/2024 20:45	WG2253821

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Method Blank (MB)

(MB) R4051695-3 03/28/24 12:22

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C5-C8 Aliphatics	U		33.3	100
Unadjusted C9-C12 Aliphatics	U		33.3	100
Unadjusted C9-C10 Aromatics	U		33.3	100
Adjusted C5-C8 Aliphatics	U		33.3	100
Adjusted C9-C12 Aliphatics	U		33.3	100
Total VPH	U		66.7	200
(S) 2,5-Dibromotoluene(FID)	98.9			70.0-130
(S) 2,5-Dibromotoluene(PID)	89.1			70.0-130

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4051695-1 03/28/24 09:54 • (LCSD) R4051695-2 03/28/24 10:31

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C5-C8 Aliphatics	1200	1310	1320	109	110	70.0-130			0.760	50
Unadjusted C9-C12 Aliphatics	1400	1390	1390	99.3	99.3	70.0-130			0.000	50
Unadjusted C9-C10 Aromatics	200	163	163	81.5	81.5	70.0-130			0.000	50
Total VPH	2800	2860	2870	102	103	70.0-130			0.349	50
(S) 2,5-Dibromotoluene(FID)				103	97.8	70.0-130				
(S) 2,5-Dibromotoluene(PID)				93.0	88.4	70.0-130				

1Cp

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8Al

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Method Blank (MB)

(MB) R4052467-3 03/29/24 10:32

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acetone	U		11.3	25.0
Acrylonitrile	U		0.671	5.00
Benzene	U		0.0941	0.500
Bromobenzene	U		0.118	0.500
Bromodichloromethane	U		0.136	0.500
Bromochloromethane	U		0.128	0.500
Bromoform	U		0.129	0.500
Bromomethane	U		0.605	2.50
n-Butylbenzene	U		0.157	0.500
sec-Butylbenzene	U		0.125	0.500
tert-Butylbenzene	U		0.127	0.500
Carbon disulfide	U		0.0962	0.500
Carbon tetrachloride	U		0.128	0.500
Chlorobenzene	U		0.117	0.500
Chlorodibromomethane	U		0.140	0.500
Chloroethane	U		0.192	2.50
2-Chloroethyl vinyl ether	U		0.575	50.0
Chloroform	U		0.111	0.500
Chloromethane	U		0.960	1.25
2-Chlorotoluene	U		0.106	0.500
4-Chlorotoluene	U		0.114	0.500
1,2-Dibromo-3-Chloropropane	U		0.276	2.50
1,2-Dibromoethane	U		0.126	0.500
Dibromomethane	U		0.122	0.500
1,2-Dichlorobenzene	U		0.107	0.500
1,3-Dichlorobenzene	U		0.299	0.500
1,4-Dichlorobenzene	U		0.120	0.500
Dichlorodifluoromethane	U		0.374	2.50
1,1-Dichloroethane	U		0.100	0.500
1,2-Dichloroethane	U		0.0819	0.500
1,1-Dichloroethene	U		0.188	0.500
cis-1,2-Dichloroethene	U		0.126	0.500
trans-1,2-Dichloroethene	U		0.149	0.500
1,2-Dichloropropane	U		0.149	0.500
1,1-Dichloropropene	U		0.142	0.500
1,3-Dichloropropane	U		0.109	1.00
cis-1,3-Dichloropropene	U		0.111	0.500
trans-1,3-Dichloropropene	U		0.118	0.500
trans-1,4-Dichloro-2-butene	U		0.467	5.00
2,2-Dichloropropane	U		0.161	0.500

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⁹Sc

Method Blank (MB)

(MB) R4052467-3 03/29/24 10:32

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Di-isopropyl ether	U		0.105	0.500
Ethylbenzene	U		0.137	0.500
Hexachloro-1,3-butadiene	U		0.337	1.00
2-Hexanone	U		0.787	5.00
n-Hexane	U		0.749	5.00
Iodomethane	1.12	U	0.554	5.00
Isopropylbenzene	U		0.105	0.500
p-Isopropyltoluene	U		0.120	0.500
2-Butanone (MEK)	U		1.19	5.00
Methylene Chloride	U		0.430	2.50
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00
Methyl tert-butyl ether	U		0.101	0.500
Naphthalene	U		0.174	2.50
n-Propylbenzene	U		0.0993	0.500
Styrene	U		0.118	0.500
1,1,1,2-Tetrachloroethane	U		0.147	0.500
1,1,2,2-Tetrachloroethane	U		0.133	0.500
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500
Tetrachloroethene	U		0.300	0.500
Toluene	U		0.278	0.500
1,2,3-Trichlorobenzene	U		0.164	0.500
1,2,4-Trichlorobenzene	U		0.481	1.00
1,1,1-Trichloroethane	U		0.149	0.500
1,1,2-Trichloroethane	U		0.158	0.500
Trichloroethene	U		0.190	0.500
Trichlorofluoromethane	U		0.160	2.50
1,2,3-Trichloropropane	U		0.237	2.50
1,2,4-Trimethylbenzene	U		0.322	0.500
1,2,3-Trimethylbenzene	U		0.104	0.500
1,3,5-Trimethylbenzene	U		0.104	0.500
Vinyl acetate	U		0.692	5.00
Vinyl chloride	U		0.234	0.500
Xylenes, Total	U		0.174	1.50
(S) Toluene-d8	103			80.0-120
(S) 4-Bromofluorobenzene	94.5			77.0-126
(S) 1,2-Dichloroethane-d4	94.9			70.0-130

¹Cp

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Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4052467-1 03/29/24 09:30 • (LCSD) R4052467-2 03/29/24 09:51

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	25.0	25.2	26.1	101	104	19.0-160			3.51	27
Acrylonitrile	25.0	24.2	24.9	96.8	99.6	55.0-149			2.85	20
Benzene	5.00	4.55	4.51	91.0	90.2	70.0-123			0.883	20
Bromobenzene	5.00	4.30	4.30	86.0	86.0	73.0-121			0.000	20
Bromodichloromethane	5.00	4.63	4.67	92.6	93.4	75.0-120			0.860	20
Bromochloromethane	5.00	5.09	5.60	102	112	76.0-122			9.54	20
Bromoform	5.00	4.32	4.43	86.4	88.6	68.0-132			2.51	20
Bromomethane	5.00	2.59	2.65	51.8	53.0	10.0-160			2.29	25
n-Butylbenzene	5.00	5.23	5.09	105	102	73.0-125			2.71	20
sec-Butylbenzene	5.00	4.68	4.80	93.6	96.0	75.0-125			2.53	20
tert-Butylbenzene	5.00	4.62	4.88	92.4	97.6	76.0-124			5.47	20
Carbon disulfide	5.00	4.49	4.34	89.8	86.8	61.0-128			3.40	20
Carbon tetrachloride	5.00	5.03	5.11	101	102	68.0-126			1.58	20
Chlorobenzene	5.00	5.33	5.42	107	108	80.0-121			1.67	20
Chlorodibromomethane	5.00	5.17	4.92	103	98.4	77.0-125			4.96	20
Chloroethane	5.00	4.63	4.33	92.6	86.6	47.0-150			6.70	20
2-Chloroethyl vinyl ether	25.0	23.6	24.3	94.4	97.2	51.0-160			2.92	20
Chloroform	5.00	4.64	4.59	92.8	91.8	73.0-120			1.08	20
Chloromethane	5.00	4.37	4.44	87.4	88.8	41.0-142			1.59	20
2-Chlorotoluene	5.00	4.59	4.79	91.8	95.8	76.0-123			4.26	20
4-Chlorotoluene	5.00	4.60	4.69	92.0	93.8	75.0-122			1.94	20
1,2-Dibromo-3-Chloropropane	5.00	5.39	5.24	108	105	58.0-134			2.82	20
1,2-Dibromoethane	5.00	5.37	5.49	107	110	80.0-122			2.21	20
Dibromomethane	5.00	5.24	5.34	105	107	80.0-120			1.89	20
1,2-Dichlorobenzene	5.00	4.94	4.86	98.8	97.2	79.0-121			1.63	20
1,3-Dichlorobenzene	5.00	4.87	5.07	97.4	101	79.0-120			4.02	20
1,4-Dichlorobenzene	5.00	4.87	4.96	97.4	99.2	79.0-120			1.83	20
Dichlorodifluoromethane	5.00	3.73	3.65	74.6	73.0	51.0-149			2.17	20
1,1-Dichloroethane	5.00	4.63	4.63	92.6	92.6	70.0-126			0.000	20
1,2-Dichloroethane	5.00	4.45	4.52	89.0	90.4	70.0-128			1.56	20
1,1-Dichloroethene	5.00	5.00	5.21	100	104	71.0-124			4.11	20
cis-1,2-Dichloroethene	5.00	5.14	5.30	103	106	73.0-120			3.07	20
trans-1,2-Dichloroethene	5.00	5.08	4.99	102	99.8	73.0-120			1.79	20
1,2-Dichloropropane	5.00	4.66	4.62	93.2	92.4	77.0-125			0.862	20
1,1-Dichloropropene	5.00	4.87	4.85	97.4	97.0	74.0-126			0.412	20
1,3-Dichloropropane	5.00	5.00	5.26	100	105	80.0-120			5.07	20
cis-1,3-Dichloropropene	5.00	4.69	4.59	93.8	91.8	80.0-123			2.16	20
trans-1,3-Dichloropropene	5.00	4.85	4.90	97.0	98.0	78.0-124			1.03	20
trans-1,4-Dichloro-2-butene	5.00	4.42	4.95	88.4	99.0	33.0-144			11.3	20
2,2-Dichloropropane	5.00	4.81	4.81	96.2	96.2	58.0-130			0.000	20

¹Cp

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Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4052467-1 03/29/24 09:30 • (LCSD) R4052467-2 03/29/24 09:51

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Di-isopropyl ether	5.00	4.17	4.22	83.4	84.4	58.0-138			1.19	20
Ethylbenzene	5.00	5.19	5.07	104	101	79.0-123			2.34	20
Hexachloro-1,3-butadiene	5.00	4.05	4.16	81.0	83.2	54.0-138			2.68	20
2-Hexanone	25.0	22.0	23.4	88.0	93.6	67.0-149			6.17	20
n-Hexane	5.00	4.65	4.65	93.0	93.0	57.0-133			0.000	20
Iodomethane	25.0	17.2	19.2	68.8	76.8	33.0-147			11.0	26
Isopropylbenzene	5.00	4.76	4.93	95.2	98.6	76.0-127			3.51	20
p-Isopropyltoluene	5.00	4.82	4.93	96.4	98.6	76.0-125			2.26	20
2-Butanone (MEK)	25.0	24.5	25.3	98.0	101	44.0-160			3.21	20
Methylene Chloride	5.00	4.71	4.65	94.2	93.0	67.0-120			1.28	20
4-Methyl-2-pentanone (MIBK)	25.0	23.3	23.8	93.2	95.2	68.0-142			2.12	20
Methyl tert-butyl ether	5.00	4.58	4.84	91.6	96.8	68.0-125			5.52	20
Naphthalene	5.00	5.77	6.41	115	128	54.0-135			10.5	20
n-Propylbenzene	5.00	4.62	4.62	92.4	92.4	77.0-124			0.000	20
Styrene	5.00	4.94	4.73	98.8	94.6	73.0-130			4.34	20
1,1,1,2-Tetrachloroethane	5.00	5.07	5.22	101	104	75.0-125			2.92	20
1,1,2,2-Tetrachloroethane	5.00	5.37	5.34	107	107	65.0-130			0.560	20
1,1,2-Trichlorotrifluoroethane	5.00	5.29	5.39	106	108	69.0-132			1.87	20
Tetrachloroethene	5.00	5.19	5.40	104	108	72.0-132			3.97	20
Toluene	5.00	4.90	4.97	98.0	99.4	79.0-120			1.42	20
1,2,3-Trichlorobenzene	5.00	6.29	6.69	126	134	50.0-138			6.16	20
1,2,4-Trichlorobenzene	5.00	4.71	4.76	94.2	95.2	57.0-137			1.06	20
1,1,1-Trichloroethane	5.00	4.84	4.86	96.8	97.2	73.0-124			0.412	20
1,1,2-Trichloroethane	5.00	5.39	5.42	108	108	80.0-120			0.555	20
Trichloroethene	5.00	5.56	5.48	111	110	78.0-124			1.45	20
Trichlorofluoromethane	5.00	5.05	5.11	101	102	59.0-147			1.18	20
1,2,3-Trichloropropane	5.00	5.68	5.86	114	117	73.0-130			3.12	20
1,2,4-Trimethylbenzene	5.00	4.55	4.72	91.0	94.4	76.0-121			3.67	20
1,2,3-Trimethylbenzene	5.00	4.57	4.76	91.4	95.2	77.0-120			4.07	20
1,3,5-Trimethylbenzene	5.00	4.60	4.69	92.0	93.8	76.0-122			1.94	20
Vinyl acetate	25.0	29.0	28.7	116	115	11.0-160			1.04	20
Vinyl chloride	5.00	4.44	4.63	88.8	92.6	67.0-131			4.19	20
Xylenes, Total	15.0	14.9	14.7	99.3	98.0	79.0-123			1.35	20
(S) Toluene-d8				102	101	80.0-120				
(S) 4-Bromofluorobenzene				95.3	96.2	77.0-126				
(S) 1,2-Dichloroethane-d4				95.9	98.9	70.0-130				

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4050655-1 03/27/24 10:15

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
EPH Screen	U		100	300
(S) o-Terphenyl	69.8			40.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4050655-2 03/27/24 10:29 • (LCSD) R4050655-3 03/27/24 10:44

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	%	%	%			%	%
EPH Screen	3100	2280	2480	73.5	80.0	40.0-140			8.40	25
(S) o-Terphenyl				66.1	65.9	40.0-140				

L1717920-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1717920-01 03/27/24 10:58 • (MS) R4050655-4 03/27/24 11:12 • (MSD) R4050655-5 03/27/24 11:27

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
EPH Screen	2980	5610	7550	8170	65.1	85.0	1	40.0-140			7.89	50
(S) o-Terphenyl					59.6	56.6		40.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4051367-1 03/28/24 10:02

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C9-C18 Aliphatics	U		200	600
Unadjusted C19-C36 Aliphatics	U		200	600
(S) 1-Chloro-octadecane	104			40.0-140

Method Blank (MB)

(MB) R4051371-1 03/28/24 08:35

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C11-C22 Aromatics	U		200	600
(S) o-Terphenyl	82.5			40.0-140
(S) 2-Fluorobiphenyl	95.5			40.0-140
(S) 2-Bromonaphthalene	91.9			40.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4051367-2 03/28/24 11:31 • (LCSD) R4051367-3 03/28/24 11:53

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C9-C18 Aliphatics	600	441	466	73.5	77.7	40.0-140			5.51	25
Unadjusted C19-C36 Aliphatics	800	780	811	97.5	101	40.0-140			3.90	25
(S) 1-Chloro-octadecane				99.9	101	40.0-140				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4051371-2 03/28/24 09:11 • (LCSD) R4051371-3 03/28/24 09:34

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C11-C22 Aromatics	1700	1550	1580	91.2	92.9	40.0-140			1.92	25
(S) o-Terphenyl				83.1	81.5	40.0-140				
(S) 2-Fluorobiphenyl				98.1	95.3	40.0-140				
(S) 2-Bromonaphthalene				94.9	92.5	40.0-140				

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

Method Blank (MB)

(MB) R4052155-2 03/30/24 13:39

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acenaphthene	U		0.0886	1.00
Acenaphthylene	U		0.0921	1.00
Anthracene	U		0.0804	1.00
Benzidine	U		3.74	10.0
Benzo(a)anthracene	U		0.199	1.00
Benzo(b)fluoranthene	U		0.130	1.00
Benzo(k)fluoranthene	U		0.120	1.00
Benzo(g,h,i)perylene	U		0.121	1.00
Benzo(a)pyrene	U		0.0381	1.00
Bis(2-chlorethoxy)methane	U		0.116	10.0
Bis(2-chloroethyl)ether	U		0.137	10.0
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0
4-Bromophenyl-phenylether	U		0.0877	10.0
2-Chloronaphthalene	U		0.0648	1.00
4-Chlorophenyl-phenylether	U		0.0926	10.0
Chrysene	U		0.130	1.00
Dibenz(a,h)anthracene	U		0.0644	1.00
3,3-Dichlorobenzidine	U		0.212	10.0
2,4-Dinitrotoluene	U		0.0983	10.0
2,6-Dinitrotoluene	U		0.250	10.0
Fluoranthene	U		0.102	1.00
Fluorene	U		0.0844	1.00
Hexachlorobenzene	U		0.0755	1.00
Hexachloro-1,3-butadiene	U		0.0968	10.0
Hexachlorocyclopentadiene	U		0.0598	10.0
Hexachloroethane	U		0.127	10.0
Indeno(1,2,3-cd)pyrene	U		0.279	1.00
Isophorone	U		0.143	10.0
Naphthalene	U		0.159	1.00
Nitrobenzene	U		0.297	10.0
n-Nitrosodimethylamine	U		0.998	10.0
n-Nitrosodiphenylamine	U		2.37	10.0
n-Nitrosodi-n-propylamine	U		0.261	10.0
Phenanthrene	U		0.112	1.00
Benzylbutyl phthalate	U		0.765	3.00
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00
Di-n-butyl phthalate	U		0.453	3.00
Diethyl phthalate	U		0.287	3.00
Dimethyl phthalate	U		0.260	3.00
Di-n-octyl phthalate	U		0.932	3.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4052155-2 03/30/24 13:39

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Pyrene	U		0.107	1.00
1,2,4-Trichlorobenzene	U		0.0698	10.0
Aniline	U		1.65	10.0
1,2-Diphenylhydrazine	U	N2	0.105	10.0
Benzyl alcohol	U		0.563	10.0
4-Chloroaniline	U		0.234	10.0
4-Chloro-3-methylphenol	U		0.131	10.0
2-Chlorophenol	U		0.133	10.0
Dibenzofuran	U		0.0970	10.0
2,4-Dichlorophenol	U		0.102	10.0
2,4-Dimethylphenol	U		0.0636	10.0
4,6-Dinitro-2-methylphenol	U		1.12	10.0
2,4-Dinitrophenol	U		5.93	10.0
2-Methylnaphthalene	U		0.117	1.00
2-Methylphenol	U		0.0929	10.0
3&4-Methyl Phenol	U		0.168	10.0
2-Nitroaniline	U		0.102	10.0
3-Nitroaniline	U		0.0869	10.0
4-Nitroaniline	U		0.0910	10.0
2-Nitrophenol	U		0.117	10.0
4-Nitrophenol	U		0.143	10.0
Pentachlorophenol	U		0.313	10.0
Phenol	U		4.33	10.0
Pyridine	U		0.627	10.0
2,4,6-Trichlorophenol	U		0.100	10.0
Acetophenone	U		0.208	10.0
Diphenylamine	U		2.37	10.0
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0
2,3,4,6-Tetrachlorophenol	U		0.231	10.0
2,4,5-Trichlorophenol	U		0.109	10.0
(S) 2-Fluorophenol	37.4			10.0-120
(S) Phenol-d5	27.0			10.0-120
(S) Nitrobenzene-d5	61.7			10.0-127
(S) 2-Fluorobiphenyl	66.8			10.0-130
(S) 2,4,6-Tribromophenol	79.5			10.0-155
(S) p-Terphenyl-d14	68.3			10.0-128

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4053099-2 04/02/24 10:32

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
2-Acetylaminofluorene	U		0.253	10.0
4-Aminobiphenyl	U		0.461	10.0
Chlorobenzilate	U		3.84	50.0
Diallate	U		0.524	10.0
2,6-Dichlorophenol	U		0.102	10.0
Dimethoate	U		5.05	50.0
P-(Dimethylamino) Azobenzene	U		3.69	10.0
Dimethylbenz (A) Anthracene	U		1.71	10.0
3,3-Dimethylbenzidine	U		3.39	10.0
a,a-Dimethylphenethylamine	U		3.13	50.0
1,3-Dinitrobenzene	U		0.359	10.0
Diphenylamine	U		2.37	10.0
Dinoseb	U		8.01	50.0
Disulfoton	U		0.267	10.0
Ethyl methanesulfonate	U		0.326	10.0
Ethyl Parathion	U		0.379	10.0
Famphur	U		3.92	20.0
Hexachloropropene	U		0.149	50.0
Hexachlorophene	U		1.44	50.0
Isodrin	U		4.11	10.0
Isosafrole	U		3.88	10.0
Kepone	U		2.66	20.0
Methapyrilene	U		10.0	50.0
3-Methylcholanthrene	U		0.164	10.0
Methyl methanesulfonate	U		3.40	50.0
Methyl parathion	U		0.213	10.0
1,4-Naphthoquinone	U		5.56	50.0
1-Naphthylamine	U		0.289	10.0
2-Naphthylamine	U		4.48	10.0
5-Nitro-o-toluidine	U		1.99	10.0
4-Nitroquinoline 1-oxide	U		2.03	10.0
n-Nitrosodiethylamine	U		3.57	10.0
n-Nitrosodi-n-butylamine	U		3.91	10.0
n-Nitrosomethylethylamine	U		3.25	10.0
n-Nitrosomorpholine	U		3.25	10.0
n-Nitrosopiperidine	U		3.72	10.0
n-Nitrosopyrrolidine	U		3.39	10.0
Pentachlorobenzene	U		4.15	10.0
Pentachloroethane	U		2.83	50.0
Pentachloronitrobenzene	U		4.15	10.0

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4053099-2 04/02/24 10:32

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Phenacetin	U		4.66	10.0
p-Phenylenediamine	U		387	6900
Phorate	U		4.86	50.0
2-Picoline	U		6.83	50.0
Pronamide	U		4.21	10.0
Safrole	U		3.68	10.0
Sulfotep	U		3.99	50.0
Thionazin	U		4.07	10.0
o-Toluidine	U		3.53	10.0
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0
1,3,5-Trinitrobenzene	U		1.32	10.0

Laboratory Control Sample (LCS)

(LCS) R4052155-1 03/30/24 13:18

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	50.0	33.8	67.6	41.0-120	
Acenaphthylene	50.0	35.8	71.6	43.0-120	
Anthracene	50.0	37.3	74.6	45.0-120	
Benzidine	100	2.16	2.16	10.0-120	J4
Benzo(a)anthracene	50.0	37.9	75.8	47.0-120	
Benzo(b)fluoranthene	50.0	34.9	69.8	46.0-120	
Benzo(k)fluoranthene	50.0	34.0	68.0	46.0-120	
Benzo(g,h,i)perylene	50.0	38.3	76.6	48.0-121	
Benzo(a)pyrene	50.0	35.8	71.6	47.0-120	
Bis(2-chlorethoxy)methane	50.0	30.5	61.0	33.0-120	
Bis(2-chloroethyl)ether	50.0	30.0	60.0	23.0-120	
2,2-Oxybis(1-Chloropropane)	50.0	27.9	55.8	28.0-120	
4-Bromophenyl-phenylether	50.0	39.1	78.2	45.0-120	
2-Chloronaphthalene	50.0	33.1	66.2	37.0-120	
4-Chlorophenyl-phenylether	50.0	36.7	73.4	44.0-120	
Chrysene	50.0	37.0	74.0	48.0-120	
Dibenz(a,h)anthracene	50.0	39.6	79.2	47.0-120	
3,3-Dichlorobenzidine	100	85.3	85.3	44.0-120	
2,4-Dinitrotoluene	50.0	39.8	79.6	49.0-124	
2,6-Dinitrotoluene	50.0	37.7	75.4	46.0-120	
Fluoranthene	50.0	40.4	80.8	51.0-120	
Fluorene	50.0	34.8	69.6	47.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4052155-1 03/30/24 13:18

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Hexachlorobenzene	50.0	37.5	75.0	44.0-120	
Hexachloro-1,3-butadiene	50.0	26.9	53.8	19.0-120	
Hexachlorocyclopentadiene	50.0	10.6	21.2	15.0-120	
Hexachloroethane	50.0	25.6	51.2	15.0-120	
Indeno(1,2,3-cd)pyrene	50.0	39.8	79.6	49.0-122	
Isophorone	50.0	30.8	61.6	36.0-120	
Naphthalene	50.0	28.2	56.4	27.0-120	
Nitrobenzene	50.0	30.3	60.6	27.0-120	
n-Nitrosodimethylamine	50.0	27.1	54.2	10.0-120	
n-Nitrosodiphenylamine	50.0	36.7	73.4	47.0-120	
n-Nitrosodi-n-propylamine	50.0	29.0	58.0	31.0-120	
Phenanthrene	50.0	37.2	74.4	46.0-120	
Benzylbutyl phthalate	50.0	34.2	68.4	43.0-121	
Bis(2-Ethylhexyl)phthalate	50.0	33.7	67.4	43.0-122	
Di-n-butyl phthalate	50.0	38.8	77.6	49.0-121	
Diethyl phthalate	50.0	38.1	76.2	48.0-122	
Dimethyl phthalate	50.0	37.2	74.4	48.0-120	
Di-n-octyl phthalate	50.0	35.6	71.2	42.0-125	
Pyrene	50.0	35.0	70.0	47.0-120	
1,2,4-Trichlorobenzene	50.0	28.1	56.2	24.0-120	
Aniline	50.0	16.5	33.0	13.0-120	
1,2-Diphenylhydrazine	50.0	36.5	73.0	41.0-126	N2
Benzyl alcohol	50.0	22.4	44.8	25.0-120	
4-Chloroaniline	50.0	24.3	48.6	25.0-120	
4-Chloro-3-methylphenol	50.0	23.3	46.6	40.0-120	
2-Chlorophenol	50.0	20.0	40.0	25.0-120	
Dibenzofuran	50.0	34.4	68.8	44.0-120	
2,4-Dichlorophenol	50.0	25.1	50.2	36.0-120	
2,4-Dimethylphenol	50.0	22.0	44.0	33.0-120	
4,6-Dinitro-2-methylphenol	50.0	41.8	83.6	38.0-138	
2,4-Dinitrophenol	50.0	37.1	74.2	10.0-120	
2-Methylnaphthalene	50.0	29.1	58.2	33.0-120	
2-Methylphenol	50.0	18.3	36.6	28.0-120	
3&4-Methyl Phenol	50.0	19.9	39.8	31.0-120	
2-Nitroaniline	50.0	36.6	73.2	43.0-120	
3-Nitroaniline	50.0	33.7	67.4	38.0-120	
4-Nitroaniline	50.0	35.7	71.4	18.0-160	
2-Nitrophenol	50.0	28.4	56.8	31.0-120	
4-Nitrophenol	50.0	14.3	28.6	10.0-120	
Pentachlorophenol	50.0	33.8	67.6	23.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4052155-1 03/30/24 13:18

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Phenol	50.0	11.7	23.4	10.0-120	
Pyridine	50.0	1.65	3.30	10.0-120	J4
2,4,6-Trichlorophenol	50.0	31.7	63.4	42.0-120	
Acetophenone	50.0	27.6	55.2	29.0-120	
Diphenylamine	50.0	36.7	73.4	35.0-120	
1,2,4,5-Tetrachlorobenzene	50.0	30.9	61.8	31.0-121	
2,3,4,6-Tetrachlorophenol	50.0	39.2	78.4	42.0-132	
2,4,5-Trichlorophenol	50.0	34.9	69.8	44.0-120	
(S) 2-Fluorophenol			31.8	10.0-120	
(S) Phenol-d5			23.8	10.0-120	
(S) Nitrobenzene-d5			65.2	10.0-127	
(S) 2-Fluorobiphenyl			70.8	10.0-130	
(S) 2,4,6-Tribromophenol			83.5	10.0-155	
(S) p-Terphenyl-d14			72.7	10.0-128	

Laboratory Control Sample (LCS)

(LCS) R4053099-1 04/02/24 10:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
2-Acetylaminofluorene	50.0	51.1	102	32.0-120	
4-Aminobiphenyl	50.0	42.4	84.8	20.0-120	
Chlorobenzilate	50.0	42.2	84.4	29.0-128	
Diallate	50.0	43.4	86.8	30.0-120	
2,6-Dichlorophenol	50.0	34.9	69.8	19.0-136	
Dimethoate	50.0	53.0	106	11.0-134	
P-(Dimethylamino) Azobenzene	50.0	42.6	85.2	27.0-120	
Dimethylbenz (A) Anthracene	50.0	33.5	67.0	14.0-124	
3,3-Dimethylbenzidine	50.0	13.6	27.2	13.0-120	
a,a-Dimethylphenethylamine	50.0	2.15	4.30	10.0-129	J4
1,3-Dinitrobenzene	50.0	39.2	78.4	34.0-120	
Diphenylamine	50.0	42.5	85.0	35.0-120	
Dinoseb	50.0	49.0	98.0	39.0-120	
Disulfoton	50.0	43.5	87.0	32.0-120	
Ethyl methanesulfonate	50.0	36.1	72.2	10.0-120	
Ethyl Parathion	50.0	59.3	119	46.0-130	
Famphur	50.0	43.0	86.0	32.0-120	
Hexachloropropene	50.0	27.3	54.6	10.0-120	
Hexachlorophene	100	31.8	31.8	10.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4053099-1 04/02/24 10:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Isodrin	50.0	41.3	82.6	22.0-157	
Isosafrole	50.0	33.5	67.0	25.0-133	
Kepone	50.0	68.7	137	10.0-120	J4
Methapyrilene	50.0	12.1	24.2	10.0-120	
3-Methylcholanthrene	50.0	42.2	84.4	30.0-160	
Methyl methanesulfonate	50.0	30.6	61.2	10.0-120	
Methyl parathion	50.0	58.5	117	42.0-120	
1,4-Naphthoquinone	50.0	4.46	8.92	50.0-150	J4
1-Naphthylamine	50.0	35.9	71.8	19.0-120	
2-Naphthylamine	50.0	23.4	46.8	10.0-120	
5-Nitro-o-toluidine	50.0	46.2	92.4	34.0-120	
4-Nitroquinoline 1-oxide	50.0	35.4	70.8	10.0-159	
n-Nitrosodiethylamine	50.0	35.8	71.6	10.0-120	
n-Nitrosodi-n-butylamine	50.0	52.6	105	13.0-143	
n-Nitrosomethylethylamine	50.0	35.4	70.8	10.0-120	
n-Nitrosomorpholine	50.0	40.5	81.0	10.0-120	
n-Nitrosopiperidine	50.0	41.7	83.4	10.0-160	
n-Nitrosopyrrolidine	50.0	42.2	84.4	10.0-124	
Pentachlorobenzene	50.0	34.1	68.2	25.0-120	
Pentachloroethane	50.0	27.3	54.6	10.0-120	
Pentachloronitrobenzene	50.0	48.3	96.6	34.0-132	
Phenacetin	50.0	51.8	104	34.0-127	
p-Phenylenediamine	50.0	0.198	0.396	50.0-150	J4
Phorate	50.0	49.4	98.8	13.0-160	
2-Picoline	50.0	9.19	18.4	10.0-120	
Pronamide	50.0	43.8	87.6	38.0-130	
Safrole	50.0	33.7	67.4	21.0-120	
Sulfotep	50.0	51.9	104	52.0-120	
Thionazin	50.0	55.6	111	38.0-121	
o-Toluidine	50.0	29.8	59.6	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	35.7	71.4	11.0-135	
1,3,5-Trinitrobenzene	50.0	57.7	115	37.0-147	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

L1718239-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1718239-01 03/30/24 17:33 • (MS) R4052155-3 03/30/24 17:55 • (MSD) R4052155-4 03/30/24 18:16

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Acenaphthene	47.6	U	31.9	26.3	67.0	55.3	1	28.0-120			19.2	25
Acenaphthylene	47.6	U	34.0	28.8	71.4	60.5	1	31.0-121			16.6	25
Anthracene	47.6	U	31.4	25.3	66.0	53.2	1	36.0-120			21.5	23
Benzidine	95.2	U	U	7.25	0.000	7.62	1	10.0-120	J6	J3 J6	200	37
Benzo(a)anthracene	47.6	U	24.7	15.1	51.9	31.7	1	39.0-120		J3 J6	48.2	23
Benzo(b)fluoranthene	47.6	U	21.8	11.7	45.8	24.6	1	37.0-120		J3 J6	60.3	23
Benzo(k)fluoranthene	47.6	U	20.7	10.8	43.5	22.7	1	37.0-120		J3 J6	62.9	26
Benzo(g,h,i)perylene	47.6	U	22.7	11.3	47.7	23.7	1	37.0-123		J3 J6	67.1	25
Benzo(a)pyrene	47.6	U	22.0	11.4	46.2	23.9	1	37.0-120		J3 J6	63.5	24
Bis(2-chlorethoxy)methane	47.6	U	30.0	25.8	63.0	54.2	1	17.0-120			15.1	31
Bis(2-chloroethyl)ether	47.6	U	28.7	26.7	60.3	56.1	1	14.0-120			7.22	33
2,2-Oxybis(1-Chloropropane)	47.6	U	26.6	23.8	55.9	50.0	1	18.0-120			11.1	34
4-Bromophenyl-phenylether	47.6	U	32.5	25.9	68.3	54.4	1	37.0-120			22.6	24
2-Chloronaphthalene	47.6	U	30.9	26.1	64.9	54.8	1	29.0-120			16.8	28
4-Chlorophenyl-phenylether	47.6	U	32.9	25.6	69.1	53.8	1	36.0-120		J3	25.0	23
Chrysene	47.6	U	23.5	12.9	49.4	27.1	1	38.0-120		J3 J6	58.2	23
Dibenz(a,h)anthracene	47.6	U	23.1	11.3	48.5	23.7	1	36.0-121		J3 J6	68.6	24
3,3-Dichlorobenzidine	95.2	U	63.0	56.2	66.2	59.0	1	10.0-134			11.4	30
2,4-Dinitrotoluene	47.6	U	36.2	32.2	76.1	67.6	1	39.0-125			11.7	25
2,6-Dinitrotoluene	47.6	U	34.5	31.2	72.5	65.5	1	36.0-120			10.0	27
Fluoranthene	47.6	U	31.2	23.9	65.5	50.2	1	41.0-121		J3	26.5	22
Fluorene	47.6	U	32.2	26.2	67.6	55.0	1	37.0-120			20.5	24
Hexachlorobenzene	47.6	U	29.1	19.2	61.1	40.3	1	35.0-122		J3	41.0	24
Hexachloro-1,3-butadiene	47.6	U	26.1	20.3	54.8	42.6	1	12.0-120			25.0	34
Hexachlorocyclopentadiene	47.6	U	12.5	10.3	26.3	21.6	1	10.0-120			19.3	33
Hexachloroethane	47.6	U	25.1	23.3	52.7	48.9	1	10.0-120			7.44	40
Indeno(1,2,3-cd)pyrene	47.6	U	23.1	11.7	48.5	24.6	1	38.0-125		J3 J6	65.5	24
Isophorone	47.6	U	30.1	25.9	63.2	54.4	1	21.0-120			15.0	27
Naphthalene	47.6	U	27.8	24.2	58.4	50.8	1	10.0-120			13.8	31
Nitrobenzene	47.6	U	29.4	27.1	61.8	56.9	1	12.0-120			8.14	30
n-Nitrosodimethylamine	47.6	U	24.1	21.3	50.6	44.7	1	10.0-120			12.3	40
n-Nitrosodiphenylamine	47.6	U	32.9	28.0	69.1	58.8	1	37.0-120			16.1	24
n-Nitrosodi-n-propylamine	47.6	U	28.5	25.3	59.9	53.2	1	16.0-120			11.9	30
Phenanthrene	47.6	U	31.7	26.2	66.6	55.0	1	33.0-120			19.0	22
Benzylbutyl phthalate	47.6	U	25.4	20.3	53.4	42.6	1	34.0-126			22.3	24
Bis(2-Ethylhexyl)phthalate	47.6	U	18.8	9.62	39.5	20.2	1	33.0-126		J3 J6	64.6	25
Di-n-butyl phthalate	47.6	U	30.2	24.5	63.4	51.5	1	35.0-128			20.8	23
Diethyl phthalate	47.6	U	35.5	29.9	74.6	62.8	1	39.0-125			17.1	24
Dimethyl phthalate	47.6	U	34.7	29.6	72.9	62.2	1	37.0-120			15.9	24
Di-n-octyl phthalate	47.6	U	19.4	9.64	40.8	20.3	1	25.0-135		J3 J6	67.2	26

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1718239-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1718239-01 03/30/24 17:33 • (MS) R4052155-3 03/30/24 17:55 • (MSD) R4052155-4 03/30/24 18:16

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Pyrene	47.6	U	26.9	20.6	56.5	43.3	1	39.0-120		J3	26.5	22
1,2,4-Trichlorobenzene	47.6	U	27.9	24.2	58.6	50.8	1	15.0-120			14.2	31
Aniline	47.6	U	10.2	8.44	21.4	17.7	1	10.0-120			18.9	39
1,2-Diphenylhydrazine	47.6	U	34.1	27.7	71.6	58.2	1	28.0-129	N2	N2	20.7	25
Benzyl alcohol	47.6	U	20.4	17.4	42.9	36.6	1	14.0-120			15.9	38
4-Chloroaniline	47.6	U	21.3	17.3	44.7	36.3	1	10.0-120			20.7	31
4-Chloro-3-methylphenol	47.6	U	24.1	17.1	50.6	35.9	1	26.0-120		J3	34.0	27
2-Chlorophenol	47.6	U	19.5	14.9	41.0	31.3	1	18.0-120			26.7	34
Dibenzofuran	47.6	U	32.4	26.5	68.1	55.7	1	32.0-120			20.0	26
2,4-Dichlorophenol	47.6	U	26.3	18.2	55.3	38.2	1	19.0-120		J3	36.4	27
2,4-Dimethylphenol	47.6	U	24.2	18.5	50.8	38.9	1	15.0-120			26.7	28
4,6-Dinitro-2-methylphenol	47.6	U	40.3	26.6	84.7	55.9	1	10.0-144		J3	41.0	39
2,4-Dinitrophenol	47.6	U	36.5	25.0	76.7	52.5	1	10.0-120			37.4	40
2-Methylnaphthalene	47.6	U	29.4	23.9	61.8	50.2	1	17.0-120			20.6	28
2-Methylphenol	47.6	U	18.7	15.2	39.3	31.9	1	10.0-120			20.6	30
3&4-Methyl Phenol	47.6	U	19.9	15.9	41.8	33.4	1	10.0-120			22.3	36
2-Nitroaniline	47.6	U	34.0	30.7	71.4	64.5	1	33.0-120			10.2	27
3-Nitroaniline	47.6	U	28.1	26.4	59.0	55.5	1	20.0-120			6.24	27
4-Nitroaniline	47.6	U	30.6	28.4	64.3	59.7	1	10.0-160			7.46	26
2-Nitrophenol	47.6	U	29.3	20.3	61.6	42.6	1	20.0-120		J3	36.3	30
4-Nitrophenol	47.6	U	12.5	10.6	26.3	22.3	1	10.0-120			16.5	40
Pentachlorophenol	47.6	U	31.4	20.6	66.0	43.3	1	10.0-128		J3	41.5	37
Phenol	47.6	U	11.1	9.80	23.3	20.6	1	10.0-120			12.4	40
Pyridine	47.6	U	6.01	4.80	12.6	10.1	1	10.0-120			22.4	37
2,4,6-Trichlorophenol	47.6	U	31.5	20.5	66.2	43.1	1	26.0-120		J3	42.3	31
Acetophenone	47.6	U	26.5	24.1	55.7	50.6	1	20.0-120			9.49	35
Diphenylamine	47.6	U	32.9	28.0	69.1	58.8	1	35.0-120			16.1	30
1,2,4,5-Tetrachlorobenzene	47.6	U	30.1	24.9	63.2	52.3	1	19.0-122			18.9	32
2,3,4,6-Tetrachlorophenol	47.6	U	37.5	24.8	78.8	52.1	1	17.0-142		J3	40.8	34
2,4,5-Trichlorophenol	47.6	U	34.5	23.4	72.5	49.2	1	33.0-120		J3	38.3	31
(S) 2-Fluorophenol					30.3	26.8		10.0-120				
(S) Phenol-d5					22.9	20.1		10.0-120				
(S) Nitrobenzene-d5					65.9	58.6		10.0-127				
(S) 2-Fluorobiphenyl					69.6	57.2		10.0-130				
(S) 2,4,6-Tribromophenol					83.2	54.7		10.0-155				
(S) p-Terphenyl-d14					49.3	31.5		10.0-128				

1

Cp

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Tc

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Sr

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Gl

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Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
N2	Analyte reported using a calibration and validation based on Azobenzene (CAS 103-33-3). 1,2-Diphenylhydrazine decomposes into Azobenzene during the analysis.

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

ACCREDITATIONS & LOCATIONS

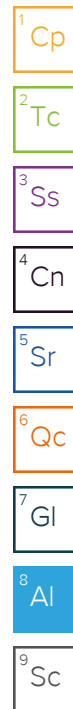
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA -- ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



Ramboll US Consulting, Inc. - Denver

1999 Broadway Suite 2225
Denver, CO 80202

Billing Information:

Troy Wyss
PO Box 4229
Indianapolis, IN 46242

Pres
Chk

Report to:
Abby Small

Email To:
asmall@ramboll.com; rdeshpande@ramboll.com

Project Description:
CMR Great Falls - 2023 RFI Soil Sampling

City/State
Collected: *Great Falls, MT*

Please Circle:
PT MT CT ET

Phone: 303-382-5474

Client Project #

Lab Project #
ENVIRONCO-CALU MONTH

Collected by (print):

Cory League

Site/Facility ID #
GREAT FALLS, MT

P.O. #

Collected by (signature):

Rush? (Lab MUST Be Notified)

___ Same Day ___ Five Day
___ Next Day ___ 5 Day (Rad Only)
___ Two Day ___ 10 Day (Rad Only)
___ Three Day

Quote #

Date Results Needed

Immediately

Packed on Ice N ___ Y ___

No.
of
Cntrs

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

CMR-SP200-240320

G

GW

03/20/24 1055

11

X

X

X

X

X

X

X

X

TRIP BLANK

GW

1

GW

* Matrix:

SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks:

3-21-24CS

pH _____ Temp _____

Flow _____ Other _____

Samples returned via:

___ UPS ___ FedEx ___ Courier

Tracking # 672719163191

Relinquished by: (Signature)

Date:

03/20/24 1430

Time:

Received by: (Signature)

Trip Blank Received: Yes No
HCL / MeOH
TBR

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Temp: 044C
42+0=42
Bottles Received: 11

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)

Date: 3-21-24
Time: 9:00

Hold: Condition:
NCF / OK

Analysis / Container / Preservative

Chain of Custody Page ___ of ___



MT JULIET, TN

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody
constitutes acknowledgment and acceptance of the
Pace Terms and Conditions found at:
<https://info.pacelabs.com/hubfs/pas-standard-terms.pdf>

SDG # 1717608
D136

Acctnum: ENVIRONCO

Template: T245953

Prelogin: P1052031

PM: 841 - Kelly Mercer

PB: NG 312124

Shipped Via: FedEX Ground

Remarks Sample # (lab only)

→ 01

→ 02

Sample Receipt Checklist

COC Seal Present/Intact: NP X Y N
COC Signed/Accurate: Y N
Bottles arrive intact: Y N
Correct bottles used: Y N
Sufficient volume sent: Y N
If Applicable
VOA Zero Headspace: Y N
Preservation Correct/Checked: Y N
RAD Screen <0.5 mR/hr: Y N

APPENDIX A3

PASSIVE TREATMENT TRENCH GROUNDWATER ANALYTICAL RESULTS

Pace Project Number:

L1710780

March 08, 2024

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1710780
Samples Received: 03/01/2024
Project Number: 1690029619_CONV
Description: Calumet Refinery AOC-16

Report To: Abby Small
1999 Broadway Suite 2225
Denver, CO 80202

Entire Report Reviewed By:



Kelly Mercer
Project Manager

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by Pace Analytical National is performed per guidance provided in laboratory standard operating procedures ENV-SOP-MTJL-0067 and ENV-SOP-MTJL-0068. Where sampling conducted by the customer, results relate to the accuracy of the information provided, and as the samples are received.

Pace Analytical National

12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 www.pacenational.com

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Cp: Cover Page	1
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¹ Cp
² Tc
³ Ss
⁴ Cn
⁵ Sr
⁶ Qc
⁷ Gl
⁸ Al
⁹ Sc

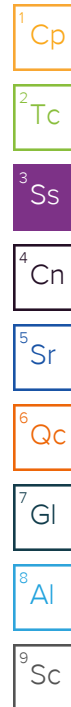
SAMPLE SUMMARY

CMR-MW-41S-240228 L1710780-01 GW

Collected by
Collected date/time
Received date/time

02/28/24 12:45 03/01/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2240920	1	03/07/24 02:26	03/07/24 02:26	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2238664	1	03/03/24 18:37	03/03/24 18:37	JAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2240283	10	03/06/24 01:39	03/06/24 01:39	DYW	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2239442	1	03/04/24 15:20	03/06/24 19:57	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2239442	1	03/04/24 15:20	03/06/24 21:05	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2238143	1	03/02/24 07:01	03/02/24 17:50	ADF	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2238143	1	03/02/24 07:01	03/02/24 17:50	ALM	Mt. Juliet, TN



CMR-MW-105-240228 L1710780-02 GW

Collected by
Collected date/time
Received date/time

02/28/24 15:25 03/01/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2240920	1	03/07/24 03:01	03/07/24 03:01	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2238664	1	03/03/24 18:56	03/03/24 18:56	JAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2240283	1	03/06/24 01:58	03/06/24 01:58	DYW	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2239442	1	03/04/24 15:20	03/06/24 20:42	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2239442	1	03/04/24 15:20	03/06/24 21:52	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2238143	1	03/02/24 07:01	03/02/24 18:11	ALM	Mt. Juliet, TN

CMR-MW-106-240228 L1710780-03 GW

Collected by
Collected date/time
Received date/time

02/28/24 14:10 03/01/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2240920	10	03/07/24 03:36	03/07/24 03:36	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2238664	1	03/03/24 19:15	03/03/24 19:15	JAH	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2239442	1	03/04/24 15:20	03/06/24 20:20	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2239442	1	03/04/24 15:20	03/06/24 21:30	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2238143	1	03/02/24 07:01	03/02/24 18:32	ALM	Mt. Juliet, TN

CASE NARRATIVE

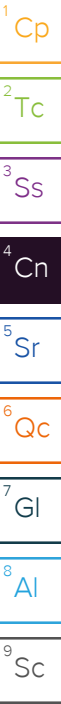
All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.



Kelly Mercer
Project Manager

Project Narrative

Due to multiple preparation procedures, calculated analytes are not reported in the quality control samples for EPH and VPH Methods.



Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	782		33.3	100	1	03/07/2024 02:26	WG2240920
Unadjusted C9-C12 Aliphatics	2240		33.3	100	1	03/07/2024 02:26	WG2240920
Unadjusted C9-C10 Aromatics	720		33.3	100	1	03/07/2024 02:26	WG2240920
Adjusted C5-C8 Aliphatics	582		33.3	100	1	03/07/2024 02:26	WG2240920
Adjusted C9-C12 Aliphatics	1680		33.3	100	1	03/07/2024 02:26	WG2240920
Total VPH	3740		66.7	200	1	03/07/2024 02:26	WG2240920
(S) 2,5-Dibromotoluene(FID)	105			70.0-130		03/07/2024 02:26	WG2240920
(S) 2,5-Dibromotoluene(PID)	99.5			70.0-130		03/07/2024 02:26	WG2240920

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U	J3	11.3	25.0	1	03/03/2024 18:37	WG2238664
Acrylonitrile	U		0.671	5.00	1	03/03/2024 18:37	WG2238664
Benzene	199		0.0941	0.500	1	03/03/2024 18:37	WG2238664
Bromobenzene	U		0.118	0.500	1	03/03/2024 18:37	WG2238664
Bromodichloromethane	U		0.136	0.500	1	03/03/2024 18:37	WG2238664
Bromochloromethane	U		0.128	0.500	1	03/03/2024 18:37	WG2238664
Bromoform	U		0.129	0.500	1	03/03/2024 18:37	WG2238664
Bromomethane	U		0.605	2.50	1	03/03/2024 18:37	WG2238664
n-Butylbenzene	U		0.157	0.500	1	03/03/2024 18:37	WG2238664
sec-Butylbenzene	0.801		0.125	0.500	1	03/03/2024 18:37	WG2238664
tert-Butylbenzene	0.149	J	0.127	0.500	1	03/03/2024 18:37	WG2238664
Carbon disulfide	U		0.0962	0.500	1	03/03/2024 18:37	WG2238664
Carbon tetrachloride	U		0.128	0.500	1	03/03/2024 18:37	WG2238664
Chlorobenzene	U		0.117	0.500	1	03/03/2024 18:37	WG2238664
Chlorodibromomethane	U		0.140	0.500	1	03/03/2024 18:37	WG2238664
Chloroethane	U		0.192	2.50	1	03/03/2024 18:37	WG2238664
2-Chloroethyl vinyl ether	U		0.575	50.0	1	03/03/2024 18:37	WG2238664
Chloroform	U		0.111	0.500	1	03/03/2024 18:37	WG2238664
Chloromethane	U		0.960	1.25	1	03/03/2024 18:37	WG2238664
2-Chlorotoluene	U		0.106	0.500	1	03/03/2024 18:37	WG2238664
4-Chlorotoluene	U		0.114	0.500	1	03/03/2024 18:37	WG2238664
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	03/03/2024 18:37	WG2238664
1,2-Dibromoethane	U		0.126	0.500	1	03/03/2024 18:37	WG2238664
Dibromomethane	U		0.122	0.500	1	03/03/2024 18:37	WG2238664
1,2-Dichlorobenzene	U		0.107	0.500	1	03/03/2024 18:37	WG2238664
1,3-Dichlorobenzene	U		0.299	0.500	1	03/03/2024 18:37	WG2238664
1,4-Dichlorobenzene	U		0.120	0.500	1	03/03/2024 18:37	WG2238664
Dichlorodifluoromethane	U		0.374	2.50	1	03/03/2024 18:37	WG2238664
1,1-Dichloroethane	U		0.100	0.500	1	03/03/2024 18:37	WG2238664
1,2-Dichloroethane	U		0.0819	0.500	1	03/03/2024 18:37	WG2238664
1,1-Dichloroethene	U		0.188	0.500	1	03/03/2024 18:37	WG2238664
cis-1,2-Dichloroethene	U		0.126	0.500	1	03/03/2024 18:37	WG2238664
trans-1,2-Dichloroethene	U		0.149	0.500	1	03/03/2024 18:37	WG2238664
1,2-Dichloropropane	U		0.149	0.500	1	03/03/2024 18:37	WG2238664
1,1-Dichloropropene	U		0.142	0.500	1	03/03/2024 18:37	WG2238664
1,3-Dichloropropane	U		0.109	1.00	1	03/03/2024 18:37	WG2238664
cis-1,3-Dichloropropene	U		0.111	0.500	1	03/03/2024 18:37	WG2238664
trans-1,3-Dichloropropene	U		0.118	0.500	1	03/03/2024 18:37	WG2238664
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	03/03/2024 18:37	WG2238664
2,2-Dichloropropane	U		0.161	0.500	1	03/03/2024 18:37	WG2238664
Di-isopropyl ether	U		0.105	0.500	1	03/03/2024 18:37	WG2238664
Ethylbenzene	21.9		0.137	0.500	1	03/03/2024 18:37	WG2238664
Hexachloro-1,3-butadiene	U		0.337	1.00	1	03/03/2024 18:37	WG2238664

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Hexanone	U		0.787	5.00	1	03/03/2024 18:37	WG2238664
n-Hexane	U		0.749	5.00	1	03/03/2024 18:37	WG2238664
Iodomethane	U		0.554	5.00	1	03/03/2024 18:37	WG2238664
Isopropylbenzene	0.975		0.105	0.500	1	03/03/2024 18:37	WG2238664
p-Isopropyltoluene	2.96		0.120	0.500	1	03/03/2024 18:37	WG2238664
2-Butanone (MEK)	U		1.19	5.00	1	03/03/2024 18:37	WG2238664
Methylene Chloride	U		0.430	2.50	1	03/03/2024 18:37	WG2238664
4-Methyl-2-pentanone (MIBK)	1.94	U	0.478	5.00	1	03/03/2024 18:37	WG2238664
Methyl tert-butyl ether	U		0.101	0.500	1	03/03/2024 18:37	WG2238664
Naphthalene	28.4		0.174	2.50	1	03/03/2024 18:37	WG2238664
n-Propylbenzene	2.81		0.0993	0.500	1	03/03/2024 18:37	WG2238664
Styrene	U		0.118	0.500	1	03/03/2024 18:37	WG2238664
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	03/03/2024 18:37	WG2238664
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	03/03/2024 18:37	WG2238664
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	03/03/2024 18:37	WG2238664
Tetrachloroethene	U		3.00	5.00	10	03/06/2024 01:39	WG2240283
Toluene	1.50		0.278	0.500	1	03/03/2024 18:37	WG2238664
1,2,3-Trichlorobenzene	U		0.164	0.500	1	03/03/2024 18:37	WG2238664
1,2,4-Trichlorobenzene	U		0.481	1.00	1	03/03/2024 18:37	WG2238664
1,1,1-Trichloroethane	U		0.149	0.500	1	03/03/2024 18:37	WG2238664
1,1,2-Trichloroethane	U		0.158	0.500	1	03/03/2024 18:37	WG2238664
Trichloroethene	U		0.190	0.500	1	03/03/2024 18:37	WG2238664
Trichlorofluoromethane	U		0.160	2.50	1	03/03/2024 18:37	WG2238664
1,2,3-Trichloropropane	U		0.237	2.50	1	03/03/2024 18:37	WG2238664
1,2,4-Trimethylbenzene	266		3.22	5.00	10	03/06/2024 01:39	WG2240283
1,2,3-Trimethylbenzene	199		0.104	0.500	1	03/03/2024 18:37	WG2238664
1,3,5-Trimethylbenzene	26.5		0.104	0.500	1	03/03/2024 18:37	WG2238664
Vinyl acetate	U		0.692	5.00	1	03/03/2024 18:37	WG2238664
Vinyl chloride	U		0.234	0.500	1	03/03/2024 18:37	WG2238664
Xylenes, Total	535		0.174	1.50	1	03/03/2024 18:37	WG2238664
(S) Toluene-d8	97.7			80.0-120		03/03/2024 18:37	WG2238664
(S) Toluene-d8	101			80.0-120		03/06/2024 01:39	WG2240283
(S) 4-Bromofluorobenzene	103			77.0-126		03/03/2024 18:37	WG2238664
(S) 4-Bromofluorobenzene	97.4			77.0-126		03/06/2024 01:39	WG2240283
(S) 1,2-Dichloroethane-d4	94.5			70.0-130		03/03/2024 18:37	WG2238664
(S) 1,2-Dichloroethane-d4	99.1			70.0-130		03/06/2024 01:39	WG2240283

TPH by Method MTDEQ EPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C9-C18 Aliphatics	U		200	600	1	03/06/2024 19:57	WG2239442
Unadjusted C19-C36 Aliphatics	U		200	600	1	03/06/2024 19:57	WG2239442
Unadjusted C11-C22 Aromatics	569	U	200	600	1	03/06/2024 21:05	WG2239442
Unadjusted Total Petroleum Hydrocarbons	569	U	200	600	1	03/06/2024 19:57	WG2239442
Adjusted C11-C22 Aromatics	548	U	200	600	1	03/06/2024 21:05	WG2239442
Adjusted Total Petroleum Hydrocarbons	548	U	200	600	1	03/06/2024 19:57	WG2239442
(S) o-Terphenyl	72.1			40.0-140		03/06/2024 21:05	WG2239442
(S) 1-Chloro-octadecane	55.5			40.0-140		03/06/2024 19:57	WG2239442
(S) 2-Fluorobiphenyl	84.9			40.0-140		03/06/2024 21:05	WG2239442
(S) 2-Bromonaphthalene	87.9			40.0-140		03/06/2024 21:05	WG2239442

¹ Cp² Tc³ Ss⁴ Cn⁵ Sr⁶ Qc⁷ Gl⁸ Al⁹ Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acenaphthene	0.347	<u>U</u>	0.0886	1.00	1	03/02/2024 17:50	WG2238143
Acenaphthylene	U		0.0921	1.00	1	03/02/2024 17:50	WG2238143
Anthracene	U		0.0804	1.00	1	03/02/2024 17:50	WG2238143
Benidine	U	<u>J3</u>	3.74	10.0	1	03/02/2024 17:50	WG2238143
Benzo(a)anthracene	U		0.199	1.00	1	03/02/2024 17:50	WG2238143
Benzo(b)fluoranthene	U		0.130	1.00	1	03/02/2024 17:50	WG2238143
Benzo(k)fluoranthene	U		0.120	1.00	1	03/02/2024 17:50	WG2238143
Benzo(g,h,i)perylene	U		0.121	1.00	1	03/02/2024 17:50	WG2238143
Benzo(a)pyrene	U		0.0381	1.00	1	03/02/2024 17:50	WG2238143
Bis(2-chlorethoxy)methane	U		0.116	10.0	1	03/02/2024 17:50	WG2238143
Bis(2-chloroethyl)ether	U		0.137	10.0	1	03/02/2024 17:50	WG2238143
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0	1	03/02/2024 17:50	WG2238143
4-Bromophenyl-phenylether	U		0.0877	10.0	1	03/02/2024 17:50	WG2238143
2-Chloronaphthalene	U		0.0648	1.00	1	03/02/2024 17:50	WG2238143
4-Chlorophenyl-phenylether	U		0.0926	10.0	1	03/02/2024 17:50	WG2238143
Chrysene	U		0.130	1.00	1	03/02/2024 17:50	WG2238143
Dibenz(a,h)anthracene	U		0.0644	1.00	1	03/02/2024 17:50	WG2238143
3,3-Dichlorobenzidine	U		0.212	10.0	1	03/02/2024 17:50	WG2238143
2,4-Dinitrotoluene	U		0.0983	10.0	1	03/02/2024 17:50	WG2238143
2,6-Dinitrotoluene	U		0.250	10.0	1	03/02/2024 17:50	WG2238143
Fluoranthene	U		0.102	1.00	1	03/02/2024 17:50	WG2238143
Fluorene	0.511	<u>U</u>	0.0844	1.00	1	03/02/2024 17:50	WG2238143
Hexachlorobenzene	U		0.0755	1.00	1	03/02/2024 17:50	WG2238143
Hexachloro-1,3-butadiene	U		0.0968	10.0	1	03/02/2024 17:50	WG2238143
Hexachlorocyclopentadiene	U		0.0598	10.0	1	03/02/2024 17:50	WG2238143
Hexachloroethane	U		0.127	10.0	1	03/02/2024 17:50	WG2238143
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	03/02/2024 17:50	WG2238143
Isophorone	U		0.143	10.0	1	03/02/2024 17:50	WG2238143
Naphthalene	13.0		0.159	1.00	1	03/02/2024 17:50	WG2238143
Nitrobenzene	U		0.297	10.0	1	03/02/2024 17:50	WG2238143
n-Nitrosodimethylamine	U		0.998	10.0	1	03/02/2024 17:50	WG2238143
n-Nitrosodiphenylamine	U		2.37	10.0	1	03/02/2024 17:50	WG2238143
n-Nitrosodi-n-propylamine	U		0.261	10.0	1	03/02/2024 17:50	WG2238143
Phenanthrene	0.257	<u>U</u>	0.112	1.00	1	03/02/2024 17:50	WG2238143
Benzylbutyl phthalate	U		0.765	3.00	1	03/02/2024 17:50	WG2238143
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00	1	03/02/2024 17:50	WG2238143
Di-n-butyl phthalate	U		0.453	3.00	1	03/02/2024 17:50	WG2238143
Diethyl phthalate	U		0.287	3.00	1	03/02/2024 17:50	WG2238143
Dimethyl phthalate	U		0.260	3.00	1	03/02/2024 17:50	WG2238143
Di-n-octyl phthalate	U		0.932	3.00	1	03/02/2024 17:50	WG2238143
Pyrene	U		0.107	1.00	1	03/02/2024 17:50	WG2238143
1,2,4-Trichlorobenzene	U		0.0698	10.0	1	03/02/2024 17:50	WG2238143
Aniline	U	<u>J3</u>	1.65	10.0	1	03/02/2024 17:50	WG2238143
1,2-Diphenylhydrazine	U	<u>N2</u>	0.105	10.0	1	03/02/2024 17:50	WG2238143
Benzyl alcohol	U		0.563	10.0	1	03/02/2024 17:50	WG2238143
4-Chloroaniline	U	<u>J3</u>	0.234	10.0	1	03/02/2024 17:50	WG2238143
4-Chloro-3-methylphenol	U	<u>J3</u>	0.131	10.0	1	03/02/2024 17:50	WG2238143
2-Chlorophenol	U		0.133	10.0	1	03/02/2024 17:50	WG2238143
Dibenzofuran	0.193	<u>U</u>	0.0970	10.0	1	03/02/2024 17:50	WG2238143
2,4-Dichlorophenol	U		0.102	10.0	1	03/02/2024 17:50	WG2238143
2,4-Dimethylphenol	16.0	<u>J3</u>	0.0636	10.0	1	03/02/2024 17:50	WG2238143
4,6-Dinitro-2-methylphenol	U		1.12	10.0	1	03/02/2024 17:50	WG2238143
2,4-Dinitrophenol	U		5.93	10.0	1	03/02/2024 17:50	WG2238143
2-Methylnaphthalene	7.41		0.117	1.00	1	03/02/2024 17:50	WG2238143
2-Methylphenol	U	<u>J3</u>	0.0929	10.0	1	03/02/2024 17:50	WG2238143
3&4-Methyl Phenol	U	<u>J3</u>	0.168	10.0	1	03/02/2024 17:50	WG2238143

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Nitroaniline	U		0.102	10.0	1	03/02/2024 17:50	WG2238143
3-Nitroaniline	U		0.0869	10.0	1	03/02/2024 17:50	WG2238143
4-Nitroaniline	U		0.0910	10.0	1	03/02/2024 17:50	WG2238143
2-Nitrophenol	U		0.117	10.0	1	03/02/2024 17:50	WG2238143
4-Nitrophenol	U		0.143	10.0	1	03/02/2024 17:50	WG2238143
Pentachlorophenol	U		0.313	10.0	1	03/02/2024 17:50	WG2238143
Phenol	U		4.33	10.0	1	03/02/2024 17:50	WG2238143
Pyridine	U	J3	0.627	10.0	1	03/02/2024 17:50	WG2238143
2,4,6-Trichlorophenol	U		0.100	10.0	1	03/02/2024 17:50	WG2238143
Acetophenone	U		0.208	10.0	1	03/02/2024 17:50	WG2238143
2-Acetylaminofluorene	U		0.253	10.0	1	03/02/2024 17:50	WG2238143
4-Aminobiphenyl	U		0.461	10.0	1	03/02/2024 17:50	WG2238143
Chlorobenzilate	U		3.84	50.0	1	03/02/2024 17:50	WG2238143
Diallate	U		0.524	10.0	1	03/02/2024 17:50	WG2238143
2,6-Dichlorophenol	U		0.102	10.0	1	03/02/2024 17:50	WG2238143
Dimethoate	U		5.05	50.0	1	03/02/2024 17:50	WG2238143
P-(Dimethylamino) Azobenzene	U		3.69	10.0	1	03/02/2024 17:50	WG2238143
Dimethylbenz (A) Anthracene	U		1.71	10.0	1	03/02/2024 17:50	WG2238143
3,3-Dimethylbenzidine	U		3.39	10.0	1	03/02/2024 17:50	WG2238143
a,a-Dimethylphenethylamine	U	J4	3.13	50.0	1	03/02/2024 17:50	WG2238143
1,3-Dinitrobenzene	U		0.359	10.0	1	03/02/2024 17:50	WG2238143
Diphenylamine	U		2.37	10.0	1	03/02/2024 17:50	WG2238143
Dinoseb	U		8.01	50.0	1	03/02/2024 17:50	WG2238143
Disulfoton	U		0.267	10.0	1	03/02/2024 17:50	WG2238143
Ethyl methanesulfonate	U		0.326	10.0	1	03/02/2024 17:50	WG2238143
Ethyl Parathion	U		0.379	10.0	1	03/02/2024 17:50	WG2238143
Famphur	U		3.92	20.0	1	03/02/2024 17:50	WG2238143
Hexachloropropene	U		0.149	50.0	1	03/02/2024 17:50	WG2238143
Hexachlorophene	U		1.44	50.0	1	03/02/2024 17:50	WG2238143
Isodrin	U		4.11	10.0	1	03/02/2024 17:50	WG2238143
Isosafrole	U		3.88	10.0	1	03/02/2024 17:50	WG2238143
Kepone	U		2.66	20.0	1	03/02/2024 17:50	WG2238143
Methapyrilene	U		10.0	50.0	1	03/02/2024 17:50	WG2238143
3-Methylcholanthrene	U		0.164	10.0	1	03/02/2024 17:50	WG2238143
Methyl methanesulfonate	U		3.40	50.0	1	03/02/2024 17:50	WG2238143
Methyl parathion	U		0.213	10.0	1	03/02/2024 17:50	WG2238143
1,4-Naphthoquinone	U	J4	5.56	50.0	1	03/02/2024 17:50	WG2238143
1-Naphthylamine	U		0.289	10.0	1	03/02/2024 17:50	WG2238143
2-Naphthylamine	U		4.48	10.0	1	03/02/2024 17:50	WG2238143
5-Nitro-o-toluidine	U		1.99	10.0	1	03/02/2024 17:50	WG2238143
4-Nitroquinoline 1-oxide	U		2.03	10.0	1	03/02/2024 17:50	WG2238143
n-Nitrosodiethylamine	U		3.57	10.0	1	03/02/2024 17:50	WG2238143
n-Nitrosodi-n-butylamine	U		3.91	10.0	1	03/02/2024 17:50	WG2238143
n-Nitrosomethylethylamine	U		3.25	10.0	1	03/02/2024 17:50	WG2238143
n-Nitrosomorpholine	U		3.25	10.0	1	03/02/2024 17:50	WG2238143
n-Nitrosopiperidine	U		3.72	10.0	1	03/02/2024 17:50	WG2238143
n-Nitrosopyrrolidine	U		3.39	10.0	1	03/02/2024 17:50	WG2238143
Pentachlorobenzene	U		4.15	10.0	1	03/02/2024 17:50	WG2238143
Pentachloroethane	U		2.83	50.0	1	03/02/2024 17:50	WG2238143
Pentachloronitrobenzene	U		4.15	10.0	1	03/02/2024 17:50	WG2238143
Phenacetin	U		4.66	10.0	1	03/02/2024 17:50	WG2238143
p-Phenylenediamine	U	J4	387	6900	1	03/02/2024 17:50	WG2238143
Phorate	U		4.86	50.0	1	03/02/2024 17:50	WG2238143
2-Picoline	U		6.83	50.0	1	03/02/2024 17:50	WG2238143
Pronamide	U		4.21	10.0	1	03/02/2024 17:50	WG2238143
Safrole	U		3.68	10.0	1	03/02/2024 17:50	WG2238143

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Sulfotep	U		3.99	50.0	1	03/02/2024 17:50	WG2238143
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0	1	03/02/2024 17:50	WG2238143
2,3,4,6-Tetrachlorophenol	U		0.231	10.0	1	03/02/2024 17:50	WG2238143
Thionazin	U		4.07	10.0	1	03/02/2024 17:50	WG2238143
o-Toluidine	U		3.53	10.0	1	03/02/2024 17:50	WG2238143
2,4,5-Trichlorophenol	U		0.109	10.0	1	03/02/2024 17:50	WG2238143
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0	1	03/02/2024 17:50	WG2238143
1,3,5-Trinitrobenzene	U		1.32	10.0	1	03/02/2024 17:50	WG2238143
(S) 2-Fluorophenol	24.6			10.0-120		03/02/2024 17:50	WG2238143
(S) Phenol-d5	14.1			10.0-120		03/02/2024 17:50	WG2238143
(S) Nitrobenzene-d5	54.1			10.0-127		03/02/2024 17:50	WG2238143
(S) 2-Fluorobiphenyl	37.3			10.0-130		03/02/2024 17:50	WG2238143
(S) 2,4,6-Tribromophenol	28.5			10.0-155		03/02/2024 17:50	WG2238143
(S) p-Terphenyl-d14	18.8			10.0-128		03/02/2024 17:50	WG2238143

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	U		33.3	100	1	03/07/2024 03:01	WG2240920
Unadjusted C9-C12 Aliphatics	U		33.3	100	1	03/07/2024 03:01	WG2240920
Unadjusted C9-C10 Aromatics	U		33.3	100	1	03/07/2024 03:01	WG2240920
Adjusted C5-C8 Aliphatics	U		33.3	100	1	03/07/2024 03:01	WG2240920
Adjusted C9-C12 Aliphatics	U		33.3	100	1	03/07/2024 03:01	WG2240920
Total VPH	U		66.7	200	1	03/07/2024 03:01	WG2240920
(S) 2,5-Dibromotoluene(FID)	102			70.0-130		03/07/2024 03:01	WG2240920
(S) 2,5-Dibromotoluene(PID)	98.5			70.0-130		03/07/2024 03:01	WG2240920

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U	J3	11.3	25.0	1	03/03/2024 18:56	WG2238664
Acrylonitrile	U		0.671	5.00	1	03/03/2024 18:56	WG2238664
Benzene	3.91		0.0941	0.500	1	03/03/2024 18:56	WG2238664
Bromobenzene	U		0.118	0.500	1	03/03/2024 18:56	WG2238664
Bromodichloromethane	U		0.136	0.500	1	03/03/2024 18:56	WG2238664
Bromochloromethane	U		0.128	0.500	1	03/03/2024 18:56	WG2238664
Bromoform	U		0.129	0.500	1	03/03/2024 18:56	WG2238664
Bromomethane	U		0.605	2.50	1	03/03/2024 18:56	WG2238664
n-Butylbenzene	U		0.157	0.500	1	03/03/2024 18:56	WG2238664
sec-Butylbenzene	U		0.125	0.500	1	03/03/2024 18:56	WG2238664
tert-Butylbenzene	U		0.127	0.500	1	03/03/2024 18:56	WG2238664
Carbon disulfide	U		0.0962	0.500	1	03/03/2024 18:56	WG2238664
Carbon tetrachloride	U		0.128	0.500	1	03/03/2024 18:56	WG2238664
Chlorobenzene	U		0.117	0.500	1	03/03/2024 18:56	WG2238664
Chlorodibromomethane	U		0.140	0.500	1	03/03/2024 18:56	WG2238664
Chloroethane	U		0.192	2.50	1	03/03/2024 18:56	WG2238664
2-Chloroethyl vinyl ether	U		0.575	50.0	1	03/03/2024 18:56	WG2238664
Chloroform	U		0.111	0.500	1	03/03/2024 18:56	WG2238664
Chloromethane	U		0.960	1.25	1	03/03/2024 18:56	WG2238664
2-Chlorotoluene	U		0.106	0.500	1	03/03/2024 18:56	WG2238664
4-Chlorotoluene	U		0.114	0.500	1	03/03/2024 18:56	WG2238664
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	03/03/2024 18:56	WG2238664
1,2-Dibromoethane	U		0.126	0.500	1	03/03/2024 18:56	WG2238664
Dibromomethane	U		0.122	0.500	1	03/03/2024 18:56	WG2238664
1,2-Dichlorobenzene	U		0.107	0.500	1	03/03/2024 18:56	WG2238664
1,3-Dichlorobenzene	U		0.299	0.500	1	03/03/2024 18:56	WG2238664
1,4-Dichlorobenzene	U		0.120	0.500	1	03/03/2024 18:56	WG2238664
Dichlorodifluoromethane	U		0.374	2.50	1	03/03/2024 18:56	WG2238664
1,1-Dichloroethane	U		0.100	0.500	1	03/03/2024 18:56	WG2238664
1,2-Dichloroethane	U		0.0819	0.500	1	03/03/2024 18:56	WG2238664
1,1-Dichloroethene	U		0.188	0.500	1	03/03/2024 18:56	WG2238664
cis-1,2-Dichloroethene	U		0.126	0.500	1	03/03/2024 18:56	WG2238664
trans-1,2-Dichloroethene	U		0.149	0.500	1	03/03/2024 18:56	WG2238664
1,2-Dichloropropane	U		0.149	0.500	1	03/03/2024 18:56	WG2238664
1,1-Dichloropropene	U		0.142	0.500	1	03/03/2024 18:56	WG2238664
1,3-Dichloropropane	U		0.109	1.00	1	03/03/2024 18:56	WG2238664
cis-1,3-Dichloropropene	U		0.111	0.500	1	03/03/2024 18:56	WG2238664
trans-1,3-Dichloropropene	U		0.118	0.500	1	03/03/2024 18:56	WG2238664
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	03/03/2024 18:56	WG2238664
2,2-Dichloropropane	U		0.161	0.500	1	03/03/2024 18:56	WG2238664
Di-isopropyl ether	U		0.105	0.500	1	03/03/2024 18:56	WG2238664
Ethylbenzene	2.41		0.137	0.500	1	03/03/2024 18:56	WG2238664
Hexachloro-1,3-butadiene	U		0.337	1.00	1	03/03/2024 18:56	WG2238664



Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Hexanone	U		0.787	5.00	1	03/03/2024 18:56	WG2238664
n-Hexane	U		0.749	5.00	1	03/03/2024 18:56	WG2238664
Iodomethane	U		0.554	5.00	1	03/03/2024 18:56	WG2238664
Isopropylbenzene	0.184	U	0.105	0.500	1	03/03/2024 18:56	WG2238664
p-Isopropyltoluene	U		0.120	0.500	1	03/03/2024 18:56	WG2238664
2-Butanone (MEK)	U		1.19	5.00	1	03/03/2024 18:56	WG2238664
Methylene Chloride	U		0.430	2.50	1	03/03/2024 18:56	WG2238664
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	03/03/2024 18:56	WG2238664
Methyl tert-butyl ether	U		0.101	0.500	1	03/03/2024 18:56	WG2238664
Naphthalene	U		0.174	2.50	1	03/06/2024 01:58	WG2240283
n-Propylbenzene	0.397	U	0.0993	0.500	1	03/03/2024 18:56	WG2238664
Styrene	U		0.118	0.500	1	03/03/2024 18:56	WG2238664
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	03/03/2024 18:56	WG2238664
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	03/03/2024 18:56	WG2238664
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	03/03/2024 18:56	WG2238664
Tetrachloroethene	U		0.300	0.500	1	03/03/2024 18:56	WG2238664
Toluene	0.431	U	0.278	0.500	1	03/03/2024 18:56	WG2238664
1,2,3-Trichlorobenzene	U		0.164	0.500	1	03/03/2024 18:56	WG2238664
1,2,4-Trichlorobenzene	U		0.481	1.00	1	03/03/2024 18:56	WG2238664
1,1,1-Trichloroethane	U		0.149	0.500	1	03/03/2024 18:56	WG2238664
1,1,2-Trichloroethane	U		0.158	0.500	1	03/03/2024 18:56	WG2238664
Trichloroethene	U		0.190	0.500	1	03/03/2024 18:56	WG2238664
Trichlorofluoromethane	U		0.160	2.50	1	03/03/2024 18:56	WG2238664
1,2,3-Trichloropropane	U		0.237	2.50	1	03/03/2024 18:56	WG2238664
1,2,4-Trimethylbenzene	0.351	U	0.322	0.500	1	03/06/2024 01:58	WG2240283
1,2,3-Trimethylbenzene	0.198	U	0.104	0.500	1	03/06/2024 01:58	WG2240283
1,3,5-Trimethylbenzene	0.117	U	0.104	0.500	1	03/03/2024 18:56	WG2238664
Vinyl acetate	U		0.692	5.00	1	03/03/2024 18:56	WG2238664
Vinyl chloride	U		0.234	0.500	1	03/03/2024 18:56	WG2238664
Xylenes, Total	0.590	U	0.174	1.50	1	03/06/2024 01:58	WG2240283
(S) Toluene-d8	101			80.0-120		03/03/2024 18:56	WG2238664
(S) Toluene-d8	103			80.0-120		03/06/2024 01:58	WG2240283
(S) 4-Bromofluorobenzene	99.4			77.0-126		03/03/2024 18:56	WG2238664
(S) 4-Bromofluorobenzene	96.6			77.0-126		03/06/2024 01:58	WG2240283
(S) 1,2-Dichloroethane-d4	97.6			70.0-130		03/03/2024 18:56	WG2238664
(S) 1,2-Dichloroethane-d4	98.5			70.0-130		03/06/2024 01:58	WG2240283

TPH by Method MTDEQ EPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C9-C18 Aliphatics	U		200	600	1	03/06/2024 20:42	WG2239442
Unadjusted C19-C36 Aliphatics	411	U	200	600	1	03/06/2024 20:42	WG2239442
Unadjusted C11-C22 Aromatics	U		200	600	1	03/06/2024 21:52	WG2239442
Unadjusted Total Petroleum Hydrocarbons	411	U	200	600	1	03/06/2024 21:52	WG2239442
Adjusted C11-C22 Aromatics	U		200	600	1	03/06/2024 21:52	WG2239442
Adjusted Total Petroleum Hydrocarbons	411	U	200	600	1	03/06/2024 21:52	WG2239442
(S) o-Terphenyl	62.1			40.0-140		03/06/2024 21:52	WG2239442
(S) 1-Chloro-octadecane	55.3			40.0-140		03/06/2024 20:42	WG2239442
(S) 2-Fluorobiphenyl	83.4			40.0-140		03/06/2024 21:52	WG2239442
(S) 2-Bromonaphthalene	89.5			40.0-140		03/06/2024 21:52	WG2239442

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acenaphthene	U		0.0886	1.00	1	03/02/2024 18:11	WG2238143
Acenaphthylene	U		0.0921	1.00	1	03/02/2024 18:11	WG2238143
Anthracene	U		0.0804	1.00	1	03/02/2024 18:11	WG2238143
Benzdine	U	J3	3.74	10.0	1	03/02/2024 18:11	WG2238143
Benzo(a)anthracene	U		0.199	1.00	1	03/02/2024 18:11	WG2238143
Benzo(b)fluoranthene	U		0.130	1.00	1	03/02/2024 18:11	WG2238143
Benzo(k)fluoranthene	U		0.120	1.00	1	03/02/2024 18:11	WG2238143
Benzo(g,h,i)perylene	U		0.121	1.00	1	03/02/2024 18:11	WG2238143
Benzo(a)pyrene	U		0.0381	1.00	1	03/02/2024 18:11	WG2238143
Bis(2-chlorethoxy)methane	U		0.116	10.0	1	03/02/2024 18:11	WG2238143
Bis(2-chloroethyl)ether	U		0.137	10.0	1	03/02/2024 18:11	WG2238143
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0	1	03/02/2024 18:11	WG2238143
4-Bromophenyl-phenylether	U		0.0877	10.0	1	03/02/2024 18:11	WG2238143
2-Chloronaphthalene	U		0.0648	1.00	1	03/02/2024 18:11	WG2238143
4-Chlorophenyl-phenylether	U		0.0926	10.0	1	03/02/2024 18:11	WG2238143
Chrysene	U		0.130	1.00	1	03/02/2024 18:11	WG2238143
Dibenz(a,h)anthracene	U		0.0644	1.00	1	03/02/2024 18:11	WG2238143
3,3-Dichlorobenzidine	U		0.212	10.0	1	03/02/2024 18:11	WG2238143
2,4-Dinitrotoluene	U		0.0983	10.0	1	03/02/2024 18:11	WG2238143
2,6-Dinitrotoluene	U		0.250	10.0	1	03/02/2024 18:11	WG2238143
Fluoranthene	U		0.102	1.00	1	03/02/2024 18:11	WG2238143
Fluorene	U		0.0844	1.00	1	03/02/2024 18:11	WG2238143
Hexachlorobenzene	U		0.0755	1.00	1	03/02/2024 18:11	WG2238143
Hexachloro-1,3-butadiene	U		0.0968	10.0	1	03/02/2024 18:11	WG2238143
Hexachlorocyclopentadiene	U		0.0598	10.0	1	03/02/2024 18:11	WG2238143
Hexachloroethane	U		0.127	10.0	1	03/02/2024 18:11	WG2238143
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	03/02/2024 18:11	WG2238143
Isophorone	U		0.143	10.0	1	03/02/2024 18:11	WG2238143
Naphthalene	0.270	J	0.159	1.00	1	03/02/2024 18:11	WG2238143
Nitrobenzene	U		0.297	10.0	1	03/02/2024 18:11	WG2238143
n-Nitrosodimethylamine	U		0.998	10.0	1	03/02/2024 18:11	WG2238143
n-Nitrosodiphenylamine	U		2.37	10.0	1	03/02/2024 18:11	WG2238143
n-Nitrosodi-n-propylamine	U		0.261	10.0	1	03/02/2024 18:11	WG2238143
Phenanthrene	U		0.112	1.00	1	03/02/2024 18:11	WG2238143
Benzylbutyl phthalate	U		0.765	3.00	1	03/02/2024 18:11	WG2238143
Bis(2-Ethylhexyl)phthalate	1.87	B J	0.895	3.00	1	03/02/2024 18:11	WG2238143
Di-n-butyl phthalate	U		0.453	3.00	1	03/02/2024 18:11	WG2238143
Diethyl phthalate	U		0.287	3.00	1	03/02/2024 18:11	WG2238143
Dimethyl phthalate	U		0.260	3.00	1	03/02/2024 18:11	WG2238143
Di-n-octyl phthalate	U		0.932	3.00	1	03/02/2024 18:11	WG2238143
Pyrene	U		0.107	1.00	1	03/02/2024 18:11	WG2238143
1,2,4-Trichlorobenzene	U		0.0698	10.0	1	03/02/2024 18:11	WG2238143
Aniline	U	J3	1.65	10.0	1	03/02/2024 18:11	WG2238143
1,2-Diphenylhydrazine	U	N2	0.105	10.0	1	03/02/2024 18:11	WG2238143
Benzyl alcohol	U		0.563	10.0	1	03/02/2024 18:11	WG2238143
4-Chloroaniline	U	J3	0.234	10.0	1	03/02/2024 18:11	WG2238143
4-Chloro-3-methylphenol	U	J3	0.131	10.0	1	03/02/2024 18:11	WG2238143
2-Chlorophenol	U		0.133	10.0	1	03/02/2024 18:11	WG2238143
Dibenzofuran	U		0.0970	10.0	1	03/02/2024 18:11	WG2238143
2,4-Dichlorophenol	U		0.102	10.0	1	03/02/2024 18:11	WG2238143
2,4-Dimethylphenol	U	J3	0.0636	10.0	1	03/02/2024 18:11	WG2238143
4,6-Dinitro-2-methylphenol	U		1.12	10.0	1	03/02/2024 18:11	WG2238143
2,4-Dinitrophenol	U		5.93	10.0	1	03/02/2024 18:11	WG2238143
2-Methylnaphthalene	U		0.117	1.00	1	03/02/2024 18:11	WG2238143
2-Methylphenol	U	J3	0.0929	10.0	1	03/02/2024 18:11	WG2238143
3&4-Methyl Phenol	U	J3	0.168	10.0	1	03/02/2024 18:11	WG2238143

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Nitroaniline	U		0.102	10.0	1	03/02/2024 18:11	WG2238143
3-Nitroaniline	U		0.0869	10.0	1	03/02/2024 18:11	WG2238143
4-Nitroaniline	U		0.0910	10.0	1	03/02/2024 18:11	WG2238143
2-Nitrophenol	U		0.117	10.0	1	03/02/2024 18:11	WG2238143
4-Nitrophenol	U		0.143	10.0	1	03/02/2024 18:11	WG2238143
Pentachlorophenol	U		0.313	10.0	1	03/02/2024 18:11	WG2238143
Phenol	U		4.33	10.0	1	03/02/2024 18:11	WG2238143
Pyridine	U	J3	0.627	10.0	1	03/02/2024 18:11	WG2238143
2,4,6-Trichlorophenol	U		0.100	10.0	1	03/02/2024 18:11	WG2238143
Acetophenone	U		0.208	10.0	1	03/02/2024 18:11	WG2238143
2-Acetylaminofluorene	U		0.253	10.0	1	03/02/2024 18:11	WG2238143
4-Aminobiphenyl	U		0.461	10.0	1	03/02/2024 18:11	WG2238143
Chlorobenzilate	U		3.84	50.0	1	03/02/2024 18:11	WG2238143
Diallylate	U		0.524	10.0	1	03/02/2024 18:11	WG2238143
2,6-Dichlorophenol	U		0.102	10.0	1	03/02/2024 18:11	WG2238143
Dimethoate	U		5.05	50.0	1	03/02/2024 18:11	WG2238143
P-(Dimethylamino) Azobenzene	U		3.69	10.0	1	03/02/2024 18:11	WG2238143
Dimethylbenz (A) Anthracene	U		1.71	10.0	1	03/02/2024 18:11	WG2238143
3,3-Dimethylbenzidine	U		3.39	10.0	1	03/02/2024 18:11	WG2238143
a,a-Dimethylphenethylamine	U	J4	3.13	50.0	1	03/02/2024 18:11	WG2238143
1,3-Dinitrobenzene	U		0.359	10.0	1	03/02/2024 18:11	WG2238143
Diphenylamine	U		2.37	10.0	1	03/02/2024 18:11	WG2238143
Dinoseb	U		8.01	50.0	1	03/02/2024 18:11	WG2238143
Disulfoton	U		0.267	10.0	1	03/02/2024 18:11	WG2238143
Ethyl methanesulfonate	U		0.326	10.0	1	03/02/2024 18:11	WG2238143
Ethyl Parathion	U		0.379	10.0	1	03/02/2024 18:11	WG2238143
Famphur	U		3.92	20.0	1	03/02/2024 18:11	WG2238143
Hexachloropropene	U		0.149	50.0	1	03/02/2024 18:11	WG2238143
Hexachlorophene	U		1.44	50.0	1	03/02/2024 18:11	WG2238143
Isodrin	U		4.11	10.0	1	03/02/2024 18:11	WG2238143
Isosafrole	U		3.88	10.0	1	03/02/2024 18:11	WG2238143
Kepone	U		2.66	20.0	1	03/02/2024 18:11	WG2238143
Methapyrilene	U		10.0	50.0	1	03/02/2024 18:11	WG2238143
3-Methylcholanthrene	U		0.164	10.0	1	03/02/2024 18:11	WG2238143
Methyl methanesulfonate	U		3.40	50.0	1	03/02/2024 18:11	WG2238143
Methyl parathion	U		0.213	10.0	1	03/02/2024 18:11	WG2238143
1,4-Naphthoquinone	U	J4	5.56	50.0	1	03/02/2024 18:11	WG2238143
1-Naphthylamine	U		0.289	10.0	1	03/02/2024 18:11	WG2238143
2-Naphthylamine	U		4.48	10.0	1	03/02/2024 18:11	WG2238143
5-Nitro-o-toluidine	U		1.99	10.0	1	03/02/2024 18:11	WG2238143
4-Nitroquinoline 1-oxide	U		2.03	10.0	1	03/02/2024 18:11	WG2238143
n-Nitrosodiethylamine	U		3.57	10.0	1	03/02/2024 18:11	WG2238143
n-Nitrosodi-n-butylamine	U		3.91	10.0	1	03/02/2024 18:11	WG2238143
n-Nitrosomethylethylamine	U		3.25	10.0	1	03/02/2024 18:11	WG2238143
n-Nitrosomorpholine	U		3.25	10.0	1	03/02/2024 18:11	WG2238143
n-Nitrosopiperidine	U		3.72	10.0	1	03/02/2024 18:11	WG2238143
n-Nitrosopyrrolidine	U		3.39	10.0	1	03/02/2024 18:11	WG2238143
Pentachlorobenzene	U		4.15	10.0	1	03/02/2024 18:11	WG2238143
Pentachloroethane	U		2.83	50.0	1	03/02/2024 18:11	WG2238143
Pentachloronitrobenzene	U		4.15	10.0	1	03/02/2024 18:11	WG2238143
Phenacetin	U		4.66	10.0	1	03/02/2024 18:11	WG2238143
p-Phenylenediamine	U	J4	387	6900	1	03/02/2024 18:11	WG2238143
Phorate	U		4.86	50.0	1	03/02/2024 18:11	WG2238143
2-Picoline	U		6.83	50.0	1	03/02/2024 18:11	WG2238143
Pronamide	U		4.21	10.0	1	03/02/2024 18:11	WG2238143
Safrole	U		3.68	10.0	1	03/02/2024 18:11	WG2238143

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Sulfotep	U		3.99	50.0	1	03/02/2024 18:11	WG2238143
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0	1	03/02/2024 18:11	WG2238143
2,3,4,6-Tetrachlorophenol	U		0.231	10.0	1	03/02/2024 18:11	WG2238143
Thionazin	U		4.07	10.0	1	03/02/2024 18:11	WG2238143
o-Toluidine	U		3.53	10.0	1	03/02/2024 18:11	WG2238143
2,4,5-Trichlorophenol	U		0.109	10.0	1	03/02/2024 18:11	WG2238143
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0	1	03/02/2024 18:11	WG2238143
1,3,5-Trinitrobenzene	U		1.32	10.0	1	03/02/2024 18:11	WG2238143
(S) 2-Fluorophenol	23.7			10.0-120		03/02/2024 18:11	WG2238143
(S) Phenol-d5	16.5			10.0-120		03/02/2024 18:11	WG2238143
(S) Nitrobenzene-d5	53.4			10.0-127		03/02/2024 18:11	WG2238143
(S) 2-Fluorobiphenyl	50.4			10.0-130		03/02/2024 18:11	WG2238143
(S) 2,4,6-Tribromophenol	37.7			10.0-155		03/02/2024 18:11	WG2238143
(S) p-Terphenyl-d14	33.3			10.0-128		03/02/2024 18:11	WG2238143

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

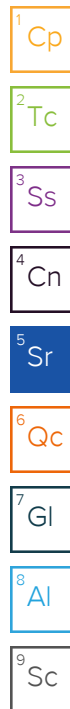
Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	U		333	1000	10	03/07/2024 03:36	WG2240920
Unadjusted C9-C12 Aliphatics	U		333	1000	10	03/07/2024 03:36	WG2240920
Unadjusted C9-C10 Aromatics	U		333	1000	10	03/07/2024 03:36	WG2240920
Adjusted C5-C8 Aliphatics	U		333	1000	10	03/07/2024 03:36	WG2240920
Adjusted C9-C12 Aliphatics	U		333	1000	10	03/07/2024 03:36	WG2240920
Total VPH	U		667	2000	10	03/07/2024 03:36	WG2240920
(S) 2,5-Dibromotoluene(FID)	102			70.0-130		03/07/2024 03:36	WG2240920
(S) 2,5-Dibromotoluene(PID)	101			70.0-130		03/07/2024 03:36	WG2240920

Sample Narrative:

L1710780-03 WG2240920: Lowest possible dilution due to sample foaming.

Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U	J3	11.3	25.0	1	03/03/2024 19:15	WG2238664
Acrylonitrile	U		0.671	5.00	1	03/03/2024 19:15	WG2238664
Benzene	U		0.0941	0.500	1	03/03/2024 19:15	WG2238664
Bromobenzene	U		0.118	0.500	1	03/03/2024 19:15	WG2238664
Bromodichloromethane	U		0.136	0.500	1	03/03/2024 19:15	WG2238664
Bromochloromethane	U		0.128	0.500	1	03/03/2024 19:15	WG2238664
Bromoform	U		0.129	0.500	1	03/03/2024 19:15	WG2238664
Bromomethane	U		0.605	2.50	1	03/03/2024 19:15	WG2238664
n-Butylbenzene	U		0.157	0.500	1	03/03/2024 19:15	WG2238664
sec-Butylbenzene	U		0.125	0.500	1	03/03/2024 19:15	WG2238664
tert-Butylbenzene	U		0.127	0.500	1	03/03/2024 19:15	WG2238664
Carbon disulfide	U		0.0962	0.500	1	03/03/2024 19:15	WG2238664
Carbon tetrachloride	U		0.128	0.500	1	03/03/2024 19:15	WG2238664
Chlorobenzene	U		0.117	0.500	1	03/03/2024 19:15	WG2238664
Chlorodibromomethane	U		0.140	0.500	1	03/03/2024 19:15	WG2238664
Chloroethane	U		0.192	2.50	1	03/03/2024 19:15	WG2238664
2-Chloroethyl vinyl ether	U		0.575	50.0	1	03/03/2024 19:15	WG2238664
Chloroform	U		0.111	0.500	1	03/03/2024 19:15	WG2238664
Chloromethane	U		0.960	1.25	1	03/03/2024 19:15	WG2238664
2-Chlorotoluene	U		0.106	0.500	1	03/03/2024 19:15	WG2238664
4-Chlorotoluene	U		0.114	0.500	1	03/03/2024 19:15	WG2238664
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	03/03/2024 19:15	WG2238664
1,2-Dibromoethane	U		0.126	0.500	1	03/03/2024 19:15	WG2238664
Dibromomethane	U		0.122	0.500	1	03/03/2024 19:15	WG2238664
1,2-Dichlorobenzene	U		0.107	0.500	1	03/03/2024 19:15	WG2238664
1,3-Dichlorobenzene	U		0.299	0.500	1	03/03/2024 19:15	WG2238664
1,4-Dichlorobenzene	U		0.120	0.500	1	03/03/2024 19:15	WG2238664
Dichlorodifluoromethane	U		0.374	2.50	1	03/03/2024 19:15	WG2238664
1,1-Dichloroethane	U		0.100	0.500	1	03/03/2024 19:15	WG2238664
1,2-Dichloroethane	U		0.0819	0.500	1	03/03/2024 19:15	WG2238664
1,1-Dichloroethene	U		0.188	0.500	1	03/03/2024 19:15	WG2238664
cis-1,2-Dichloroethene	U		0.126	0.500	1	03/03/2024 19:15	WG2238664
trans-1,2-Dichloroethene	U		0.149	0.500	1	03/03/2024 19:15	WG2238664
1,2-Dichloropropane	U		0.149	0.500	1	03/03/2024 19:15	WG2238664
1,1-Dichloropropene	U		0.142	0.500	1	03/03/2024 19:15	WG2238664
1,3-Dichloropropane	U		0.109	1.00	1	03/03/2024 19:15	WG2238664
cis-1,3-Dichloropropene	U		0.111	0.500	1	03/03/2024 19:15	WG2238664
trans-1,3-Dichloropropene	U		0.118	0.500	1	03/03/2024 19:15	WG2238664
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	03/03/2024 19:15	WG2238664
2,2-Dichloropropane	U		0.161	0.500	1	03/03/2024 19:15	WG2238664



Volatile Organic Compounds (GC/MS) by Method 8260B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Di-isopropyl ether	U		0.105	0.500	1	03/03/2024 19:15	WG2238664
Ethylbenzene	U		0.137	0.500	1	03/03/2024 19:15	WG2238664
Hexachloro-1,3-butadiene	U		0.337	1.00	1	03/03/2024 19:15	WG2238664
2-Hexanone	U		0.787	5.00	1	03/03/2024 19:15	WG2238664
n-Hexane	U		0.749	5.00	1	03/03/2024 19:15	WG2238664
Iodomethane	U		0.554	5.00	1	03/03/2024 19:15	WG2238664
Isopropylbenzene	U		0.105	0.500	1	03/03/2024 19:15	WG2238664
p-Isopropyltoluene	U		0.120	0.500	1	03/03/2024 19:15	WG2238664
2-Butanone (MEK)	U		1.19	5.00	1	03/03/2024 19:15	WG2238664
Methylene Chloride	U		0.430	2.50	1	03/03/2024 19:15	WG2238664
4-Methyl-2-pentanone (MIBK)	3.27	U	0.478	5.00	1	03/03/2024 19:15	WG2238664
Methyl tert-butyl ether	U		0.101	0.500	1	03/03/2024 19:15	WG2238664
Naphthalene	U		0.174	2.50	1	03/03/2024 19:15	WG2238664
n-Propylbenzene	U		0.0993	0.500	1	03/03/2024 19:15	WG2238664
Styrene	U		0.118	0.500	1	03/03/2024 19:15	WG2238664
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	03/03/2024 19:15	WG2238664
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	03/03/2024 19:15	WG2238664
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	03/03/2024 19:15	WG2238664
Tetrachloroethene	U		0.300	0.500	1	03/03/2024 19:15	WG2238664
Toluene	U		0.278	0.500	1	03/03/2024 19:15	WG2238664
1,2,3-Trichlorobenzene	U		0.164	0.500	1	03/03/2024 19:15	WG2238664
1,2,4-Trichlorobenzene	U		0.481	1.00	1	03/03/2024 19:15	WG2238664
1,1,1-Trichloroethane	U		0.149	0.500	1	03/03/2024 19:15	WG2238664
1,1,2-Trichloroethane	U		0.158	0.500	1	03/03/2024 19:15	WG2238664
Trichloroethene	U		0.190	0.500	1	03/03/2024 19:15	WG2238664
Trichlorofluoromethane	U		0.160	2.50	1	03/03/2024 19:15	WG2238664
1,2,3-Trichloropropane	U		0.237	2.50	1	03/03/2024 19:15	WG2238664
1,2,4-Trimethylbenzene	U		0.322	0.500	1	03/03/2024 19:15	WG2238664
1,2,3-Trimethylbenzene	U		0.104	0.500	1	03/03/2024 19:15	WG2238664
1,3,5-Trimethylbenzene	U		0.104	0.500	1	03/03/2024 19:15	WG2238664
Vinyl acetate	U		0.692	5.00	1	03/03/2024 19:15	WG2238664
Vinyl chloride	U		0.234	0.500	1	03/03/2024 19:15	WG2238664
Xylenes, Total	U		0.174	1.50	1	03/03/2024 19:15	WG2238664
(S) Toluene-d8	105			80.0-120		03/03/2024 19:15	WG2238664
(S) 4-Bromofluorobenzene	96.7			77.0-126		03/03/2024 19:15	WG2238664
(S) 1,2-Dichloroethane-d4	97.5			70.0-130		03/03/2024 19:15	WG2238664

TPH by Method MTDEQ EPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C9-C18 Aliphatics	U		200	600	1	03/06/2024 20:20	WG2239442
Unadjusted C19-C36 Aliphatics	U		200	600	1	03/06/2024 20:20	WG2239442
Unadjusted C11-C22 Aromatics	U		200	600	1	03/06/2024 21:30	WG2239442
Unadjusted Total Petroleum Hydrocarbons	U		200	600	1	03/06/2024 20:20	WG2239442
Adjusted C11-C22 Aromatics	U		200	600	1	03/06/2024 21:30	WG2239442
Adjusted Total Petroleum Hydrocarbons	U		200	600	1	03/06/2024 20:20	WG2239442
(S) o-Terphenyl	77.5			40.0-140		03/06/2024 21:30	WG2239442
(S) 1-Chloro-octadecane	61.6			40.0-140		03/06/2024 20:20	WG2239442
(S) 2-Fluorobiphenyl	86.2			40.0-140		03/06/2024 21:30	WG2239442
(S) 2-Bromonaphthalene	90.8			40.0-140		03/06/2024 21:30	WG2239442

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

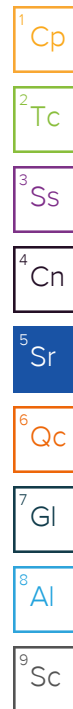
7 Gl

8 Al

9 Sc

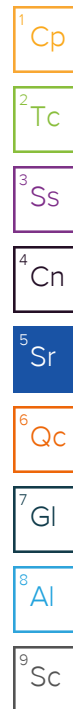
Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acenaphthene	U		0.0886	1.00	1	03/02/2024 18:32	WG2238143
Acenaphthylene	U		0.0921	1.00	1	03/02/2024 18:32	WG2238143
Anthracene	U		0.0804	1.00	1	03/02/2024 18:32	WG2238143
Benzdine	U	J3	3.74	10.0	1	03/02/2024 18:32	WG2238143
Benzo(a)anthracene	U		0.199	1.00	1	03/02/2024 18:32	WG2238143
Benzo(b)fluoranthene	U		0.130	1.00	1	03/02/2024 18:32	WG2238143
Benzo(k)fluoranthene	U		0.120	1.00	1	03/02/2024 18:32	WG2238143
Benzo(g,h,i)perylene	U		0.121	1.00	1	03/02/2024 18:32	WG2238143
Benzo(a)pyrene	U		0.0381	1.00	1	03/02/2024 18:32	WG2238143
Bis(2-chlorethoxy)methane	U		0.116	10.0	1	03/02/2024 18:32	WG2238143
Bis(2-chloroethyl)ether	U		0.137	10.0	1	03/02/2024 18:32	WG2238143
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0	1	03/02/2024 18:32	WG2238143
4-Bromophenyl-phenylether	U		0.0877	10.0	1	03/02/2024 18:32	WG2238143
2-Chloronaphthalene	U		0.0648	1.00	1	03/02/2024 18:32	WG2238143
4-Chlorophenyl-phenylether	U		0.0926	10.0	1	03/02/2024 18:32	WG2238143
Chrysene	U		0.130	1.00	1	03/02/2024 18:32	WG2238143
Dibenz(a,h)anthracene	U		0.0644	1.00	1	03/02/2024 18:32	WG2238143
3,3-Dichlorobenzidine	U		0.212	10.0	1	03/02/2024 18:32	WG2238143
2,4-Dinitrotoluene	U		0.0983	10.0	1	03/02/2024 18:32	WG2238143
2,6-Dinitrotoluene	U		0.250	10.0	1	03/02/2024 18:32	WG2238143
Fluoranthene	U		0.102	1.00	1	03/02/2024 18:32	WG2238143
Fluorene	U		0.0844	1.00	1	03/02/2024 18:32	WG2238143
Hexachlorobenzene	U		0.0755	1.00	1	03/02/2024 18:32	WG2238143
Hexachloro-1,3-butadiene	U		0.0968	10.0	1	03/02/2024 18:32	WG2238143
Hexachlorocyclopentadiene	U		0.0598	10.0	1	03/02/2024 18:32	WG2238143
Hexachloroethane	U		0.127	10.0	1	03/02/2024 18:32	WG2238143
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	03/02/2024 18:32	WG2238143
Isophorone	U		0.143	10.0	1	03/02/2024 18:32	WG2238143
Naphthalene	U		0.159	1.00	1	03/02/2024 18:32	WG2238143
Nitrobenzene	U		0.297	10.0	1	03/02/2024 18:32	WG2238143
n-Nitrosodimethylamine	U		0.998	10.0	1	03/02/2024 18:32	WG2238143
n-Nitrosodiphenylamine	U		2.37	10.0	1	03/02/2024 18:32	WG2238143
n-Nitrosodi-n-propylamine	U		0.261	10.0	1	03/02/2024 18:32	WG2238143
Phenanthrene	U		0.112	1.00	1	03/02/2024 18:32	WG2238143
Benzylbutyl phthalate	U		0.765	3.00	1	03/02/2024 18:32	WG2238143
Bis(2-Ethylhexyl)phthalate	1.87	B J	0.895	3.00	1	03/02/2024 18:32	WG2238143
Di-n-butyl phthalate	U		0.453	3.00	1	03/02/2024 18:32	WG2238143
Diethyl phthalate	U		0.287	3.00	1	03/02/2024 18:32	WG2238143
Dimethyl phthalate	U		0.260	3.00	1	03/02/2024 18:32	WG2238143
Di-n-octyl phthalate	U		0.932	3.00	1	03/02/2024 18:32	WG2238143
Pyrene	U		0.107	1.00	1	03/02/2024 18:32	WG2238143
1,2,4-Trichlorobenzene	U		0.0698	10.0	1	03/02/2024 18:32	WG2238143
Aniline	U	J3	1.65	10.0	1	03/02/2024 18:32	WG2238143
1,2-Diphenylhydrazine	U	N2	0.105	10.0	1	03/02/2024 18:32	WG2238143
Benzyl alcohol	U		0.563	10.0	1	03/02/2024 18:32	WG2238143
4-Chloroaniline	U	J3	0.234	10.0	1	03/02/2024 18:32	WG2238143
4-Chloro-3-methylphenol	U	J3	0.131	10.0	1	03/02/2024 18:32	WG2238143
2-Chlorophenol	U		0.133	10.0	1	03/02/2024 18:32	WG2238143
Dibenzofuran	U		0.0970	10.0	1	03/02/2024 18:32	WG2238143
2,4-Dichlorophenol	U		0.102	10.0	1	03/02/2024 18:32	WG2238143
2,4-Dimethylphenol	U	J3	0.0636	10.0	1	03/02/2024 18:32	WG2238143
4,6-Dinitro-2-methylphenol	U		1.12	10.0	1	03/02/2024 18:32	WG2238143
2,4-Dinitrophenol	U		5.93	10.0	1	03/02/2024 18:32	WG2238143
2-Methylnaphthalene	U		0.117	1.00	1	03/02/2024 18:32	WG2238143
2-Methylphenol	U	J3	0.0929	10.0	1	03/02/2024 18:32	WG2238143
3&4-Methyl Phenol	U	J3	0.168	10.0	1	03/02/2024 18:32	WG2238143



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Nitroaniline	U		0.102	10.0	1	03/02/2024 18:32	WG2238143
3-Nitroaniline	U		0.0869	10.0	1	03/02/2024 18:32	WG2238143
4-Nitroaniline	U		0.0910	10.0	1	03/02/2024 18:32	WG2238143
2-Nitrophenol	U		0.117	10.0	1	03/02/2024 18:32	WG2238143
4-Nitrophenol	U		0.143	10.0	1	03/02/2024 18:32	WG2238143
Pentachlorophenol	U		0.313	10.0	1	03/02/2024 18:32	WG2238143
Phenol	U		4.33	10.0	1	03/02/2024 18:32	WG2238143
Pyridine	U	J3	0.627	10.0	1	03/02/2024 18:32	WG2238143
2,4,6-Trichlorophenol	U		0.100	10.0	1	03/02/2024 18:32	WG2238143
Acetophenone	U		0.208	10.0	1	03/02/2024 18:32	WG2238143
2-Acetylaminofluorene	U		0.253	10.0	1	03/02/2024 18:32	WG2238143
4-Aminobiphenyl	U		0.461	10.0	1	03/02/2024 18:32	WG2238143
Chlorobenzilate	U		3.84	50.0	1	03/02/2024 18:32	WG2238143
Diallate	U		0.524	10.0	1	03/02/2024 18:32	WG2238143
2,6-Dichlorophenol	U		0.102	10.0	1	03/02/2024 18:32	WG2238143
Dimethoate	U		5.05	50.0	1	03/02/2024 18:32	WG2238143
P-(Dimethylamino) Azobenzene	U		3.69	10.0	1	03/02/2024 18:32	WG2238143
Dimethylbenz (A) Anthracene	U		1.71	10.0	1	03/02/2024 18:32	WG2238143
3,3-Dimethylbenzidine	U		3.39	10.0	1	03/02/2024 18:32	WG2238143
a,a-Dimethylphenethylamine	U	J4	3.13	50.0	1	03/02/2024 18:32	WG2238143
1,3-Dinitrobenzene	U		0.359	10.0	1	03/02/2024 18:32	WG2238143
Diphenylamine	U		2.37	10.0	1	03/02/2024 18:32	WG2238143
Dinoseb	U		8.01	50.0	1	03/02/2024 18:32	WG2238143
Disulfoton	U		0.267	10.0	1	03/02/2024 18:32	WG2238143
Ethyl methanesulfonate	U		0.326	10.0	1	03/02/2024 18:32	WG2238143
Ethyl Parathion	U		0.379	10.0	1	03/02/2024 18:32	WG2238143
Famphur	U		3.92	20.0	1	03/02/2024 18:32	WG2238143
Hexachloropropene	U		0.149	50.0	1	03/02/2024 18:32	WG2238143
Hexachlorophene	U		1.44	50.0	1	03/02/2024 18:32	WG2238143
Isodrin	U		4.11	10.0	1	03/02/2024 18:32	WG2238143
Isosafrole	U		3.88	10.0	1	03/02/2024 18:32	WG2238143
Kepone	U		2.66	20.0	1	03/02/2024 18:32	WG2238143
Methapyrilene	U		10.0	50.0	1	03/02/2024 18:32	WG2238143
3-Methylcholanthrene	U		0.164	10.0	1	03/02/2024 18:32	WG2238143
Methyl methanesulfonate	U		3.40	50.0	1	03/02/2024 18:32	WG2238143
Methyl parathion	U		0.213	10.0	1	03/02/2024 18:32	WG2238143
1,4-Naphthoquinone	U	J4	5.56	50.0	1	03/02/2024 18:32	WG2238143
1-Naphthylamine	U		0.289	10.0	1	03/02/2024 18:32	WG2238143
2-Naphthylamine	U		4.48	10.0	1	03/02/2024 18:32	WG2238143
5-Nitro-o-toluidine	U		1.99	10.0	1	03/02/2024 18:32	WG2238143
4-Nitroquinoline 1-oxide	U		2.03	10.0	1	03/02/2024 18:32	WG2238143
n-Nitrosodiethylamine	U		3.57	10.0	1	03/02/2024 18:32	WG2238143
n-Nitrosodi-n-butylamine	U		3.91	10.0	1	03/02/2024 18:32	WG2238143
n-Nitrosomethylethylamine	U		3.25	10.0	1	03/02/2024 18:32	WG2238143
n-Nitrosomorpholine	U		3.25	10.0	1	03/02/2024 18:32	WG2238143
n-Nitrosopiperidine	U		3.72	10.0	1	03/02/2024 18:32	WG2238143
n-Nitrosopyrrolidine	U		3.39	10.0	1	03/02/2024 18:32	WG2238143
Pentachlorobenzene	U		4.15	10.0	1	03/02/2024 18:32	WG2238143
Pentachloroethane	U		2.83	50.0	1	03/02/2024 18:32	WG2238143
Pentachloronitrobenzene	U		4.15	10.0	1	03/02/2024 18:32	WG2238143
Phenacetin	U		4.66	10.0	1	03/02/2024 18:32	WG2238143
p-Phenylenediamine	U	J4	387	6900	1	03/02/2024 18:32	WG2238143
Phorate	U		4.86	50.0	1	03/02/2024 18:32	WG2238143
2-Picoline	U		6.83	50.0	1	03/02/2024 18:32	WG2238143
Pronamide	U		4.21	10.0	1	03/02/2024 18:32	WG2238143
Safrole	U		3.68	10.0	1	03/02/2024 18:32	WG2238143



Semi Volatile Organic Compounds (GC/MS) by Method 8270C

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Sulfotep	U		3.99	50.0	1	03/02/2024 18:32	WG2238143
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0	1	03/02/2024 18:32	WG2238143
2,3,4,6-Tetrachlorophenol	U		0.231	10.0	1	03/02/2024 18:32	WG2238143
Thionazin	U		4.07	10.0	1	03/02/2024 18:32	WG2238143
o-Toluidine	U		3.53	10.0	1	03/02/2024 18:32	WG2238143
2,4,5-Trichlorophenol	U		0.109	10.0	1	03/02/2024 18:32	WG2238143
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0	1	03/02/2024 18:32	WG2238143
1,3,5-Trinitrobenzene	U		1.32	10.0	1	03/02/2024 18:32	WG2238143
(S) 2-Fluorophenol	23.8			10.0-120		03/02/2024 18:32	WG2238143
(S) Phenol-d5	17.9			10.0-120		03/02/2024 18:32	WG2238143
(S) Nitrobenzene-d5	59.5			10.0-127		03/02/2024 18:32	WG2238143
(S) 2-Fluorobiphenyl	54.6			10.0-130		03/02/2024 18:32	WG2238143
(S) 2,4,6-Tribromophenol	51.0			10.0-155		03/02/2024 18:32	WG2238143
(S) p-Terphenyl-d14	39.6			10.0-128		03/02/2024 18:32	WG2238143

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4043005-3 03/06/24 14:14

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C5-C8 Aliphatics	U		33.3	100
Unadjusted C9-C12 Aliphatics	U		33.3	100
Unadjusted C9-C10 Aromatics	U		33.3	100
Adjusted C5-C8 Aliphatics	U		33.3	100
Adjusted C9-C12 Aliphatics	U		33.3	100
Total VPH	U		66.7	200
(S) 2,5-Dibromotoluene(FID)	101			70.0-130
(S) 2,5-Dibromotoluene(PID)	99.3			70.0-130

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4043005-1 03/06/24 11:54 • (LCSD) R4043005-2 03/06/24 12:29

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C5-C8 Aliphatics	1200	912	933	76.0	77.8	70.0-130			2.28	50
Unadjusted C9-C12 Aliphatics	1400	1230	1240	87.9	88.6	70.0-130			0.810	50
Unadjusted C9-C10 Aromatics	200	175	176	87.5	88.0	70.0-130			0.570	50
Total VPH	2800	2320	2350	82.9	83.9	70.0-130			1.28	50
(S) 2,5-Dibromotoluene(FID)				89.9	89.7	70.0-130				
(S) 2,5-Dibromotoluene(PID)				86.1	86.3	70.0-130				

L1711346-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1711346-01 03/06/24 14:49 • (MS) R4043005-4 03/07/24 04:10 • (MSD) R4043005-5 03/07/24 04:45

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Unadjusted C5-C8 Aliphatics	1200	U	1190	951	99.2	79.2	1	70.0-130			22.3	50
Unadjusted C9-C12 Aliphatics	1400	U	1520	1130	109	80.7	1	70.0-130			29.4	50
Unadjusted C9-C10 Aromatics	200	U	215	169	108	84.5	1	70.0-130			24.0	50
Total VPH	2800	U	2930	2250	105	80.4	1	70.0-130			26.3	50
(S) 2,5-Dibromotoluene(FID)					90.7	93.5		70.0-130				
(S) 2,5-Dibromotoluene(PID)					86.6	89.2		70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4041851-3 03/03/24 14:19

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acetone	U		11.3	25.0
Acrylonitrile	U		0.671	5.00
Benzene	U		0.0941	0.500
Bromobenzene	U		0.118	0.500
Bromodichloromethane	U		0.136	0.500
Bromochloromethane	U		0.128	0.500
Bromoform	U		0.129	0.500
Bromomethane	U		0.605	2.50
n-Butylbenzene	U		0.157	0.500
sec-Butylbenzene	U		0.125	0.500
tert-Butylbenzene	U		0.127	0.500
Carbon disulfide	U		0.0962	0.500
Carbon tetrachloride	U		0.128	0.500
Chlorobenzene	U		0.117	0.500
Chlorodibromomethane	U		0.140	0.500
Chloroethane	U		0.192	2.50
2-Chloroethyl vinyl ether	U		0.575	50.0
Chloroform	U		0.111	0.500
Chloromethane	U		0.960	1.25
2-Chlorotoluene	U		0.106	0.500
4-Chlorotoluene	U		0.114	0.500
1,2-Dibromo-3-Chloropropane	U		0.276	2.50
1,2-Dibromoethane	U		0.126	0.500
Dibromomethane	U		0.122	0.500
1,2-Dichlorobenzene	U		0.107	0.500
1,3-Dichlorobenzene	U		0.299	0.500
1,4-Dichlorobenzene	U		0.120	0.500
Dichlorodifluoromethane	U		0.374	2.50
1,1-Dichloroethane	U		0.100	0.500
1,2-Dichloroethane	U		0.0819	0.500
1,1-Dichloroethene	U		0.188	0.500
cis-1,2-Dichloroethene	U		0.126	0.500
trans-1,2-Dichloroethene	U		0.149	0.500
1,2-Dichloropropane	U		0.149	0.500
1,1-Dichloropropene	U		0.142	0.500
1,3-Dichloropropane	U		0.109	1.00
cis-1,3-Dichloropropene	U		0.111	0.500
trans-1,3-Dichloropropene	U		0.118	0.500
trans-1,4-Dichloro-2-butene	U		0.467	5.00
2,2-Dichloropropane	U		0.161	0.500

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4041851-3 03/03/24 14:19

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Di-isopropyl ether	U		0.105	0.500
Ethylbenzene	U		0.137	0.500
Hexachloro-1,3-butadiene	U		0.337	1.00
2-Hexanone	U		0.787	5.00
n-Hexane	U		0.749	5.00
Iodomethane	U		0.554	5.00
Isopropylbenzene	U		0.105	0.500
p-Isopropyltoluene	U		0.120	0.500
2-Butanone (MEK)	U		1.19	5.00
Methylene Chloride	U		0.430	2.50
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00
Methyl tert-butyl ether	U		0.101	0.500
Naphthalene	U		0.174	2.50
n-Propylbenzene	U		0.0993	0.500
Styrene	U		0.118	0.500
1,1,1,2-Tetrachloroethane	U		0.147	0.500
1,1,2,2-Tetrachloroethane	U		0.133	0.500
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500
Tetrachloroethene	U		0.300	0.500
Toluene	U		0.278	0.500
1,2,3-Trichlorobenzene	U		0.164	0.500
1,2,4-Trichlorobenzene	U		0.481	1.00
1,1,1-Trichloroethane	U		0.149	0.500
1,1,2-Trichloroethane	U		0.158	0.500
Trichloroethene	U		0.190	0.500
Trichlorofluoromethane	U		0.160	2.50
1,2,3-Trichloropropane	U		0.237	2.50
1,2,4-Trimethylbenzene	U		0.322	0.500
1,2,3-Trimethylbenzene	U		0.104	0.500
1,3,5-Trimethylbenzene	U		0.104	0.500
Vinyl acetate	U		0.692	5.00
Vinyl chloride	U		0.234	0.500
Xylenes, Total	U		0.174	1.50
(S) Toluene-d8	102			80.0-120
(S) 4-Bromofluorobenzene	98.3			77.0-126
(S) 1,2-Dichloroethane-d4	99.4			70.0-130

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4041851-1 03/03/24 13:22 • (LCSD) R4041851-2 03/03/24 13:41

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Acetone	25.0	23.5	15.9	94.0	63.6	19.0-160		J3	38.6	27
Acrylonitrile	25.0	24.8	24.0	99.2	96.0	55.0-149			3.28	20
Benzene	5.00	5.09	5.07	102	101	70.0-123			0.394	20
Bromobenzene	5.00	4.66	4.98	93.2	99.6	73.0-121			6.64	20
Bromodichloromethane	5.00	5.03	4.98	101	99.6	75.0-120			0.999	20
Bromochloromethane	5.00	5.34	5.13	107	103	76.0-122			4.01	20
Bromoform	5.00	4.94	5.07	98.8	101	68.0-132			2.60	20
Bromomethane	5.00	5.02	4.98	100	99.6	10.0-160			0.800	25
n-Butylbenzene	5.00	4.94	5.36	98.8	107	73.0-125			8.16	20
sec-Butylbenzene	5.00	5.08	5.71	102	114	75.0-125			11.7	20
tert-Butylbenzene	5.00	5.31	5.93	106	119	76.0-124			11.0	20
Carbon disulfide	5.00	5.24	5.11	105	102	61.0-128			2.51	20
Carbon tetrachloride	5.00	5.87	5.99	117	120	68.0-126			2.02	20
Chlorobenzene	5.00	5.07	5.36	101	107	80.0-121			5.56	20
Chlorodibromomethane	5.00	5.06	5.38	101	108	77.0-125			6.13	20
Chloroethane	5.00	5.08	5.14	102	103	47.0-150			1.17	20
2-Chloroethyl vinyl ether	25.0	25.8	28.0	103	112	51.0-160			8.18	20
Chloroform	5.00	4.63	4.66	92.6	93.2	73.0-120			0.646	20
Chloromethane	5.00	4.46	4.78	89.2	95.6	41.0-142			6.93	20
2-Chlorotoluene	5.00	4.77	5.11	95.4	102	76.0-123			6.88	20
4-Chlorotoluene	5.00	4.88	5.22	97.6	104	75.0-122			6.73	20
1,2-Dibromo-3-Chloropropane	5.00	4.24	4.33	84.8	86.6	58.0-134			2.10	20
1,2-Dibromoethane	5.00	5.08	5.41	102	108	80.0-122			6.29	20
Dibromomethane	5.00	5.21	5.19	104	104	80.0-120			0.385	20
1,2-Dichlorobenzene	5.00	4.97	5.44	99.4	109	79.0-121			9.03	20
1,3-Dichlorobenzene	5.00	5.08	5.38	102	108	79.0-120			5.74	20
1,4-Dichlorobenzene	5.00	4.93	5.40	98.6	108	79.0-120			9.10	20
Dichlorodifluoromethane	5.00	5.20	5.44	104	109	51.0-149			4.51	20
1,1-Dichloroethane	5.00	5.16	5.09	103	102	70.0-126			1.37	20
1,2-Dichloroethane	5.00	5.26	5.36	105	107	70.0-128			1.88	20
1,1-Dichloroethene	5.00	4.85	4.92	97.0	98.4	71.0-124			1.43	20
cis-1,2-Dichloroethene	5.00	4.96	4.78	99.2	95.6	73.0-120			3.70	20
trans-1,2-Dichloroethene	5.00	5.25	5.07	105	101	73.0-120			3.49	20
1,2-Dichloropropane	5.00	5.13	5.20	103	104	77.0-125			1.36	20
1,1-Dichloropropene	5.00	5.22	5.48	104	110	74.0-126			4.86	20
1,3-Dichloropropane	5.00	5.31	5.61	106	112	80.0-120			5.49	20
cis-1,3-Dichloropropene	5.00	4.86	5.08	97.2	102	80.0-123			4.43	20
trans-1,3-Dichloropropene	5.00	4.85	5.24	97.0	105	78.0-124			7.73	20
trans-1,4-Dichloro-2-butene	5.00	4.11	4.48	82.2	89.6	33.0-144			8.61	20
2,2-Dichloropropane	5.00	5.14	4.94	103	98.8	58.0-130			3.97	20

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Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4041851-1 03/03/24 13:22 • (LCSD) R4041851-2 03/03/24 13:41

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Di-isopropyl ether	5.00	4.63	4.52	92.6	90.4	58.0-138			2.40	20
Ethylbenzene	5.00	5.02	5.34	100	107	79.0-123			6.18	20
Hexachloro-1,3-butadiene	5.00	4.34	4.59	86.8	91.8	54.0-138			5.60	20
2-Hexanone	25.0	25.8	26.5	103	106	67.0-149			2.68	20
n-Hexane	5.00	4.52	4.71	90.4	94.2	57.0-133			4.12	20
Iodomethane	25.0	26.0	24.9	104	99.6	33.0-147			4.32	26
Isopropylbenzene	5.00	5.20	5.42	104	108	76.0-127			4.14	20
p-Isopropyltoluene	5.00	5.18	5.64	104	113	76.0-125			8.50	20
2-Butanone (MEK)	25.0	24.1	22.9	96.4	91.6	44.0-160			5.11	20
Methylene Chloride	5.00	5.05	4.72	101	94.4	67.0-120			6.76	20
4-Methyl-2-pentanone (MIBK)	25.0	25.6	26.2	102	105	68.0-142			2.32	20
Methyl tert-butyl ether	5.00	4.85	4.47	97.0	89.4	68.0-125			8.15	20
Naphthalene	5.00	3.74	4.25	74.8	85.0	54.0-135			12.8	20
n-Propylbenzene	5.00	4.98	5.44	99.6	109	77.0-124			8.83	20
Styrene	5.00	4.74	4.97	94.8	99.4	73.0-130			4.74	20
1,1,1,2-Tetrachloroethane	5.00	5.09	5.25	102	105	75.0-125			3.09	20
1,1,2,2-Tetrachloroethane	5.00	5.13	5.16	103	103	65.0-130			0.583	20
1,1,2-Trichlorotrifluoroethane	5.00	5.66	5.76	113	115	69.0-132			1.75	20
Tetrachloroethene	5.00	4.89	5.64	97.8	113	72.0-132			14.2	20
Toluene	5.00	4.66	5.01	93.2	100	79.0-120			7.24	20
1,2,3-Trichlorobenzene	5.00	3.89	4.22	77.8	84.4	50.0-138			8.14	20
1,2,4-Trichlorobenzene	5.00	3.73	4.08	74.6	81.6	57.0-137			8.96	20
1,1,1-Trichloroethane	5.00	5.60	5.57	112	111	73.0-124			0.537	20
1,1,2-Trichloroethane	5.00	5.11	5.34	102	107	80.0-120			4.40	20
Trichloroethene	5.00	5.08	5.40	102	108	78.0-124			6.11	20
Trichlorofluoromethane	5.00	5.61	5.73	112	115	59.0-147			2.12	20
1,2,3-Trichloropropane	5.00	5.58	5.74	112	115	73.0-130			2.83	20
1,2,4-Trimethylbenzene	5.00	4.75	5.24	95.0	105	76.0-121			9.81	20
1,2,3-Trimethylbenzene	5.00	4.98	5.33	99.6	107	77.0-120			6.79	20
1,3,5-Trimethylbenzene	5.00	5.08	5.38	102	108	76.0-122			5.74	20
Vinyl acetate	25.0	21.8	18.4	87.2	73.6	11.0-160			16.9	20
Vinyl chloride	5.00	5.09	5.49	102	110	67.0-131			7.56	20
Xylenes, Total	15.0	15.1	15.9	101	106	79.0-123			5.16	20
(S) Toluene-d8				97.0	103	80.0-120				
(S) 4-Bromofluorobenzene				99.6	97.1	77.0-126				
(S) 1,2-Dichloroethane-d4				103	102	70.0-130				

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Method Blank (MB)

(MB) R4042101-3 03/05/24 22:53

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Naphthalene	U		0.174	2.50
Tetrachloroethene	U		0.300	0.500
1,2,4-Trimethylbenzene	U		0.322	0.500
1,2,3-Trimethylbenzene	U		0.104	0.500
Xylenes, Total	U		0.174	1.50
(S) Toluene-d8	104			80.0-120
(S) 4-Bromofluorobenzene	92.3			77.0-126
(S) 1,2-Dichloroethane-d4	98.9			70.0-130

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4042101-1 03/05/24 21:56 • (LCSD) R4042101-2 03/05/24 22:15

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Naphthalene	5.00	3.88	4.18	77.6	83.6	54.0-135			7.44	20
Tetrachloroethene	5.00	5.19	4.72	104	94.4	72.0-132			9.49	20
1,2,4-Trimethylbenzene	5.00	4.74	4.62	94.8	92.4	76.0-121			2.56	20
1,2,3-Trimethylbenzene	5.00	4.87	4.71	97.4	94.2	77.0-120			3.34	20
Xylenes, Total	15.0	15.2	14.3	101	95.3	79.0-123			6.10	20
(S) Toluene-d8				102	103	80.0-120				
(S) 4-Bromofluorobenzene				96.9	96.9	77.0-126				
(S) 1,2-Dichloroethane-d4				101	100	70.0-130				

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Method Blank (MB)

(MB) R4041976-1 03/05/24 13:49

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C9-C18 Aliphatics	U		200	600
Unadjusted C19-C36 Aliphatics	U		200	600
(S) 1-Chloro-octadecane	89.0			40.0-140

Method Blank (MB)

(MB) R4041976-4 03/05/24 14:58

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C11-C22 Aromatics	U		200	600
(S) o-Terphenyl	83.4			40.0-140
(S) 2-Fluorobiphenyl	89.4			40.0-140
(S) 2-Bromonaphthalene	94.2			40.0-140

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4041976-2 03/05/24 14:12 • (LCSD) R4041976-3 03/05/24 14:34

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C9-C18 Aliphatics	600	438	422	73.0	70.3	40.0-140			3.72	25
Unadjusted C19-C36 Aliphatics	800	741	713	92.6	89.1	40.0-140			3.85	25
(S) 1-Chloro-octadecane				102	97.4	40.0-140				

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4041976-5 03/05/24 15:22 • (LCSD) R4041976-6 03/05/24 15:45

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C11-C22 Aromatics	1700	1460	1510	85.9	88.8	40.0-140			3.37	25
(S) o-Terphenyl				89.3	87.9	40.0-140				
(S) 2-Fluorobiphenyl				92.4	90.8	40.0-140				
(S) 2-Bromonaphthalene				97.1	97.1	40.0-140				

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Method Blank (MB)

(MB) R4041148-4 03/02/24 15:44

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Acenaphthene	U		0.0886	1.00
Acenaphthylene	U		0.0921	1.00
Anthracene	U		0.0804	1.00
Benzidine	U		3.74	10.0
Benzo(a)anthracene	U		0.199	1.00
Benzo(b)fluoranthene	U		0.130	1.00
Benzo(k)fluoranthene	U		0.120	1.00
Benzo(g,h,i)perylene	U		0.121	1.00
Benzo(a)pyrene	U		0.0381	1.00
Bis(2-chlorethoxy)methane	U		0.116	10.0
Bis(2-chloroethyl)ether	U		0.137	10.0
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0
4-Bromophenyl-phenylether	U		0.0877	10.0
2-Chloronaphthalene	U		0.0648	1.00
4-Chlorophenyl-phenylether	U		0.0926	10.0
Chrysene	U		0.130	1.00
Dibenz(a,h)anthracene	U		0.0644	1.00
3,3-Dichlorobenzidine	U		0.212	10.0
2,4-Dinitrotoluene	U		0.0983	10.0
2,6-Dinitrotoluene	U		0.250	10.0
Fluoranthene	U		0.102	1.00
Fluorene	U		0.0844	1.00
Hexachlorobenzene	U		0.0755	1.00
Hexachloro-1,3-butadiene	U		0.0968	10.0
Hexachlorocyclopentadiene	U		0.0598	10.0
Hexachloroethane	U		0.127	10.0
Indeno(1,2,3-cd)pyrene	U		0.279	1.00
Isophorone	U		0.143	10.0
Naphthalene	U		0.159	1.00
Nitrobenzene	U		0.297	10.0
n-Nitrosodimethylamine	U		0.998	10.0
n-Nitrosodiphenylamine	U		2.37	10.0
n-Nitrosodi-n-propylamine	U		0.261	10.0
Phenanthrene	U		0.112	1.00
Benzylbutyl phthalate	U		0.765	3.00
Bis(2-Ethylhexyl)phthalate	2.28	U	0.895	3.00
Di-n-butyl phthalate	U		0.453	3.00
Diethyl phthalate	U		0.287	3.00
Dimethyl phthalate	U		0.260	3.00
Di-n-octyl phthalate	U		0.932	3.00

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Method Blank (MB)

(MB) R4041148-4 03/02/24 15:44

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Pyrene	U		0.107	1.00
1,2,4-Trichlorobenzene	U		0.0698	10.0
Aniline	U		1.65	10.0
1,2-Diphenylhydrazine	U	N2	0.105	10.0
Benzyl alcohol	U		0.563	10.0
4-Chloroaniline	U		0.234	10.0
4-Chloro-3-methylphenol	U		0.131	10.0
2-Chlorophenol	U		0.133	10.0
Dibenzofuran	U		0.0970	10.0
2,4-Dichlorophenol	U		0.102	10.0
2,4-Dimethylphenol	U		0.0636	10.0
4,6-Dinitro-2-methylphenol	U		1.12	10.0
2,4-Dinitrophenol	U		5.93	10.0
2-Methylnaphthalene	U		0.117	1.00
2-Methylphenol	U		0.0929	10.0
3&4-Methyl Phenol	U		0.168	10.0
2-Nitroaniline	U		0.102	10.0
3-Nitroaniline	U		0.0869	10.0
4-Nitroaniline	U		0.0910	10.0
2-Nitrophenol	U		0.117	10.0
4-Nitrophenol	U		0.143	10.0
Pentachlorophenol	U		0.313	10.0
Phenol	U		4.33	10.0
Pyridine	U		0.627	10.0
2,4,6-Trichlorophenol	U		0.100	10.0
Acetophenone	U		0.208	10.0
Diphenylamine	U		2.37	10.0
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0
2,3,4,6-Tetrachlorophenol	U		0.231	10.0
2,4,5-Trichlorophenol	U		0.109	10.0
(S) 2-Fluorophenol	25.9			10.0-120
(S) Phenol-d5	17.4			10.0-120
(S) Nitrobenzene-d5	56.5			10.0-127
(S) 2-Fluorobiphenyl	59.3			10.0-130
(S) 2,4,6-Tribromophenol	48.9			10.0-155
(S) p-Terphenyl-d14	70.2			10.0-128

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Method Blank (MB)

(MB) R4041148-4 03/02/24 15:44

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
2-Acetylaminofluorene	U		0.253	10.0
4-Aminobiphenyl	U		0.461	10.0
Chlorobenzilate	U		3.84	50.0
Diallate	U		0.524	10.0
2,6-Dichlorophenol	U		0.102	10.0
Dimethoate	U		5.05	50.0
P-(Dimethylamino) Azobenzene	U		3.69	10.0
Dimethylbenz (A) Anthracene	U		1.71	10.0
3,3-Dimethylbenzidine	U		3.39	10.0
a,a-Dimethylphenethylamine	U		3.13	50.0
1,3-Dinitrobenzene	U		0.359	10.0
Dinoseb	U		8.01	50.0
Disulfoton	U		0.267	10.0
Ethyl methanesulfonate	U		0.326	10.0
Ethyl Parathion	U		0.379	10.0
Famphur	U		3.92	20.0
Hexachloropropene	U		0.149	50.0
Hexachlorophene	U		1.44	50.0
Isodrin	U		4.11	10.0
Isosafrole	U		3.88	10.0
Kepone	U		2.66	20.0
Methapyrilene	U		10.0	50.0
3-Methylcholanthrene	U		0.164	10.0
Methyl methanesulfonate	U		3.40	50.0
Methyl parathion	U		0.213	10.0
1,4-Naphthoquinone	U		5.56	50.0
1-Naphthylamine	U		0.289	10.0
2-Naphthylamine	U		4.48	10.0
5-Nitro-o-toluidine	U		1.99	10.0
4-Nitroquinoline 1-oxide	U		2.03	10.0
n-Nitrosodiethylamine	U		3.57	10.0
n-Nitrosodi-n-butylamine	U		3.91	10.0
n-Nitrosomethylethylamine	U		3.25	10.0
n-Nitrosomorpholine	U		3.25	10.0
n-Nitrosopiperidine	U		3.72	10.0
n-Nitrosopyrrolidine	U		3.39	10.0
Pentachlorobenzene	U		4.15	10.0
Pentachloroethane	U		2.83	50.0
Pentachloronitrobenzene	U		4.15	10.0
Phenacetin	U		4.66	10.0

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Method Blank (MB)

(MB) R4041148-4 03/02/24 15:44

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
p-Phenylenediamine	U		387	6900
Phorate	U		4.86	50.0
2-Picoline	U		6.83	50.0
Pronamide	U		4.21	10.0
Safrole	U		3.68	10.0
Sulfotep	U		3.99	50.0
Thionazin	U		4.07	10.0
o-Toluidine	U		3.53	10.0
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0
1,3,5-Trinitrobenzene	U		1.32	10.0

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4041148-1 03/02/24 14:41 • (LCSD) R4041148-2 03/02/24 15:02

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acenaphthene	50.0	37.4	39.1	74.8	78.2	41.0-120			4.44	22
Acenaphthylene	50.0	39.4	41.5	78.8	83.0	43.0-120			5.19	22
Anthracene	50.0	40.6	40.5	81.2	81.0	45.0-120			0.247	20
Benzidine	100	14.7	53.5	14.7	53.5	10.0-120		J3	114	36
Benzo(a)anthracene	50.0	43.0	42.9	86.0	85.8	47.0-120			0.233	20
Benzo(b)fluoranthene	50.0	40.7	40.6	81.4	81.2	46.0-120			0.246	20
Benzo(k)fluoranthene	50.0	40.0	40.1	80.0	80.2	46.0-120			0.250	21
Benzo(g,h,i)perylene	50.0	37.6	37.4	75.2	74.8	48.0-121			0.533	20
Benzo(a)pyrene	50.0	36.1	36.0	72.2	72.0	47.0-120			0.277	20
Bis(2-chlorethoxy)methane	50.0	26.6	26.9	53.2	53.8	33.0-120			1.12	24
Bis(2-chloroethyl)ether	50.0	32.3	34.1	64.6	68.2	23.0-120			5.42	33
2,2-Oxybis(1-Chloropropane)	50.0	33.2	36.3	66.4	72.6	28.0-120			8.92	31
4-Bromophenyl-phenylether	50.0	39.0	39.2	78.0	78.4	45.0-120			0.512	20
2-Chloronaphthalene	50.0	34.5	36.5	69.0	73.0	37.0-120			5.63	25
4-Chlorophenyl-phenylether	50.0	38.7	40.5	77.4	81.0	44.0-120			4.55	20
Chrysene	50.0	38.0	37.8	76.0	75.6	48.0-120			0.528	20
Dibenz(a,h)anthracene	50.0	37.9	38.3	75.8	76.6	47.0-120			1.05	20
3,3-Dichlorobenzidine	100	90.6	100	90.6	100	44.0-120			9.86	20
2,4-Dinitrotoluene	50.0	38.2	38.3	76.4	76.6	49.0-124			0.261	20
2,6-Dinitrotoluene	50.0	36.5	37.1	73.0	74.2	46.0-120			1.63	21
Fluoranthene	50.0	42.4	41.3	84.8	82.6	51.0-120			2.63	20
Fluorene	50.0	39.6	41.5	79.2	83.0	47.0-120			4.69	20
Hexachlorobenzene	50.0	38.6	37.9	77.2	75.8	44.0-120			1.83	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4041148-1 03/02/24 14:41 • (LCSD) R4041148-2 03/02/24 15:02

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Hexachloro-1,3-butadiene	50.0	24.0	24.4	48.0	48.8	19.0-120			1.65	32
Hexachlorocyclopentadiene	50.0	19.8	21.7	39.6	43.4	15.0-120			9.16	31
Hexachloroethane	50.0	32.8	33.6	65.6	67.2	15.0-120			2.41	37
Indeno(1,2,3-cd)pyrene	50.0	38.2	38.3	76.4	76.6	49.0-122			0.261	20
Isophorone	50.0	28.5	29.2	57.0	58.4	36.0-120			2.43	23
Naphthalene	50.0	28.8	29.2	57.6	58.4	27.0-120			1.38	27
Nitrobenzene	50.0	25.8	26.3	51.6	52.6	27.0-120			1.92	29
n-Nitrosodimethylamine	50.0	16.9	19.3	33.8	38.6	10.0-120			13.3	40
n-Nitrosodiphenylamine	50.0	35.5	37.8	71.0	75.6	47.0-120			6.28	20
n-Nitrosodi-n-propylamine	50.0	35.8	38.8	71.6	77.6	31.0-120			8.04	28
Phenanthrene	50.0	39.1	38.6	78.2	77.2	46.0-120			1.29	20
Benzylbutyl phthalate	50.0	36.0	35.3	72.0	70.6	43.0-121			1.96	20
Bis(2-Ethylhexyl)phthalate	50.0	36.3	36.0	72.6	72.0	43.0-122			0.830	20
Di-n-butyl phthalate	50.0	44.2	41.2	88.4	82.4	49.0-121			7.03	20
Diethyl phthalate	50.0	40.9	40.0	81.8	80.0	48.0-122			2.22	20
Dimethyl phthalate	50.0	38.2	38.7	76.4	77.4	48.0-120			1.30	20
Di-n-octyl phthalate	50.0	34.1	35.0	68.2	70.0	42.0-125			2.60	20
Pyrene	50.0	40.5	39.7	81.0	79.4	47.0-120			2.00	20
1,2,4-Trichlorobenzene	50.0	26.8	27.2	53.6	54.4	24.0-120			1.48	29
Aniline	50.0	10.7	21.1	21.4	42.2	13.0-120		J3	65.4	31
1,2-Diphenylhydrazine	50.0	38.4	38.7	76.8	77.4	41.0-126	N2	N2	0.778	20
Benzyl alcohol	50.0	22.0	26.3	44.0	52.6	25.0-120			17.8	26
4-Chloroaniline	50.0	15.7	22.9	31.4	45.8	25.0-120		J3	37.3	25
4-Chloro-3-methylphenol	50.0	20.0	26.5	40.0	53.0	40.0-120		J3	28.0	21
2-Chlorophenol	50.0	22.7	30.8	45.4	61.6	25.0-120			30.3	35
Dibenzofuran	50.0	37.6	39.3	75.2	78.6	44.0-120			4.42	22
2,4-Dichlorophenol	50.0	23.3	29.6	46.6	59.2	36.0-120			23.8	26
2,4-Dimethylphenol	50.0	18.9	25.7	37.8	51.4	33.0-120		J3	30.5	26
4,6-Dinitro-2-methylphenol	50.0	35.2	35.4	70.4	70.8	38.0-138			0.567	25
2,4-Dinitrophenol	50.0	26.0	26.7	52.0	53.4	10.0-120			2.66	39
2-Methylnaphthalene	50.0	30.2	30.9	60.4	61.8	33.0-120			2.29	25
2-Methylphenol	50.0	20.8	28.7	41.6	57.4	28.0-120		J3	31.9	29
3&4-Methyl Phenol	50.0	23.3	31.8	46.6	63.6	31.0-120		J3	30.9	30
2-Nitroaniline	50.0	35.7	38.2	71.4	76.4	43.0-120			6.77	22
3-Nitroaniline	50.0	31.1	36.0	62.2	72.0	38.0-120			14.6	21
4-Nitroaniline	50.0	35.9	38.8	71.8	77.6	18.0-160			7.76	21
2-Nitrophenol	50.0	24.8	28.4	49.6	56.8	31.0-120			13.5	29
4-Nitrophenol	50.0	8.95	9.22	17.9	18.4	10.0-120			2.97	33
Pentachlorophenol	50.0	23.7	20.4	47.4	40.8	23.0-120			15.0	25
Phenol	50.0	9.23	11.1	18.5	22.2	10.0-120			18.4	36

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R4041148-1 03/02/24 14:41 • (LCSD) R4041148-2 03/02/24 15:02

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Pyridine	50.0	5.80	11.6	11.6	23.2	10.0-120		J3	66.7	38
2,4,6-Trichlorophenol	50.0	32.7	37.3	65.4	74.6	42.0-120			13.1	23
Acetophenone	50.0	32.1	34.3	64.2	68.6	29.0-120			6.63	28
Diphenylamine	50.0	35.5	37.8	71.0	75.6	35.0-120			6.28	20
1,2,4,5-Tetrachlorobenzene	50.0	32.3	32.9	64.6	65.8	31.0-121			1.84	27
2,3,4,6-Tetrachlorophenol	50.0	36.3	38.2	72.6	76.4	42.0-132			5.10	22
2,4,5-Trichlorophenol	50.0	33.5	37.9	67.0	75.8	44.0-120			12.3	22
(S) 2-Fluorophenol				26.1	34.3	10.0-120				
(S) Phenol-d5				17.4	21.8	10.0-120				
(S) Nitrobenzene-d5				47.8	49.7	10.0-127				
(S) 2-Fluorobiphenyl				61.3	64.1	10.0-130				
(S) 2,4,6-Tribromophenol				65.0	68.0	10.0-155				
(S) p-Terphenyl-d14				65.7	63.8	10.0-128				

Laboratory Control Sample (LCS)

(LCS) R4041148-3 03/02/24 15:23

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
2-Acetylaminofluorene	50.0	45.2	90.4	32.0-120	
4-Aminobiphenyl	50.0	39.6	79.2	20.0-120	
Chlorobenzilate	50.0	37.2	74.4	29.0-128	
Diallate	50.0	33.7	67.4	30.0-120	
2,6-Dichlorophenol	50.0	26.7	53.4	19.0-136	
Dimethoate	50.0	25.6	51.2	11.0-134	
P-(Dimethylamino) Azobenzene	50.0	40.7	81.4	27.0-120	
Dimethylbenz (A) Anthracene	50.0	41.0	82.0	14.0-124	
3,3-Dimethylbenzidine	50.0	16.0	32.0	13.0-120	
a,a-Dimethylphenethylamine	50.0	0.314	0.628	10.0-129	J4
1,3-Dinitrobenzene	50.0	36.4	72.8	34.0-120	
Diphenylamine	50.0	46.0	92.0	35.0-120	
Dinoseb	50.0	36.1	72.2	39.0-120	
Disulfoton	50.0	36.8	73.6	32.0-120	
Ethyl methanesulfonate	50.0	28.8	57.6	10.0-120	
Ethyl Parathion	50.0	33.7	67.4	46.0-130	
Famphur	50.0	27.7	55.4	32.0-120	
Hexachloropropene	50.0	19.9	39.8	10.0-120	
Hexachlorophene	100	21.8	21.8	10.0-120	
Isodrin	50.0	39.3	78.6	22.0-157	

Cp

Tc

Ss

Cn

Sr

Qc

Gl

Al

Sc

Laboratory Control Sample (LCS)

(LCS) R4041148-3 03/02/24 15:23

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Isosafrole	50.0	33.6	67.2	25.0-133	
Kepone	50.0	17.3	34.6	10.0-120	
Methapyrilene	50.0	11.0	22.0	10.0-120	
3-Methylcholanthrene	50.0	38.5	77.0	30.0-160	
Methyl methanesulfonate	50.0	19.9	39.8	10.0-120	
Methyl parathion	50.0	34.2	68.4	42.0-120	
1,4-Naphthoquinone	50.0	4.89	9.78	50.0-150	J4
1-Naphthylamine	50.0	35.3	70.6	19.0-120	
2-Naphthylamine	50.0	22.9	45.8	10.0-120	
5-Nitro-o-toluidine	50.0	44.6	89.2	34.0-120	
4-Nitroquinoline 1-oxide	50.0	26.0	52.0	10.0-159	
n-Nitrosodiethylamine	50.0	36.2	72.4	10.0-120	
n-Nitrosodi-n-butylamine	50.0	38.6	77.2	13.0-143	
n-Nitrosomethylethylamine	50.0	29.7	59.4	10.0-120	
n-Nitrosomorpholine	50.0	30.6	61.2	10.0-120	
n-Nitrosopiperidine	50.0	32.3	64.6	10.0-160	
n-Nitrosopyrrolidine	50.0	34.6	69.2	10.0-124	
Pentachlorobenzene	50.0	33.9	67.8	25.0-120	
Pentachloroethane	50.0	29.1	58.2	10.0-120	
Pentachloronitrobenzene	50.0	35.9	71.8	34.0-132	
Phenacetin	50.0	35.1	70.2	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	59.4	119	13.0-160	
2-Picoline	50.0	9.89	19.8	10.0-120	
Pronamide	50.0	39.0	78.0	38.0-130	
Safrole	50.0	27.4	54.8	21.0-120	
Sulfotep	50.0	41.9	83.8	52.0-120	
Thionazin	50.0	38.2	76.4	38.0-121	
o-Toluidine	50.0	33.1	66.2	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	25.7	51.4	11.0-135	
1,3,5-Trinitrobenzene	50.0	47.3	94.6	37.0-147	

1
Cp

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Qc

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Al

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Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

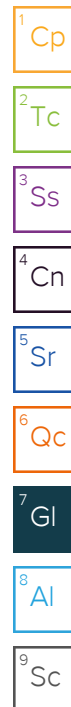
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location. Results relate to the accuracy of this information provided, and as the samples are received.

Abbreviations and Definitions

MDL	Method Detection Limit.
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Qualifier	This column provides a letter and/or number designation that corresponds to additional information concerning the result reported. If a Qualifier is present, a definition per Qualifier is provided within the Glossary and Definitions page and potentially a discussion of possible implications of the Qualifier in the Case Narrative if applicable.
Result	The actual analytical final result (corrected for any sample specific characteristics) reported for your sample. If there was no measurable result returned for a specific analyte, the result in this column may state "ND" (Not Detected) or "BDL" (Below Detectable Levels). The information in the results column should always be accompanied by either an MDL (Method Detection Limit) or RDL (Reporting Detection Limit) that defines the lowest value that the laboratory could detect or report for this analyte.
Uncertainty (Radiochemistry)	Confidence level of 2 sigma.
Case Narrative (Cn)	A brief discussion about the included sample results, including a discussion of any non-conformances to protocol observed either at sample receipt by the laboratory from the field or during the analytical process. If present, there will be a section in the Case Narrative to discuss the meaning of any data qualifiers used in the report.
Quality Control Summary (Qc)	This section of the report includes the results of the laboratory quality control analyses required by procedure or analytical methods to assist in evaluating the validity of the results reported for your samples. These analyses are not being performed on your samples typically, but on laboratory generated material.
Sample Chain of Custody (Sc)	This is the document created in the field when your samples were initially collected. This is used to verify the time and date of collection, the person collecting the samples, and the analyses that the laboratory is requested to perform. This chain of custody also documents all persons (excluding commercial shippers) that have had control or possession of the samples from the time of collection until delivery to the laboratory for analysis.
Sample Results (Sr)	This section of your report will provide the results of all testing performed on your samples. These results are provided by sample ID and are separated by the analyses performed on each sample. The header line of each analysis section for each sample will provide the name and method number for the analysis reported.
Sample Summary (Ss)	This section of the Analytical Report defines the specific analyses performed for each sample ID, including the dates and times of preparation and/or analysis.

Qualifier Description

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
N2	Analyte reported using a calibration and validation based on Azobenzene (CAS 103-33-3). 1,2-Diphenylhydrazine decomposes into Azobenzene during the analysis.



ACCREDITATIONS & LOCATIONS

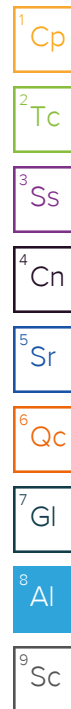
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

Alabama	40660	Nebraska	NE-OS-15-05
Alaska	17-026	Nevada	TN000032021-1
Arizona	AZ0612	New Hampshire	2975
Arkansas	88-0469	New Jersey--NELAP	TN002
California	2932	New Mexico ¹	TN00003
Colorado	TN00003	New York	11742
Connecticut	PH-0197	North Carolina	Env375
Florida	E87487	North Carolina ¹	DW21704
Georgia	NELAP	North Carolina ³	41
Georgia ¹	923	North Dakota	R-140
Idaho	TN00003	Ohio--VAP	CL0069
Illinois	200008	Oklahoma	9915
Indiana	C-TN-01	Oregon	TN200002
Iowa	364	Pennsylvania	68-02979
Kansas	E-10277	Rhode Island	LA000356
Kentucky ^{1 6}	KY90010	South Carolina	84004002
Kentucky ²	16	South Dakota	n/a
Louisiana	AI30792	Tennessee ^{1 4}	2006
Louisiana	LA018	Texas	T104704245-20-18
Maine	TN00003	Texas ⁵	LAB0152
Maryland	324	Utah	TN000032021-11
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	110033
Minnesota	047-999-395	Washington	C847
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	998093910
Montana	CERT0086	Wyoming	A2LA
A2LA -- ISO 17025	1461.01	AIHA-LAP,LLC EMLAP	100789
A2LA -- ISO 17025 ⁵	1461.02	DOD	1461.01
Canada	1461.01	USDA	P330-15-00234
EPA--Crypto	TN00003		

¹ Drinking Water ² Underground Storage Tanks ³ Aquatic Toxicity ⁴ Chemical/Microbiological ⁵ Mold ⁶ Wastewater n/a Accreditation not applicable

* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

* Accreditation is only applicable to the test methods specified on each scope of accreditation held by Pace Analytical.



Ramboll US Consulting, Inc. - Denver

1999 Broadway Suite 2225
Denver, CO 80202

Billing information:

Troy Wyss
PO Box 4229
Indianapolis, IN 46242

Report to:
Abby Small

Email To:
asmall@ramboll.com; rdeshpande@ramboll.com

Project Description:
Calumet Refinery AOC-16

City/State
Collected:

Please Circle:
PT MT CT ET

Phone: 303-382-5474

Client Project #
1690029619_CONV

Lab Project #
ENVIRONCO-CALUMET GW

Collected by (print):

Kyle A. Groves

Site/Facility ID #

P.O. #

Collected by (signature):

Kyle A. Groves

Rush? (Lab MUST Be Notified)

Same Day Five Day
Next Day 5 Day (Rad Only)
Two Day 10 Day (Rad Only)
Three Day

Quote #

Date Results Needed

Immediately

Packed on Ice N Y ☒

No.
of
Cntrs

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

CMR-MW-41S-240228

Grab

GW

240228

1245

10

CMR-MW-10S-240228

Grab

GW

240228

1525

10

CMR-MW-106-240228

Grab

GW

240228

1410

10

* Matrix:

SS - Soil AIR - Air F - Filter
GW - Groundwater B - Bioassay
WW - WasteWater
DW - Drinking Water
OT - Other

Remarks:

Samples returned via:

UPS FedEx Courier

Tracking #

Relinquished by (Signature)

Kyle A. Groves

Date:

02/29/24

Time:

10:00

Received by (Signature)

Relinquished by (Signature)

Date:

Time:

Received by (Signature)

Relinquished by (Signature)

Date:

Time:

Received for lab by (Signature)

Christopher J. Gallin

Trip Blank Received: Yes/No

2 HCL/MeOH
TBR

Temp: 22.14 °C Bottles Received:

30

Date: 3/1/24 Time: 0900

Sample Receipt Checklist

COC Seal Present/Intact: NP ☒ Y ☐ N
COC Signed/Accurate: ☒ Y ☐ N
Bottles arrive intact: ☒ Y ☐ N
Correct bottles used: ☒ Y ☐ N
Sufficient volume sent: ☒ Y ☐ N
If Applicable
VOA Zero Headspace: ☒ Y ☐ N
Preservation Correct/Checked: ☒ Y ☐ N
RAD Screen <0.5 mR/hr: ☒ Y ☐ N

If preservation required by Login: Date/Time

Hold:

Condition:
NCF / OK

Analysis / Container / Preservative

Chain of Custody Page 1 of 1



MT JULIET, TN

12065 Lebanon Rd Mount Juliet, TN 37122
Submitting a sample via this chain of custody
constitutes acknowledgment and acceptance of the
Pace Terms and Conditions found at:
<https://info.pacelabs.com/hubfs/pas-standard-terms.pdf>

SDG #

Table #

Acctnum: ENVIRONCO

Template: T247450

Prelogin: P1056560

PM: 841 - Kelly Mercer

PB: 2.21.24 BK

Shipped Via: FedEx Ground

Remarks

Sample # (lab only)

01

02

03

[illegible]

Date _____

APPENDIX B

HISTORICAL ANALYTICAL RESULTS AND CONTAMINANT MASS REMOVAL - VAPOR

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-211015		CMR-SP301-211016		CMR-SP301-211017	
		10/15/2021		10/16/2021		10/17/2021	
		41		41		41	
		26		24		24	
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	18,100 U	0.00	18,600 U	0.00	19,600 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	22,800 U	0.00	23,400 U	0.00	24,700 U	0.00
1,1,2-Trichloroethane	79-00-5	9,040 U	0.00	9,290 U	0.00	9,800 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	25,400 U	0.00	26,100 U	0.00	27,600 U	0.00
1,1-Dichloroethane	75-34-3	13,400 U	0.00	13,800 U	0.00	14,500 U	0.00
1,1-Dichloroethene	75-35-4	13,100 U	0.00	13,500 U	0.00	14,200 U	0.00
1,2,4-Trichlorobenzene	120-82-1	123,000 U	0.00	126,000 U	0.00	133,000 U	0.00
1,2,4-Trimethylbenzene	95-63-6	340,000	1.36	471,000	1.73	562,000	2.07
1,2-Dibromoethane (EDB)	106-93-4	12,700 U	0.00	13,100 U	0.00	13,800 U	0.00
1,2-Dichlorobenzene	95-50-1	49,800 U	0.00	51,200 U	0.00	54,100 U	0.00
1,2-Dichloroethane	107-06-2	13,400 U	0.00	13,800 U	0.00	14,500 U	0.00
1,2-Dichloropropane	78-87-5	15,300 U	0.00	15,700 U	0.00	16,600 U	0.00
1,3,5-Trimethylbenzene	108-67-8	179,000	0.71	225,000	0.83	272,000	1.00
1,3-Butadiene	106-99-0	7,330 U	0.00	7,530 U	0.00	7,950 U	0.00
1,3-Dichlorobenzene	541-73-1	49,800 U	0.00	51,200 U	0.00	54,100 U	0.00
1,4-Dichlorobenzene	106-46-7	49,800 U	0.00	51,200 U	0.00	54,100 U	0.00
2-Butanone (MEK)	78-93-3	48,800 U	0.00	50,200 U	0.00	53,000 U	0.00
2-Hexanone	591-78-6	67,700 U	0.00	69,600 U	0.00	73,500 U	0.00
2-Propanol	67-63-0	40,700 U	0.00	41,900 U	0.00	44,200 U	0.00
4-Ethyltoluene	622-96-8	171,000	0.68	222,000	0.82	257,000	0.95
4-Methyl-2-pentanone (MIBK)	108-10-1	88,300	0.35	81,400	0.30	84,900	0.31
Acetone	67-64-1	98,300 U	0.00	101,000 U	0.00	107,000 U	0.00
Benzene	71-43-2	2,850,000 E	11.36	2,430,000 E	8.94	2,640,000 E	9.71
Benzyl chloride	100-44-7	42,800 U	0.00	44,000 U	0.00	46,500 U	0.00
Bromodichloromethane	75-27-4	22,100 U	0.00	22,800 U	0.00	24,000 U	0.00
Bromoform	75-25-2	85,500 U	0.00	87,900 U	0.00	92,700 U	0.00
Bromomethane	74-83-9	12,800 U	0.00	13,200 U	0.00	13,900 U	0.00
Carbon disulfide	75-15-0	10,300 U	0.00	10,600 U	0.00	11,200 U	0.00
Carbon tetrachloride	56-23-5	20,800 U	0.00	21,400 U	0.00	22,600 U	0.00
Chlorobenzene	108-90-7	15,200 U	0.00	15,700 U	0.00	16,500 U	0.00
Chloroethane	75-00-3	8,730 U	0.00	8,970 U	0.00	9,470 U	0.00
Chloroform	67-66-3	8,080 U	0.00	8,300 U	0.00	8,760 U	0.00
Chloromethane	74-87-3	6,840 U	0.00	7,030 U	0.00	7,420 U	0.00
cis-1,2-Dichloroethene	156-59-2	13,100 U	0.00	13,500 U	0.00	14,200 U	0.00
cis-1,3-Dichloropropene	10061-01-5	37,600 U	0.00	38,700 U	0.00	40,800 U	0.00
Cyclohexane	110-82-7	28,500 U	0.00	29,300 U	0.00	30,900 U	0.00
Dibromochloromethane	124-48-1	28,200 U	0.00	29,000 U	0.00	30,600 U	0.00
Dichlorodifluoromethane	75-71-8	16,400 U	0.00	16,900 U	0.00	17,800 U	0.00
Dichlorotetrafluoroethane	76-14-2	23,100 U	0.00	23,800 U	0.00	25,100 U	0.00
Ethanol	64-17-5	31,300 U	0.00	32,100 U	0.00	33,900 U	0.00
Ethyl acetate	141-78-6	11,900 U	0.00	12,300 U	0.00	12,900 U	0.00
Ethylbenzene	100-41-4	1,200,000	4.78	1,360,000	5.00	1,380,000	5.08
Hexachloro-1,3-butadiene	87-68-3	88,200 U	0.00	90,700 U	0.00	95,700 U	0.00
m&p-Xylene	179601-23-1	4,030,000	16.06	5,010,000	18.43	5,310,000	19.54
Methylene Chloride	75-09-2	57,500 U	0.00	59,100 U	0.00	62,400 U	0.00
Methyl-tert-butyl ether	1634-04-4	59,600 U	0.00	61,300 U	0.00	64,700 U	0.00
Naphthalene	91-20-3	43,300 U	0.00	44,500 U	0.00	47,000 U	0.00
n-Heptane	142-82-5	3,330,000 E	13.27	3,060,000 E	11.26	3,340,000 E	12.29
n-Hexane	110-54-3	7,840,000 E	31.25	7,320,000 E	26.93	7,900,000 E	29.07
o-Xylene	95-47-6	916,000	3.65	1,210,000	4.45	1,320,000	4.86
Propylene	115-07-1	14,200 U	0.00	14,600 U	0.00	15,500 U	0.00
Styrene	100-42-5	14,100 U	0.00	14,500 U	0.00	15,300 U	0.00
Tetrachloroethene	127-18-4	11,200 U	0.00	11,500 U	0.00	12,200 U	0.00
Tetrahydrofuran	109-99-9	9,770 U	0.00	10,000 U	0.00	10,600 U	0.00
Toluene	108-88-3	1,490,000	5.94	1,860,000	6.84	1,870,000	6.88
trans-1,2-Dichloroethene	156-60-5	13,100 U	0.00	13,500 U	0.00	14,200 U	0.00
trans-1,3-Dichloropropene	10061-02-6	37,600 U	0.00	38,700 U	0.00	40,800 U	0.00
Trichloroethene	79-01-6	17,800 U	0.00	18,300 U	0.00	19,300 U	0.00
Trichlorofluoromethane	75-69-4	18,600 U	0.00	19,100 U	0.00	20,100 U	0.00
Vinyl acetate	108-05-4	11,700 U	0.00	12,000 U	0.00	12,600 U	0.00
Vinyl chloride	75-01-4	4,230 U	0.00	4,350 U	0.00	4,590 U	0.00
Total VOCs	--	--	89.42	--	85.54	--	91.74
Period Total VOC Mass Removed (lbs)		89.4		85.5		91.7	
Cumulative Total VOC Mass Removed (lbs)		89		175		267	

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-2		CMR-SP301-211201		CMR-SP301-211208	
		11/19/2021		12/1/2021		12/8/2021	
		41		56		65	
		--		283		144	
VOCs	CAS No.	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	158 R	0.00	9,290 U	0.00	9,800 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	199 R	0.00	11,700 U	0.00	12,400 U	0.00
1,1,2-Trichloroethane	79-00-5	79 R	0.00	4,650 U	0.00	4,900 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	222 R	0.00	13,100 U	0.00	13,800 U	0.00
1,1-Dichloroethane	75-34-3	117 R	0.00	6,890 U	0.00	7,270 U	0.00
1,1-Dichloroethene	75-35-4	115 R	0.00	6,750 U	0.00	7,120 U	0.00
1,2,4-Trichlorobenzene	120-82-1	1,070 R	0.00	63,100 U	0.00	66,600 U	0.00
1,2,4-Trimethylbenzene	95-63-6	7,720 R	0.00	49,600	2.95	50,300	1.76
1,2-Dibromoethane (EDB)	106-93-4	111 R	0.00	6,540 U	0.00	6,900 U	0.00
1,2-Dichlorobenzene	95-50-1	435 R	0.00	25,600 U	0.00	27,000 U	0.00
1,2-Dichloroethane	107-06-2	117 R	0.00	6,890 U	0.00	7,270 U	0.00
1,2-Dichloropropane	78-87-5	134 R	0.00	7,860 U	0.00	8,290 U	0.00
1,3,5-Trimethylbenzene	108-67-8	3,310 R	0.00	27,100	1.61	27,900	0.98
1,3-Butadiene	106-99-0	64 R	0.00	3,770 U	0.00	3,970 U	0.00
1,3-Dichlorobenzene	541-73-1	435 R	0.00	25,600 U	0.00	27,000 U	0.00
1,4-Dichlorobenzene	106-46-7	435 R	0.00	25,600 U	0.00	27,000 U	0.00
2-Butanone (MEK)	78-93-3	427 R	0.00	25,100 U	0.00	26,500 U	0.00
2-Hexanone	591-78-6	592 R	0.00	34,800 U	0.00	36,700 U	0.00
2-Propanol	67-63-0	356 R	0.00	20,900 U	0.00	22,100 U	0.00
4-Ethyltoluene	622-96-8	1,180 R	0.00	26,600	1.58	26,700	0.93
4-Methyl-2-pentanone (MIBK)	108-10-1	592 R	0.00	34,800 U	0.00	36,700 U	0.00
Acetone	67-64-1	859 R	0.00	50,600 U	0.00	53,300 U	0.00
Benzene	71-43-2	51 R	0.00	135,000	8.04	94,100	3.29
Benzyl chloride	100-44-7	374 R	0.00	22,000 U	0.00	23,200 U	0.00
Bromodichloromethane	75-27-4	193 R	0.00	11,400 U	0.00	12,000 U	0.00
Bromoform	75-25-2	747 R	0.00	43,900 U	0.00	46,400 U	0.00
Bromomethane	74-83-9	112 R	0.00	6,600 U	0.00	6,970 U	0.00
Carbon disulfide	75-15-0	90 R	0.00	5,300 U	0.00	5,590 U	0.00
Carbon tetrachloride	56-23-5	182 R	0.00	10,700 U	0.00	11,300 U	0.00
Chlorobenzene	108-90-7	133 R	0.00	7,840 U	0.00	8,270 U	0.00
Chloroethane	75-00-3	76 R	0.00	11,200 U	0.00	11,800 U	0.00
Chloroform	67-66-3	71 R	0.00	4,150 U	0.00	4,380 U	0.00
Chloromethane	74-87-3	60 R	0.00	3,520 U	0.00	3,710 U	0.00
cis-1,2-Dichloroethene	156-59-2	115 R	0.00	6,750 U	0.00	7,120 U	0.00
cis-1,3-Dichloropropene	10061-01-5	328 R	0.00	19,300 U	0.00	20,400 U	0.00
Cyclohexane	110-82-7	3,940 R	0.00	945,000	56.27	687,000	24.03
Dibromochloromethane	124-48-1	246 R	0.00	14,500 U	0.00	15,300 U	0.00
Dichlorodifluoromethane	75-71-8	144 R	0.00	8,450 U	0.00	8,920 U	0.00
Dichlorotetrafluoroethane	76-14-2	202 R	0.00	11,900 U	0.00	12,500 U	0.00
Ethanol	64-17-5	273 R	0.00	16,100 U	0.00	17,000 U	0.00
Ethyl acetate	141-78-6	104 R	0.00	6,140 U	0.00	6,470 U	0.00
Ethylbenzene	100-41-4	1,520 R	0.00	104,000	6.19	80,800	2.83
Hexachloro-1,3-butadiene	87-68-3	771 R	0.00	45,400 U	0.00	47,900 U	0.00
m&p-Xylene	179601-23-1	7,210 R	0.00	475,000	28.28	401,000	14.02
Methylene Chloride	75-09-2	502 R	0.00	29,600 U	0.00	31,200 U	0.00
Methyl-tert-butyl ether	1634-04-4	520 R	0.00	30,600 U	0.00	32,300 U	0.00
Naphthalene	91-20-3	378 R	0.00	44,600 U	0.00	47,100 U	0.00
n-Heptane	142-82-5	847 R	0.00	280,000	16.67	197,000	6.89
n-Hexane	110-54-3	274 R	0.00	507,000	30.19	377,000	13.19
o-Xylene	95-47-6	4,140 R	0.00	113,000	6.73	98,400	3.44
Propylene	115-07-1	124 R	0.00	7,320 U	0.00	7,730 U	0.00
Styrene	100-42-5	308 R	0.00	7,250 U	0.00	7,650 U	0.00
Tetrachloroethene	127-18-4	98 R	0.00	5,770 U	0.00	6,090 U	0.00
Tetrahydrofuran	109-99-9	85 R	0.00	5,020 U	0.00	5,300 U	0.00
Toluene	108-88-3	352 R	0.00	117,000	6.97	80,500	2.82
trans-1,2-Dichloroethene	156-60-5	115 R	0.00	6,750 U	0.00	7,120 U	0.00
trans-1,3-Dichloropropene	10061-02-6	328 R	0.00	19,300 U	0.00	20,400 U	0.00
Trichloroethene	79-01-6	78 R	0.00	4,570 U	0.00	4,820 U	0.00
Trichlorofluoromethane	75-69-4	162 R	0.00	9,540 U	0.00	10,100 U	0.00
Vinyl acetate	108-05-4	102 R	0.00	5,990 U	0.00	6,320 U	0.00
Vinyl chloride	75-01-4	37 R	0.00	4,350 U	0.00	4,590 U	0.00
Total VOCs	--	--	0.00	--	165.48	--	74.17
Period Total VOC Mass Removed (lbs)		0.0		165.5		74.2	
Cumulative Total VOC Mass Removed (lbs)		267		432		506	

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-211216		CMR-SP301-220216		CMR-SP301-110309	
		12/31/2021		2/16/2022		3/9/2022	
		61		66		70	
		334		--		949	
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	46,400 U	0.00	3 R	0.00	12,300 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	23,400 U	0.00	4 R	0.00	15,500 U	0.00
1,1,2-Trichloroethane	79-00-5	46,400 U	0.00	2 R	0.00	6,160 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	26,100 U	0.00	4 R	0.00	17,300 U	0.00
1,1-Dichloroethane	75-34-3	13,800 U	0.00	2 R	0.00	9,130 U	0.00
1,1-Dichloroethene	75-35-4	13,500 U	0.00	2 R	0.00	8,940 U	0.00
1,2,4-Trichlorobenzene	120-82-1	253,000 U	0.00	41 R	0.00	167,000 U	0.00
1,2,4-Trimethylbenzene	95-63-6	121,000	9.22	378 R	0.00	50,700	12.63
1,2-Dibromoethane (EDB)	106-93-4	26,200 U	0.00	2 R	0.00	8,670 U	0.00
1,2-Dichlorobenzene	95-50-1	51,200 U	0.00	8 R	0.00	34,000 U	0.00
1,2-Dichloroethane	107-06-2	13,800 U	0.00	2 R	0.00	9,130 U	0.00
1,2-Dichloropropane	78-87-5	39,300 U	0.00	3 R	0.00	10,400 U	0.00
1,3,5-Trimethylbenzene	108-67-8	75,900	5.79	218 R	0.00	43,300	10.79
1,3-Butadiene	106-99-0	7,530 U	0.00	1 R	0.00	4,990 U	0.00
1,3-Dichlorobenzene	541-73-1	51,200 U	0.00	8 R	0.00	34,000 U	0.00
1,4-Dichlorobenzene	106-46-7	102,000 U	0.00	8 R	0.00	34,000 U	0.00
2-Butanone (MEK)	78-93-3	50,200 U	0.00	16 R	0.00	33,300 U	0.00
2-Hexanone	591-78-6	69,600 U	0.00	11 R	0.00	46,200 U	0.00
2-Propanol	67-63-0	41,900 U	0.00	7 R	0.00	27,700 U	0.00
4-Ethyltoluene	622-96-8	51,900	3.96	41 R	0.00	32,200	8.02
4-Methyl-2-pentanone (MIBK)	108-10-1	69,600 U	0.00	11 R	0.00	46,200 U	0.00
Acetone	67-64-1	101,000 U	0.00	37 R	0.00	67,000 U	0.00
Benzene	71-43-2	150,000	11.44	4 R	0.00	195,000	48.57
Benzyl chloride	100-44-7	88,100 U	0.00	7 R	0.00	29,200 U	0.00
Bromodichloromethane	75-27-4	22,800 U	0.00	4 R	0.00	15,100 U	0.00
Bromoform	75-25-2	176,000 U	0.00	14 R	0.00	58,300 U	0.00
Bromomethane	74-83-9	13,200 U	0.00	2 R	0.00	8,760 U	0.00
Carbon disulfide	75-15-0	10,600 U	0.00	2 R	0.00	7,020 U	0.00
Carbon tetrachloride	56-23-5	21,400 U	0.00	4 R	0.00	14,200 U	0.00
Chlorobenzene	108-90-7	15,700 U	0.00	3 R	0.00	10,400 U	0.00
Chloroethane	75-00-3	8,970 U	0.00	2 R	0.00	5,950 U	0.00
Chloroform	67-66-3	8,300 U	0.00	1 R	0.00	5,500 U	0.00
Chloromethane	74-87-3	17,600 U	0.00	1 R	0.00	4,660 U	0.00
cis-1,2-Dichloroethene	156-59-2	13,500 U	0.00	2 R	0.00	8,940 U	0.00
cis-1,3-Dichloropropene	10061-01-5	38,700 U	0.00	6 R	0.00	25,600 U	0.00
Cyclohexane	110-82-7	29,300 U	0.00	5 R	0.00	19,400 U	0.00
Dibromochloromethane	124-48-1	29,000 U	0.00	5 R	0.00	19,200 U	0.00
Dichlorodifluoromethane	75-71-8	16,900 U	0.00	3 R	0.00	11,200 U	0.00
Dichlorotetrafluoroethane	76-14-2	23,800 U	0.00	4 R	0.00	15,800 U	0.00
Ethanol	64-17-5	32,100 U	0.00	8 R	0.00	21,300 U	0.00
Ethyl acetate	141-78-6	12,300 U	0.00	2 R	0.00	8,130 U	0.00
Ethylbenzene	100-41-4	151,000	11.51	29 R	0.00	256,000	63.76
Hexachloro-1,3-butadiene	87-68-3	90,700 U	0.00	15 R	0.00	60,100 U	0.00
m&p-Xylene	179601-23-1	783,000	59.70	186 R	0.00	1,010,000	251.57
Methylene Chloride	75-09-2	59,100 U	0.00	10 R	0.00	39,200 U	0.00
Methyl-tert-butyl ether	1634-04-4	61,300 U	0.00	10 R	0.00	40,600 U	0.00
Naphthalene	91-20-3	44,500 U	0.00	15 R	0.00	29,500 U	0.00
n-Heptane	142-82-5	336,000	25.62	19 R	0.00	441,000	109.84
n-Hexane	110-54-3	575,000	43.84	12 R	0.00	819,000	204.00
o-Xylene	95-47-6	236,000	17.99	148 R	0.00	263,000	65.51
Propylene	115-07-1	14,600 U	0.00	2 R	0.00	9,710 U	0.00
Styrene	100-42-5	14,500 U	0.00	6 R	0.00	9,610 U	0.00
Tetrachloroethene	127-18-4	11,500 U	0.00	2 R	0.00	7,650 U	0.00
Tetrahydrofuran	109-99-9	10,000 U	0.00	132 R	0.00	6,660 U	0.00
Toluene	108-88-3	140,000	10.67	13 R	0.00	210,000	52.31
trans-1,2-Dichloroethene	156-60-5	33,700 U	0.00	2 R	0.00	8,940 U	0.00
trans-1,3-Dichloropropene	10061-02-6	38,700 U	0.00	6 R	0.00	25,600 U	0.00
Trichloroethene	79-01-6	18,300 U	0.00	2 R	0.00	6,060 U	0.00
Trichlorofluoromethane	75-69-4	19,100 U	0.00	3 R	0.00	12,700 U	0.00
Vinyl acetate	108-05-4	12,000 U	0.00	2 R	0.00	7,950 U	0.00
Vinyl chloride	75-01-4	21,700 U	0.00	1 R	0.00	2,890 U	0.00
Total VOCs	--	--	199.73	--	0.00	--	826.99
Period Total VOC Mass Removed (lbs)		199.7		0.0		827.0	
Cumulative Total VOC Mass Removed (lbs)		706		706		1,533	

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-2022411		CMR-SP301-220511		CMR-SP301-220617	
		4/11/2022		5/11/2022		6/17/2022	
		102		128		172	
		632		742		517	
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	1,680 U	0.00	6,520 U	0.00	13,000 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	2,120 U	0.00	8,230 U	0.00	16,500 U	0.00
1,1,2-Trichloroethane	79-00-5	842 U	0.00	3,260 U	0.00	6,520 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	2,370 U	0.00	9,170 U	0.00	18,300 U	0.00
1,1-Dichloroethane	75-34-3	1,250 U	0.00	4,840 U	0.00	9,670 U	0.00
1,1-Dichloroethene	75-35-4	1,220 U	0.00	4,740 U	0.00	9,470 U	0.00
1,2,4-Trichlorobenzene	120-82-1	11,400 U	0.00	44,300 U	0.00	88,600 U	0.00
1,2,4-Trimethylbenzene	95-63-6	2,310	0.56	9,770	3.48	68,600	22.79
1,2-Dibromoethane (EDB)	106-93-4	1,180 U	0.00	4,590 U	0.00	9,180 U	0.00
1,2-Dichlorobenzene	95-50-1	4,640 U	0.00	18,000 U	0.00	36,000 U	0.00
1,2-Dichloroethane	107-06-2	1,250 U	0.00	4,840 U	0.00	9,670 U	0.00
1,2-Dichloropropane	78-87-5	1,420 U	0.00	5,520 U	0.00	11,000 U	0.00
1,3,5-Trimethylbenzene	108-67-8	2,090	0.50	10,000	3.56	55,200	18.34
1,3-Butadiene	106-99-0	683 U	0.00	2,640 U	0.00	5,290 U	0.00
1,3-Dichlorobenzene	541-73-1	4,640 U	0.00	18,000 U	0.00	36,000 U	0.00
1,4-Dichlorobenzene	106-46-7	4,640 U	0.00	18,000 U	0.00	36,000 U	0.00
2-Butanone (MEK)	78-93-3	4,550 U	0.00	17,600 U	0.00	35,300 U	0.00
2-Hexanone	591-78-6	6,310 U	0.00	24,400 U	0.00	48,900 U	0.00
2-Propanol	67-63-0	3,790 U	0.00	14,700 U	0.00	29,400 U	0.00
4-Ethyltoluene	622-96-8	3,790 U	0.00	14,700 U	0.00	29,400 U	0.00
4-Methyl-2-pentanone (MIBK)	108-10-1	6,310 U	0.00	24,400 U	0.00	48,900 U	0.00
Acetone	67-64-1	9,160 U	0.00	35,500 U	0.00	71,000 U	0.00
Benzene	71-43-2	36,400	8.77	114,000	40.58	50,200	16.68
Benzyl chloride	100-44-7	3,990 U	0.00	15,500 U	0.00	30,900 U	0.00
Bromodichloromethane	75-27-4	2,060 U	0.00	7,990 U	0.00	16,000 U	0.00
Bromoform	75-25-2	7,960 U	0.00	30,800 U	0.00	61,700 U	0.00
Bromomethane	74-83-9	1,200 U	0.00	4,640 U	0.00	9,270 U	0.00
Carbon disulfide	75-15-0	960 U	0.00	3,720 U	0.00	7,440 U	0.00
Carbon tetrachloride	56-23-5	1,940 U	0.00	7,520 U	0.00	15,000 U	0.00
Chlorobenzene	108-90-7	1,420 U	0.00	5,500 U	0.00	11,000 U	0.00
Chloroethane	75-00-3	813 U	0.00	7,880 U	0.00	6,300 U	0.00
Chloroform	67-66-3	752 U	0.00	2,910 U	0.00	5,830 U	0.00
Chloromethane	74-87-3	637 U	0.00	2,470 U	0.00	4,940 U	0.00
cis-1,2-Dichloroethene	156-59-2	1,220 U	0.00	4,740 U	0.00	9,470 U	0.00
cis-1,3-Dichloropropene	10061-01-5	3,500 U	0.00	13,600 U	0.00	27,100 U	0.00
Cyclohexane	110-82-7	2,650 U	0.00	10,300 U	0.00	20,600 U	0.00
Dibromochloromethane	124-48-1	2,620 U	0.00	10,200 U	0.00	20,300 U	0.00
Dichlorodifluoromethane	75-71-8	1,530 U	0.00	5,930 U	0.00	11,900 U	0.00
Dichlorotetrafluoroethane	76-14-2	2,150 U	0.00	8,340 U	0.00	16,700 U	0.00
Ethanol	64-17-5	2,910 U	0.00	11,300 U	0.00	22,600 U	0.00
Ethyl acetate	141-78-6	1,110 U	0.00	4,310 U	0.00	8,610 U	0.00
Ethylbenzene	100-41-4	19,400	4.68	59,700	21.25	45,800	15.22
Hexachloro-1,3-butadiene	87-68-3	8,220 U	0.00	31,800 U	0.00	63,700 U	0.00
m&p-Xylene	179601-23-1	75,500	18.20	262,000	93.25	380,000	126.25
Methylene Chloride	75-09-2	5,350 U	0.00	20,700 U	0.00	41,500 U	0.00
Methyl-tert-butyl ether	1634-04-4	5,550 U	0.00	21,500 U	0.00	43,000 U	0.00
Naphthalene	91-20-3	4,030 U	0.00	15,600 U	0.00	31,300 U	0.00
n-Heptane	142-82-5	66,900	16.12	292,000	103.93	157,000	52.16
n-Hexane	110-54-3	190,000	45.79	587,000	208.93	300,000	99.67
o-Xylene	95-47-6	16,700	4.02	58,000	20.64	126,000	41.86
Propylene	115-07-1	1,330 U	0.00	5,140 U	0.00	10,300 U	0.00
Styrene	100-42-5	1,310 U	0.00	5,090 U	0.00	10,200 U	0.00
Tetrachloroethene	127-18-4	1,050 U	0.00	4,050 U	0.00	13,000	4.32
Tetrahydrofuran	109-99-9	910 U	0.00	3,530 U	0.00	7,050 U	0.00
Toluene	108-88-3	22,200	5.35	57,000	20.29	43,200	14.35
trans-1,2-Dichloroethene	156-60-5	1,220 U	0.00	4,740 U	0.00	9,470 U	0.00
trans-1,3-Dichloropropene	10061-02-6	3,500 U	0.00	13,600 U	0.00	27,100 U	0.00
Trichloroethene	79-01-6	828 U	0.00	3,210 U	0.00	6,420 U	0.00
Trichlorofluoromethane	75-69-4	1,730 U	0.00	6,700 U	0.00	13,400 U	0.00
Vinyl acetate	108-05-4	1,090 U	0.00	4,210 U	0.00	8,410 U	0.00
Vinyl chloride	75-01-4	394 U	0.00	3,060 U	0.00	3,060 U	0.00
Total VOCs	--	--	103.99	--	515.90	--	411.66
Period Total VOC Mass Removed (lbs)		104.0		515.9		411.7	
Cumulative Total VOC Mass Removed (lbs)		1,637		2,153		2,565	

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-220727		CMR-SP301-083122		CMR-SP301-083122	
		7/27/2022		8/31/2022		9/30/2022 ^a	
		155		37		76	
		715		506		720	
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	1,490 U	0.00	10,700 U	0.00	10,700 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	1,880 U	0.00	13,500 U	0.00	13,500 U	0.00
1,1,2-Trichloroethane	79-00-5	746 U	0.00	5,370 U	0.00	5,370 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	2,100 U	0.00	15,100 U	0.00	15,100 U	0.00
1,1-Dichloroethane	75-34-3	1,110 U	0.00	7,960 U	0.00	7,960 U	0.00
1,1-Dichloroethene	75-35-4	1,080 U	0.00	7,800 U	0.00	7,800 U	0.00
1,2,4-Trichlorobenzene	120-82-1	10,100 U	0.00	73,000 U	0.00	73,000 U	0.00
1,2,4-Trimethylbenzene	95-63-6	3,710	1.54	9,670 U	0.00	9,670 U	0.00
1,2-Dibromoethane (EDB)	106-93-4	1,050 U	0.00	7,560 U	0.00	7,560 U	0.00
1,2-Dichlorobenzene	95-50-1	4,110 U	0.00	29,600 U	0.00	29,600 U	0.00
1,2-Dichloroethane	107-06-2	1,110 U	0.00	7,960 U	0.00	7,960 U	0.00
1,2-Dichloropropane	78-87-5	1,260 U	0.00	9,090 U	0.00	9,090 U	0.00
1,3,5-Trimethylbenzene	108-67-8	2,610	1.08	10,100	0.71	10,100	2.08
1,3-Butadiene	106-99-0	605 U	0.00	4,350 U	0.00	4,350 U	0.00
1,3-Dichlorobenzene	541-73-1	4,110 U	0.00	29,600 U	0.00	29,600 U	0.00
1,4-Dichlorobenzene	106-46-7	4,110 U	0.00	29,600 U	0.00	29,600 U	0.00
2-Butanone (MEK)	78-93-3	4,030 U	0.00	29,000 U	0.00	29,000 U	0.00
2-Hexanone	591-78-6	5,590 U	0.00	40,300 U	0.00	40,300 U	0.00
2-Propanol	67-63-0	3,360 U	0.00	24,200 U	0.00	24,200 U	0.00
4-Ethyltoluene	622-96-8	3,360 U	0.00	24,200 U	0.00	24,200 U	0.00
4-Methyl-2-pentanone (MIBK)	108-10-1	5,590 U	0.00	40,300 U	0.00	40,300 U	0.00
Acetone	67-64-1	8,120 U	0.00	58,400 U	0.00	58,400 U	0.00
Benzene	71-43-2	3,710	1.54	42,900	3.02	42,900	8.84
Benzyl chloride	100-44-7	3,530 U	0.00	25,400 U	0.00	25,400 U	0.00
Bromodichloromethane	75-27-4	1,830 U	0.00	13,200 U	0.00	13,200 U	0.00
Bromoform	75-25-2	7,060 U	0.00	50,800 U	0.00	50,800 U	0.00
Bromomethane	74-83-9	1,060 U	0.00	7,630 U	0.00	7,630 U	0.00
Carbon disulfide	75-15-0	851 U	0.00	6,130 U	0.00	6,130 U	0.00
Carbon tetrachloride	56-23-5	1,720 U	0.00	12,400 U	0.00	12,400 U	0.00
Chlorobenzene	108-90-7	1,260 U	0.00	9,060 U	0.00	9,060 U	0.00
Chloroethane	75-00-3	720 U	0.00	5,190 U	0.00	5,190 U	0.00
Chloroform	67-66-3	667 U	0.00	4,800 U	0.00	4,800 U	0.00
Chloromethane	74-87-3	564 U	0.00	4,060 U	0.00	4,060 U	0.00
cis-1,2-Dichloroethene	156-59-2	1,080 U	0.00	7,800 U	0.00	7,800 U	0.00
cis-1,3-Dichloropropene	10061-01-5	3,100 U	0.00	22,400 U	0.00	22,400 U	0.00
Cyclohexane	110-82-7	2,350 U	0.00	16,900 U	0.00	16,900 U	0.00
Dibromochloromethane	124-48-1	2,330 U	0.00	16,700 U	0.00	16,700 U	0.00
Dichlorodifluoromethane	75-71-8	1,360 U	0.00	9,770 U	0.00	9,770 U	0.00
Dichlorotetrafluoroethane	76-14-2	1,910 U	0.00	13,700 U	0.00	13,700 U	0.00
Ethanol	64-17-5	2,580 U	0.00	18,600 U	0.00	18,600 U	0.00
Ethyl acetate	141-78-6	985 U	0.00	7,090 U	0.00	7,090 U	0.00
Ethylbenzene	100-41-4	4,890	2.03	24,000	1.69	24,000	4.94
Hexachloro-1,3-butadiene	87-68-3	7,280 U	0.00	52,400 U	0.00	52,400 U	0.00
m&p-Xylene	179601-23-1	27,600	11.44	161,000	11.33	161,000	33.17
Methylene Chloride	75-09-2	4,740 U	0.00	34,200 U	0.00	34,200 U	0.00
Methyl-tert-butyl ether	1634-04-4	4,920 U	0.00	35,400 U	0.00	35,400 U	0.00
Naphthalene	91-20-3	4,490	1.86	25,700 U	0.00	25,700 U	0.00
n-Heptane	142-82-5	12,200	5.06	122,000	8.58	122,000	25.14
n-Hexane	110-54-3	22,000	9.12	209,000	14.70	209,000	43.06
o-Xylene	95-47-6	9,100	3.77	31,500	2.22	31,500	6.49
Propylene	115-07-1	1,180 U	0.00	8,470 U	0.00	8,470 U	0.00
Styrene	100-42-5	1,160 U	0.00	8,380 U	0.00	8,380 U	0.00
Tetrachloroethene	127-18-4	926 U	0.00	6,670 U	0.00	6,670 U	0.00
Tetrahydrofuran	109-99-9	806 U	0.00	5,810 U	0.00	5,810 U	0.00
Toluene	108-88-3	7,740	3.21	7,410 U	0.00	7,410 U	0.00
trans-1,2-Dichloroethene	156-60-5	1,080 U	0.00	7,800 U	0.00	7,800 U	0.00
trans-1,3-Dichloropropene	10061-02-6	3,100 U	0.00	22,400 U	0.00	22,400 U	0.00
Trichloroethene	79-01-6	734 U	0.00	5,280 U	0.00	5,280 U	0.00
Trichlorofluoromethane	75-69-4	1,530 U	0.00	11,000 U	0.00	11,000 U	0.00
Vinyl acetate	108-05-4	2,400 U	0.00	17,300 U	0.00	17,300 U	0.00
Vinyl chloride	75-01-4	349 U	0.00	2,520 U	0.00	2,520 U	0.00
Total VOCs	--	--	40.64	--	42.25	--	123.72
Period Total VOC Mass Removed (lbs)		40.6		42.2		123.7	
Cumulative Total VOC Mass Removed (lbs)		2,605		2,648		2,771	

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes	SP301		SP301		SP301		SP301	
	CMR-SP301-221214		CMR-SP301-221214		CMR-SP301-221214		CMR-DS3-221214	
	10/31/2022		11/30/2022		12/14/2022		12/14/2022	
	22		11		88		--	
	75		20		469		--	
								Field Duplicate
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)
1,1,1-Trichloroethane	71-55-6	4,310 U	0.00	4,310 U	0.00	4,310 U	0.00	2,810 U
1,1,2,2-Tetrachloroethane	79-34-5	5,430 U	0.00	5,430 U	0.00	5,430 U	0.00	3,550 U
1,1,2-Trichloroethane	79-00-5	2,150 U	0.00	2,150 U	0.00	2,150 U	0.00	1,410 U
1,1,2-Trichlorotrifluoroethane	76-13-1	6,050 U	0.00	6,050 U	0.00	6,050 U	0.00	3,960 U
1,1-Dichloroethane	75-34-3	3,190 U	0.00	3,190 U	0.00	3,190 U	0.00	2,090 U
1,1-Dichloroethene	75-35-4	3,130 U	0.00	3,130 U	0.00	3,130 U	0.00	2,040 U
1,2,4-Trichlorobenzene	120-82-1	29,200 U	0.00	29,200 U	0.00	29,200 U	0.00	19,100 U
1,2,4-Trimethylbenzene	95-63-6	5,870	0.04	5,870	0.00	5,870	0.90	3,400
1,2-Dibromoethane (EDB)	106-93-4	3,030 U	0.00	3,030 U	0.00	3,030 U	0.00	1,980 U
1,2-Dichlorobenzene	95-50-1	11,900 U	0.00	11,900 U	0.00	11,900 U	0.00	7,760 U
1,2-Dichloroethane	107-06-2	3,190 U	0.00	3,190 U	0.00	3,190 U	0.00	2,090 U
1,2-Dichloropropane	78-87-5	3,640 U	0.00	3,640 U	0.00	3,640 U	0.00	2,380 U
1,3,5-Trimethylbenzene	108-67-8	5,060	0.03	5,060	0.00	5,060	0.78	3,240
1,3-Butadiene	106-99-0	1,750 U	0.00	1,750 U	0.00	1,750 U	0.00	1,140 U
1,3-Dichlorobenzene	541-73-1	11,900 U	0.00	11,900 U	0.00	11,900 U	0.00	7,760 U
1,4-Dichlorobenzene	106-46-7	11,900 U	0.00	11,900 U	0.00	11,900 U	0.00	7,760 U
2-Butanone (MEK)	78-93-3	11,600 U	0.00	11,600 U	0.00	11,600 U	0.00	7,610 U
2-Hexanone	591-78-6	16,100 U	0.00	16,100 U	0.00	16,100 U	0.00	10,500 U
2-Propanol	67-63-0	9,700 U	0.00	9,700 U	0.00	9,700 U	0.00	6,340 U
4-Ethyltoluene	622-96-8	9,700 U	0.00	9,700 U	0.00	9,700 U	0.00	6,340 U
4-Methyl-2-pentanone (MIBK)	108-10-1	16,100 U	0.00	16,100 U	0.00	16,100 U	0.00	10,500 U
Acetone	67-64-1	23,400 U	0.00	23,400 U	0.00	23,400 U	0.00	15,300 U
Benzene	71-43-2	59,900	0.37	59,900	0.05	59,900	9.21	49,100
Benzyl chloride	100-44-7	10,200 U	0.00	10,200 U	0.00	10,200 U	0.00	6,670 U
Bromodichloromethane	75-27-4	5,270 U	0.00	5,270 U	0.00	5,270 U	0.00	3,450 U
Bromoform	75-25-2	20,400 U	0.00	20,400 U	0.00	20,400 U	0.00	13,300 U
Bromomethane	74-83-9	3,060 U	0.00	3,060 U	0.00	3,060 U	0.00	2,000 U
Carbon disulfide	75-15-0	2,460 U	0.00	2,460 U	0.00	2,460 U	0.00	1,610 U
Carbon tetrachloride	56-23-5	4,960 U	0.00	4,960 U	0.00	4,960 U	0.00	3,250 U
Chlorobenzene	108-90-7	3,630 U	0.00	3,630 U	0.00	3,630 U	0.00	2,370 U
Chloroethane	75-00-3	2,080 U	0.00	2,080 U	0.00	2,080 U	0.00	1,360 U
Chloroform	67-66-3	1,920 U	0.00	1,920 U	0.00	1,920 U	0.00	1,260 U
Chloromethane	74-87-3	1,630 U	0.00	1,630 U	0.00	1,630 U	0.00	1,070 U
cis-1,2-Dichloroethene	156-59-2	3,130 U	0.00	3,130 U	0.00	3,130 U	0.00	2,040 U
cis-1,3-Dichloropropene	10061-01-5	8,960 U	0.00	8,960 U	0.00	8,960 U	0.00	5,860 U
Cyclohexane	110-82-7	6,790 U	0.00	6,790 U	0.00	6,790 U	0.00	4,440 U
Dibromochloromethane	124-48-1	6,710 U	0.00	6,710 U	0.00	6,710 U	0.00	4,390 U
Dichlorodifluoromethane	75-71-8	3,920 U	0.00	3,920 U	0.00	3,920 U	0.00	2,560 U
Dichlorotetrafluoroethane	76-14-2	5,510 U	0.00	5,510 U	0.00	5,510 U	0.00	3,600 U
Ethanol	64-17-5	7,450 U	0.00	7,450 U	0.00	7,450 U	0.00	4,870 U
Ethyl acetate	141-78-6	2,840 U	0.00	2,840 U	0.00	2,840 U	0.00	1,860 U
Ethylbenzene	100-41-4	25,000	0.16	25,000	0.02	25,000	3.85	22,400
Hexachloro-1,3-butadiene	87-68-3	21,000 U	0.00	21,000 U	0.00	21,000 U	0.00	13,700 U
m&p-Xylene	179601-23-1	83,500	0.52	83,500	0.07	83,500	12.84	73,500
Methylene Chloride	75-09-2	13,700 U	0.00	13,700 U	0.00	13,700 U	0.00	8,950 U
Methyl-tert-butyl ether	1634-04-4	14,200 U	0.00	14,200 U	0.00	14,200 U	0.00	9,280 U
Naphthalene	91-20-3	10,300 U	0.00	10,300 U	0.00	10,300 U	0.00	6,750 U
n-Heptane	142-82-5	138,000	0.86	138,000	0.11	138,000	21.23	115,000
n-Hexane	110-54-3	209,000	1.30	209,000	0.17	209,000	32.15	169,000
o-Xylene	95-47-6	15,000	0.09	15,000	0.01	15,000	2.31	13,400
Propylene	115-07-1	3,390 U	0.00	3,390 U	0.00	3,390 U	0.00	2,220 U
Styrene	100-42-5	3,360 U	0.00	3,360 U	0.00	3,360 U	0.00	2,200 U
Tetrachloroethene	127-18-4	2,670 U	0.00	2,670 U	0.00	2,670 U	0.00	1,750 U
Tetrahydrofuran	109-99-9	2,330 U	0.00	2,330 U	0.00	2,330 U	0.00	1,520 U
Toluene	108-88-3	3,580	0.02	3,580	0.00	3,580	0.55	3,140
trans-1,2-Dichloroethene	156-60-5	3,130 U	0.00	3,130 U	0.00	3,130 U	0.00	2,040 U
trans-1,3-Dichloropropene	10061-02-6	8,960 U	0.00	8,960 U	0.00	8,960 U	0.00	5,860 U
Trichloroethene	79-01-6	2,120 U	0.00	2,120 U	0.00	2,120 U	0.00	1,380 U
Trichlorofluoromethane	75-69-4	4,420 U	0.00	4,420 U	0.00	4,420 U	0.00	2,890 U
Vinyl acetate	108-05-4	2,780 U	0.00	2,780 U	0.00	2,780 U	0.00	1,820 U
Vinyl chloride	75-01-4	1,010 U	0.00	1,010 U	0.00	1,010 U	0.00	659 U
Total VOCs	--	--	3.40	--	0.45	--	83.81	--
Period Total VOC Mass Removed (lbs)		3.4		0.4		83.8		--
Cumulative Total VOC Mass Removed (lbs)		2,775		2,775		2,859		--

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-230130		CMR-SP301-230228		CMR-SP301-230321	
		1/30/2023		2/28/2023		3/21/2023	
		44		105		147	
		703		534		734	
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	78 U	0.00	1,340 U	0.00	1 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	99 U	0.00	1,690 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	39 U	0.00	671 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	110 U	0.00	1,890 U	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	58 U	0.00	996 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	57 U	0.00	975 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	532 U	0.00	9,120 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	114	0.01	1,210 U	0.00	491 U	0.00
1,2-Dibromoethane (EDB)	106-93-4	55 U	0.00	945 U	0.00	2 U	0.00
1,2-Dichlorobenzene	95-50-1	216 U	0.00	3,700 U	0.00	1 U	0.00
1,2-Dichloroethane	107-06-2	58 U	0.00	996 U	0.00	1 U	0.00
1,2-Dichloropropane	78-87-5	66 U	0.00	1,140 U	0.00	1 U	0.00
1,3,5-Trimethylbenzene	108-67-8	144	0.02	1,210 U	0.00	388	0.16
1,3-Butadiene	106-99-0	32 U	0.00	544 U	0.00	4 U	0.00
1,3-Dichlorobenzene	541-73-1	216 U	0.00	3,700 U	0.00	1 U	0.00
1,4-Dichlorobenzene	106-46-7	216 U	0.00	3,700 U	0.00	1 U	0.00
2-Butanone (MEK)	78-93-3	212 U	0.00	3,630 U	0.00	4 U	0.00
2-Hexanone	591-78-6	293 U	0.00	5,030 U	0.00	5 U	0.00
2-Propanol	67-63-0	176 U	0.00	3,020 U	0.00	7	0.00
4-Ethyltoluene	622-96-8	176 U	0.00	3,020 U	0.00	205	0.08
4-Methyl-2-pentanone (MIBK)	108-10-1	293 U	0.00	5,030 U	0.00	5 U	0.00
Acetone	67-64-1	426 U	0.00	7,310 U	0.00	33	0.01
Benzene	71-43-2	884	0.10	1,120	0.24	303	0.12
Benzyl chloride	100-44-7	185 U	0.00	3,180 U	0.00	1 U	0.00
Bromodichloromethane	75-27-4	96 U	0.00	1,650 U	0.00	1 U	0.00
Bromoform	75-25-2	370 U	0.00	6,350 U	0.00	6 U	0.00
Bromomethane	74-83-9	56 U	0.00	954 U	0.00	1 U	0.00
Carbon disulfide	75-15-0	45 U	0.00	766 U	0.00	12	0.00
Carbon tetrachloride	56-23-5	90 U	0.00	1,550 U	0.00	1 U	0.00
Chlorobenzene	108-90-7	66 U	0.00	1,130 U	0.00	1 U	0.00
Chloroethane	75-00-3	38 U	0.00	648 U	0.00	1 U	0.00
Chloroform	67-66-3	35 U	0.00	600 U	0.00	1 U	0.00
Chloromethane	74-87-3	30 U	0.00	508 U	0.00	0 U	0.00
cis-1,2-Dichloroethene	156-59-2	57 U	0.00	975 U	0.00	1 U	0.00
cis-1,3-Dichloropropene	10061-01-5	163 U	0.00	2,790 U	0.00	1 U	0.00
Cyclohexane	110-82-7	123 U	0.00	2,120 U	0.00	8,020	3.24
Dibromochloromethane	124-48-1	122 U	0.00	2,090 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	71 U	0.00	1,220 U	0.00	2	0.00
Dichlorotetrafluoroethane	76-14-2	100 U	0.00	1,720 U	0.00	1 U	0.00
Ethanol	64-17-5	212	0.02	2,320 U	0.00	35	0.01
Ethyl acetate	141-78-6	52 U	0.00	887 U	0.00	-- --	--
Ethylbenzene	100-41-4	566	0.07	1,070 U	0.00	1,040	0.42
Hexachloro-1,3-butadiene	87-68-3	382 U	0.00	6,560 U	0.00	7 U	0.00
m&p-Xylene	179601-23-1	4,970	0.57	2,140 U	0.00	-- --	--
Methylene Chloride	75-09-2	249 U	0.00	4,270 U	0.00	1 U	0.00
Methyl-tert-butyl ether	1634-04-4	258 U	0.00	4,430 U	0.00	1 U	0.00
Naphthalene	91-20-3	188 U	0.00	3,220 U	0.00	3 U	0.00
n-Heptane	142-82-5	1,780	0.21	2,700	0.57	3,590	1.45
n-Hexane	110-54-3	1,410	0.16	8,780	1.85	16,600	6.70
o-Xylene	95-47-6	1,220	0.14	1,070 U	0.00	958	0.39
Propylene	115-07-1	62 U	0.00	1,060 U	0.00	2 U	0.00
Styrene	100-42-5	61 U	0.00	1,050 U	0.00	1 U	0.00
Tetrachloroethene	127-18-4	49 U	0.00	833 U	0.00	1 U	0.00
Tetrahydrofuran	109-99-9	42 U	0.00	726 U	0.00	1 U	0.00
Toluene	108-88-3	656	0.08	927 U	0.00	942 U	0.00
trans-1,2-Dichloroethene	156-60-5	57 U	0.00	975 U	0.00	1 U	0.00
trans-1,3-Dichloropropene	10061-02-6	163 U	0.00	2,790 U	0.00	1 U	0.00
Trichloroethene	79-01-6	39 U	0.00	660 U	0.00	1 U	0.00
Trichlorofluoromethane	75-69-4	80 U	0.00	1,380 U	0.00	1 U	0.00
Vinyl acetate	108-05-4	51 U	0.00	866 U	0.00	1 U	0.00
Vinyl chloride	75-01-4	18 U	0.00	314 U	0.00	1 U	0.00
Total VOCs	--	--	1.38	--	2.65	--	12.59
Period Total VOC Mass Removed (lbs)		1.4		2.7		12.6	
Cumulative Total VOC Mass Removed (lbs)		2,860		2,863		2,876	

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-230531		CMR-SP301-230531		CMR-SP301-290623	
		4/30/2023		5/31/2023		6/29/2023	
		81		75		70	
		533		510		449	
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	275 U	0.00	275 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	2 U	0.00	2 U	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	1 U	0.00	1 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	1 U	0.00	1 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	933 U	0.00	933 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	196 U	0.00	196 U	0.00	4	0.00
1,2-Dibromoethane (EDB)	106-93-4	2 U	0.00	2 U	0.00	2 U	0.00
1,2-Dichlorobenzene	95-50-1	240 U	0.00	240 U	0.00	1 U	0.00
1,2-Dichloroethane	107-06-2	1 U	0.00	1 U	0.00	1 U	0.00
1,2-Dichloropropane	78-87-5	1 U	0.00	1 U	0.00	1 U	0.00
1,3,5-Trimethylbenzene	108-67-8	196 U	0.00	196 U	0.00	2	0.00
1,3-Butadiene	106-99-0	4 U	0.00	4 U	0.00	4 U	0.00
1,3-Dichlorobenzene	541-73-1	240 U	0.00	240 U	0.00	1 U	0.00
1,4-Dichlorobenzene	106-46-7	240 U	0.00	240 U	0.00	1 U	0.00
2-Butanone (MEK)	78-93-3	22	0.00	22	0.00	4 U	0.00
2-Hexanone	591-78-6	5 U	0.00	5 U	0.00	5 U	0.00
2-Propanol	67-63-0	13	0.00	13	0.00	3 U	0.00
4-Ethyltoluene	622-96-8	196 U	0.00	196 U	0.00	1 U	0.00
4-Methyl-2-pentanone (MIBK)	108-10-1	5 U	0.00	5 U	0.00	5 U	0.00
Acetone	67-64-1	3 U	0.00	3 U	0.00	3 U	0.00
Benzene	71-43-2	206	0.03	206	0.03	1 U	0.00
Benzyl chloride	100-44-7	208 U	0.00	208 U	0.00	1 U	0.00
Bromodichloromethane	75-27-4	1 U	0.00	1 U	0.00	1 U	0.00
Bromoform	75-25-2	1,240 U	0.00	1,240 U	0.00	6 U	0.00
Bromomethane	74-83-9	1 U	0.00	1 U	0.00	1 U	0.00
Carbon disulfide	75-15-0	6	0.00	6	0.00	1 U	0.00
Carbon tetrachloride	56-23-5	1 U	0.00	1 U	0.00	1 U	0.00
Chlorobenzene	108-90-7	1 U	0.00	1 U	0.00	1 U	0.00
Chloroethane	75-00-3	1 U	0.00	1 U	0.00	1 U	0.00
Chloroform	67-66-3	1 U	0.00	1 U	0.00	1 U	0.00
Chloromethane	74-87-3	0 U	0.00	0 U	0.00	1	0.00
cis-1,2-Dichloroethene	156-59-2	1 U	0.00	1 U	0.00	1 U	0.00
cis-1,3-Dichloropropene	10061-01-5	1 U	0.00	1 U	0.00	1 U	0.00
Cyclohexane	110-82-7	278	0.05	278	0.04	3,120	0.37
Dibromochloromethane	124-48-1	2 U	0.00	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	3	0.00	3	0.00	2	0.00
Dichlorotetrafluoroethane	76-14-2	1 U	0.00	1 U	0.00	1 U	0.00
Ethanol	64-17-5	60	0.01	60	0.01	13	0.00
Ethyl acetate	141-78-6	-- --	--	-- --	--	-- --	--
Ethylbenzene	100-41-4	173 U	0.00	173 U	0.00	160	0.02
Hexachloro-1,3-butadiene	87-68-3	1,350 U	0.00	1,350 U	0.00	7 U	0.00
m&p-Xylene	179601-23-1	642	0.10	642	0.09	221	0.03
Methylene Chloride	75-09-2	1 U	0.00	1 U	0.00	1 U	0.00
Methyl-tert-butyl ether	1634-04-4	1 U	0.00	1 U	0.00	1 U	0.00
Naphthalene	91-20-3	660 U	0.00	660 U	0.00	3 U	0.00
n-Heptane	142-82-5	11,700	1.90	11,700	1.67	2,920	0.34
n-Hexane	110-54-3	1,700	0.28	1,700	0.24	9,270	1.09
o-Xylene	95-47-6	189	0.03	189	0.03	46	0.01
Propylene	115-07-1	27	0.00	27	0.00	15	0.00
Styrene	100-42-5	170 U	0.00	170 U	0.00	1 U	0.00
Tetrachloroethene	127-18-4	4	0.00	4	0.00	1 U	0.00
Tetrahydrofuran	109-99-9	1 U	0.00	1 U	0.00	1 U	0.00
Toluene	108-88-3	146	0.02	146	0.02	159	0.02
trans-1,2-Dichloroethene	156-60-5	1 U	0.00	1 U	0.00	1 U	0.00
trans-1,3-Dichloropropene	10061-02-6	1 U	0.00	1 U	0.00	1 U	0.00
Trichloroethene	79-01-6	1 U	0.00	1 U	0.00	1 U	0.00
Trichlorofluoromethane	75-69-4	1	0.00	1	0.00	1	0.00
Vinyl acetate	108-05-4	1 U	0.00	1 U	0.00	1 U	0.00
Vinyl chloride	75-01-4	1 U	0.00	1 U	0.00	1 U	0.00
Total VOCs	--	--	2.43	--	2.14	--	1.87
Period Total VOC Mass Removed (lbs)		2.4		2.1		1.9	
Cumulative Total VOC Mass Removed (lbs)		2,878		2,880		2,882	

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-110723		CMR-SB-301-101223		CMR-SP301-122723	
		7/11/2023		10/12/2023		12/27/2023	
		78		26		41	
		310		238		595	
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	22 U	0.00	1 U	0.00	1 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	28 U	0.00	550 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	22 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	31 U	0.00	2	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	16 U	0.00	1 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	16 U	0.00	1 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	93 U	0.00	1,870 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	638	0.06	795	0.02	59	0.01
1,2-Dibromoethane (EDB)	106-93-4	31 U	0.00	2 U	0.00	2 U	0.00
1,2-Dichlorobenzene	95-50-1	24 U	0.00	481 U	0.00	1 U	0.00
1,2-Dichloroethane	107-06-2	16 U	0.00	18	0.00	1 U	0.00
1,2-Dichloropropane	78-87-5	19 U	0.00	1 U	0.00	1 U	0.00
1,3,5-Trimethylbenzene	108-67-8	408	0.04	712	0.02	75	0.01
1,3-Butadiene	106-99-0	89 U	0.00	4 U	0.00	4 U	0.00
1,3-Dichlorobenzene	541-73-1	24 U	0.00	481 U	0.00	1 U	0.00
1,4-Dichlorobenzene	106-46-7	24 U	0.00	481 U	0.00	1 U	0.00
2-Butanone (MEK)	78-93-3	74 U	0.00	81	0.00	11	0.00
2-Hexanone	591-78-6	102 U	0.00	5 U	0.00	5 U	0.00
2-Propanol	67-63-0	62 U	0.00	17	0.00	10	0.00
4-Ethyltoluene	622-96-8	287	0.03	445	0.01	27	0.00
4-Methyl-2-pentanone (MIBK)	108-10-1	102 U	0.00	5 U	0.00	5 U	0.00
Acetone	67-64-1	59 U	0.00	3 U	0.00	3 U	0.00
Benzene	71-43-2	3,550	0.32	25,700	0.59	348	0.03
Benzyl chloride	100-44-7	21 U	0.00	416 U	0.00	1 U	0.00
Bromodichloromethane	75-27-4	27 U	0.00	1 U	0.00	1 U	0.00
Bromoform	75-25-2	124 U	0.00	2,480 U	0.00	6 U	0.00
Bromomethane	74-83-9	16 U	0.00	1 U	0.00	1 U	0.00
Carbon disulfide	75-15-0	12 U	0.00	28	0.00	2	0.00
Carbon tetrachloride	56-23-5	25 U	0.00	1 U	0.00	1 U	0.00
Chlorobenzene	108-90-7	19 U	0.00	287	0.01	1 U	0.00
Chloroethane	75-00-3	11 U	0.00	2	0.00	1 U	0.00
Chloroform	67-66-3	20 U	0.00	1 U	0.00	1 U	0.00
Chloromethane	74-87-3	8 U	0.00	9	0.00	0 U	0.00
cis-1,2-Dichloroethene	156-59-2	16 U	0.00	1 U	0.00	1 U	0.00
cis-1,3-Dichloropropene	10061-01-5	18 U	0.00	1 U	0.00	1 U	0.00
Cyclohexane	110-82-7	6,100	0.55	3,550	0.08	479	0.04
Dibromochloromethane	124-48-1	34 U	0.00	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	20 U	0.00	2	0.00	2	0.00
Dichlorotetrafluoroethane	76-14-2	28 U	0.00	1 U	0.00	1 U	0.00
Ethanol	64-17-5	94 U	0.00	42	0.00	43	0.00
Ethyl acetate	141-78-6	-- --	--	-- --	--	-- --	--
Ethylbenzene	100-41-4	2,310	0.21	1,530	0.04	100	0.01
Hexachloro-1,3-butadiene	87-68-3	135 U	0.00	2,690 U	0.00	7 U	0.00
m&p-Xylene	179601-23-1	7,720	0.70	8,710	0.20	590	0.05
Methylene Chloride	75-09-2	14 U	0.00	1 U	0.00	1 U	0.00
Methyl-tert-butyl ether	1634-04-4	14 U	0.00	1 U	0.00	1 U	0.00
Napthalene	91-20-3	66 U	0.00	1,320 U	0.00	3 U	0.00
n-Heptane	142-82-5	7,360	0.66	3,800	0.09	182	0.02
n-Hexane	110-54-3	15,700	1.42	5,850	0.13	395	0.04
o-Xylene	95-47-6	2,130	0.19	2,150	0.05	162	0.01
Propylene	115-07-1	43 U	0.00	122	0.00	2 U	0.00
Styrene	100-42-5	17 U	0.00	340 U	0.00	1 U	0.00
Tetrachloroethene	127-18-4	27 U	0.00	1 U	0.00	1 U	0.00
Tetrahydrofuran	109-99-9	12 U	0.00	1 U	0.00	1 U	0.00
Toluene	108-88-3	618	0.06	753 U	0.00	2 U	0.00
trans-1,2-Dichloroethene	156-60-5	16 U	0.00	1 U	0.00	9	0.00
trans-1,3-Dichloropropene	10061-02-6	18 U	0.00	1 U	0.00	1 U	0.00
Trichloroethene	79-01-6	21 U	0.00	1 U	0.00	1 U	0.00
Trichlorofluoromethane	75-69-4	23 U	0.00	1	0.00	1	0.00
Vinyl acetate	108-05-4	14 U	0.00	2 U	0.00	2 U	0.00
Vinyl chloride	75-01-4	10 U	0.00	1 U	0.00	1 U	0.00
Total VOCs	--	--	4.22	--	1.24	--	0.23
Period Total VOC Mass Removed (lbs)		4.2		1.2		0.2	
Cumulative Total VOC Mass Removed (lbs)		2,886		2,887		2,888	

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-013124		CMR-SP301-240208		CMR-SP301-240327	
		1/31/2024		2/8/2024		3/27/2024	
		46		143		116	
		558		689		739	
VOCs	CAS No.	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	2 U	0.00	2 U	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	1 U	0.00	1 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	1 U	0.00	1 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	5 U	0.00	5 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	2	0.00	810	0.30	100	0.03
1,2-Dibromoethane (EDB)	106-93-4	2 U	0.00	2 U	0.00	2 U	0.00
1,2-Dichlorobenzene	95-50-1	1 U	0.00	1 U	0.00	1 U	0.00
1,2-Dichloroethane	107-06-2	1 U	0.00	1 U	0.00	1 U	0.00
1,2-Dichloropropane	78-87-5	1 U	0.00	1 U	0.00	1 U	0.00
1,3,5-Trimethylbenzene	108-67-8	1 U	0.00	785	0.29	204	0.07
1,3-Butadiene	106-99-0	4 U	0.00	4 U	0.00	4 U	0.00
1,3-Dichlorobenzene	541-73-1	1 U	0.00	1 U	0.00	1 U	0.00
1,4-Dichlorobenzene	106-46-7	1 U	0.00	1 U	0.00	1 U	0.00
2-Butanone (MEK)	78-93-3	4 U	0.00	4 U	0.00	4 U	0.00
2-Hexanone	591-78-6	5 U	0.00	5 U	0.00	5 U	0.00
2-Propanol	67-63-0	3	0.00	5	0.00	3 U	0.00
4-Ethyltoluene	622-96-8	2	0.00	227	0.08	33	0.01
4-Methyl-2-pentanone (MIBK)	108-10-1	6	0.00	5 U	0.00	5 U	0.00
Acetone	67-64-1	17	0.00	10	0.00	3 U	0.00
Benzene	71-43-2	4	0.00	1,020	0.38	145	0.05
Benzyl chloride	100-44-7	1 U	0.00	1 U	0.00	1 U	0.00
Bromodichloromethane	75-27-4	1 U	0.00	1 U	0.00	1 U	0.00
Bromoform	75-25-2	6 U	0.00	6 U	0.00	6 U	0.00
Bromomethane	74-83-9	1 U	0.00	1 U	0.00	1 U	0.00
Carbon disulfide	75-15-0	1 U	0.00	2	0.00	3	0.00
Carbon tetrachloride	56-23-5	1 U	0.00	1 U	0.00	1 U	0.00
Chlorobenzene	108-90-7	1 U	0.00	1 U	0.00	1 U	0.00
Chloroethane	75-00-3	1 U	0.00	1 U	0.00	1 U	0.00
Chloroform	67-66-3	1 U	0.00	1 U	0.00	1 U	0.00
Chloromethane	74-87-3	1	0.00	0 U	0.00	0	0.00
cis-1,2-Dichloroethene	156-59-2	1 U	0.00	1 U	0.00	1 U	0.00
cis-1,3-Dichloropropene	10061-01-5	1 U	0.00	1 U	0.00	1 U	0.00
Cyclohexane	110-82-7	2	0.00	3,260	1.20	396	0.13
Dibromochloromethane	124-48-1	2 U	0.00	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	2	0.00	1	0.00	2	0.00
Dichlorotetrafluoroethane	76-14-2	1 U	0.00	1 U	0.00	1 U	0.00
Ethanol	64-17-5	17	0.00	8 B	0.00	13	0.00
Ethyl acetate	141-78-6	-- --	--	-- --	--	-- --	--
Ethylbenzene	100-41-4	2	0.00	233	0.09	41	0.01
Hexachloro-1,3-butadiene	87-68-3	7 U	0.00	7 U	0.00	7 U	0.00
m&p-Xylene	179601-23-1	9	0.00	2,990	1.10	299	0.10
Methylene Chloride	75-09-2	1 U	0.00	1 U	0.00	1 U	0.00
Methyl-tert-butyl ether	1634-04-4	1 U	0.00	1 U	0.00	1 U	0.00
Naphthalene	91-20-3	3 U	0.00	3 U	0.00	3 U	0.00
n-Heptane	142-82-5	4	0.00	2,000	0.74	194	0.06
n-Hexane	110-54-3	7	0.00	4,650	1.72	652	0.21
o-Xylene	95-47-6	4	0.00	720	0.27	102	0.03
Propylene	115-07-1	2 U	0.00	10	0.00	7	0.00
Styrene	100-42-5	1 U	0.00	1 U	0.00	1 U	0.00
Tetrachloroethene	127-18-4	1 U	0.00	1 U	0.00	1 U	0.00
Tetrahydrofuran	109-99-9	1 U	0.00	1 U	0.00	1 U	0.00
Toluene	108-88-3	8	0.00	36	0.01	13	0.00
trans-1,2-Dichloroethene	156-60-5	1 U	0.00	1 U	0.00	1 U	0.00
trans-1,3-Dichloropropene	10061-02-6	1 U	0.00	2	0.00	1 U	0.00
Trichloroethene	79-01-6	1 U	0.00	1 U	0.00	1 U	0.00
Trichlorofluoromethane	75-69-4	1	0.00	1 U	0.00	1	0.00
Vinyl acetate	108-05-4	2 U	0.00	2 U	0.00	2 U	0.00
Vinyl chloride	75-01-4	1 U	0.00	1 U	0.00	1 U	0.00
Total VOCs	--	--	0.02	--	6.22	--	0.73
Period Total VOC Mass Removed (lbs)		0.0		6.2		0.7	
Cumulative Total VOC Mass Removed (lbs)		2,888		2,894		2,895	

Appendix B
Historical Analytical Results and Contaminant Mass Removal - Vapor
Calumet Montana Refining, LLC - Great Falls, Montana

1. Blower flowrate is continuously recorded by the system PLC. Average blower flowrate during the period is used for the calculations
 2. Operational time during system start-up and comissioning (October, 2021 through December 2021) is the number of hours the system operated between each sampling event. Opertational time during the standard system opration (beginning January 2022) represents system runtime (in hour) for the month during with the sample was taken.
 3. Results from November 19, 2021 and February 16, 2022 appear anomalously low as PID readings from these two events were consistent with PID readings from the other sampling events. Therfore, these results were rejected.
 4. Sample was not collected during September 2022, therefore results from August 2022 were used for mass removal calculations.
 5. Sample was not collected during October 2022 and November 2022, therefore results from December 2022 were used for mass removal calculations.
 6. Sample collected for April 2023 was received by the lab outside the allowable vacuum range so sample was not analyzed; therefore results from May 2023 were used for mass removal calculations.
 7. Samples were not collected in August and September 2023 due to system shutdown.
 8. Samples were not collected in November 2023 due to system shutdown.
- E: Analyte concentration exceeded the calibration range. The reported result is estimated.
R: Result rejected.
U: The analyte was not detected in the sample at the estimated detection limit.
B: The analyte was found in the associated blank as well as in the sample.
VOCs : Volatile Organic Compounds
ug/m³ : micrograms per cubic meter
Sample Calculation

$$\text{Mass Removed (lb)} = 340000 \frac{\text{ug}}{\text{m}^3} \times 10^{-6} \frac{\text{g}}{\text{ug}} \times \frac{1}{453.6} \frac{\text{lb}}{\text{g}} \times 41 \frac{\text{ft}^3}{\text{min}} \times 0.02832 \frac{\text{m}^3}{\text{ft}^3} \times 26 \text{ hr} \times 60 \frac{\text{min}}{\text{hr}}$$

APPENDIX C

HISTORICAL ANALYTICAL RESULTS AND CONTAMINANT MASS REMOVAL - LIQUID

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200	
		CMR-SP200-211015		CMR-SP200-211208		CMR-SP200-220216		CMR-SP200-220411	
		10/15/2021		12/8/2021		2/16/2022		4/11/2022	
		21,138		43,176		80,754		137,543	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
VOCs									
1,1,1-TRICHLOROETHANE	71-55-6	ND	--	ND	--	ND	--	ND	--
1,1,2,2-TETRACHLOROETHANE	79-34-5	ND	--	ND	--	ND	--	ND	--
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ND	--	ND	--	ND	--	ND	--
1,1,2-TRICHLOROETHANE	79-00-5	ND	--	ND	--	ND	--	ND	--
1,1-DICHLOROETHANE	75-34-3	ND	--	ND	--	ND	--	ND	--
1,1-DICHLOROETHENE	75-35-4	ND	--	ND	--	ND	--	ND	--
1,2,3-TRICHLOROBENZENE	87-61-6	ND	--	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--	ND	--
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	ND	--	ND	--	ND	--	ND	--
1,2-DIBROMOETHANE	106-93-4	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROETHANE	107-06-2	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROPROPANE	78-87-5	ND	--	ND	--	ND	--	ND	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	ND	--	ND	--	ND	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	ND	--	ND	--	ND	--
1,4-DIOXANE	123-91-1	ND	--	ND	--	ND	--	ND	--
2-BUTANONE	78-93-3	ND	--	ND	--	ND	--	ND	--
2-HEXANONE	591-78-6	ND	--	ND	--	ND	--	ND	--
4-METHYL-2-PENTANONE	108-10-1	ND	--	ND	--	ND	--	ND	--
ACETONE	67-64-1	ND	--	ND	--	ND	--	ND	--
BENZENE	71-43-2	2300	0.11	350	0.0333	420	0.0748	540	0.1637
BROMOCHLOROMETHANE	74-97-5	ND	--	ND	--	ND	--	ND	--
BROMODICHLOROMETHANE	75-27-4	ND	--	ND	--	ND	--	ND	--
BROMOFORM	75-25-2	ND	--	ND	--	ND	--	ND	--
BROMOMETHANE	74-83-9	ND	--	ND	--	ND	--	ND	--
CARBON DISULFIDE	75-15-0	ND	--	ND	--	ND	--	ND	--
CARBON TETRACHLORIDE	56-23-5	ND	--	ND	--	ND	--	ND	--
CHLOROBENZENE	108-90-7	ND	--	ND	--	ND	--	ND	--
CHLOROETHANE	75-00-3	ND	--	ND	--	ND	--	ND	--
CHLOROFORM	67-66-3	ND	--	ND	--	ND	--	ND	--
CHLOROMETHANE	74-87-3	ND	--	ND	--	ND	--	ND	--
CIS-1,2-DICHLOROETHENE	156-59-2	ND	--	79	0.01	ND	--	ND	--
CIS-1,3-DICHLOROPROPENE	10061-01-5	ND	--	ND	--	ND	--	ND	--
CUMENE	98-82-8	ND	--	130	0.0124	ND	--	ND	--
CYCLOHEXANE	110-82-7	160	0.01	72	0.01	ND	--	ND	--
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--	ND	--	ND	--
ETHYL BENZENE	100-41-4	1100	0.05	730	0.0695	450	0.0801	590	0.1789
M,P-XYLENE	179601-23-1	5100	0.24	5400	0.51	3200	0.57	3200	0.97
METHYL ACETATE	79-20-9	ND	--	ND	--	ND	--	ND	--
METHYL TERT-BUTYL ETHER	1634-04-4	ND	--	ND	--	ND	--	ND	--
METHYLCYCLOHEXANE	108-87-2	71	0.00	43	0.00	ND	--	ND	--
METHYLENE CHLORIDE	75-09-2	ND	--	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	290	0.01	1500	0.1428	460	0.0819	510	0.1546
ORTHO-XYLENE	95-47-6	1400	0.07	1800	0.17	1100	0.20	960	0.29
STYRENE	100-42-5	ND	--	ND	--	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--	ND	--
TOLUENE	108-88-3	1500	0.07	330	0.03	370	0.07	ND	--
TRANS-1,2-DICHLOROETHENE	156-60-5	ND	--	ND	--	ND	--	ND	--
TRANS-1,3-DICHLOROPROPENE	10061-02-6	ND	--	ND	--	ND	--	ND	--
TRICHLOROETHENE	79-01-6	ND	--	ND	--	ND	--	ND	--
TRICHLOROFUOROMETHANE	75-69-4	ND	--	ND	--	ND	--	ND	--
VINYL CHLORIDE	75-01-4	ND	--	ND	--	ND	--	ND	--
XYLENES (TOTAL)	1330-20-7	6500	0.30	--	--	--	--	--	--
Total VOCs	--	--	0.86	--	0.993	--	1.068	--	1.759
Period Total VOC Mass Removed (lbs)		0.9		0.993		1.068		1.759	
Cumulative Total VOC Mass Removed (lbs)		0.9		1.85		2.92		4.68	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200	
		CMR-SP200-211015		CMR-SP200-211208		CMR-SP200-220216		CMR-SP200-220411	
		10/15/2021		12/8/2021		2/16/2022		4/11/2022	
		21,138		43,176		80,754		137,543	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
SVOCs									
1,2,4,5-TETRACHLOROBENZENE	95-94-3	ND	--	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	ND	--	ND	--	ND	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	ND	--	ND	--	ND	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	ND	--	ND	--	ND	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ND	--	ND	--	ND	--	ND	--
2,3,4,6-TETRACHLOROPHENOL	58-90-2	ND	--	ND	--	ND	--	ND	--
2,4,5-TRICHLOROPHENOL	95-95-4	ND	--	ND	--	ND	--	ND	--
2,4,6-TRICHLOROPHENOL	88-06-2	ND	--	ND	--	ND	--	ND	--
2,4-DICHLOROPHENOL	120-83-2	ND	--	ND	--	ND	--	ND	--
2,4-DIMETHYLPHENOL	105-67-9	ND	--	ND	--	590	0.1050	270	0.0819
2,4-DINITROPHENOL	51-28-5	ND	--	ND	--	ND	--	ND	--
2,4-DINITROTOLUENE	121-14-2	ND	--	ND	--	ND	--	ND	--
2,6-DINITROTOLUENE	606-20-2	ND	--	ND	--	ND	--	ND	--
2-CHLORONAPHTHALENE	91-58-7	ND	--	ND	--	ND	--	ND	--
2-CHLOROPHENOL	95-57-8	ND	--	ND	--	ND	--	ND	--
2-METHYLNAPHTHALENE	91-57-6	710	0.03	9,700	0.9233	710	0.1264	340	0.1031
2-METHYLPHENOL	95-48-7	ND	--	ND	--	ND	--	ND	--
2-NITROANILINE	88-74-4	ND	--	ND	--	ND	--	ND	--
2-NITROPHENOL	88-75-5	ND	--	ND	--	ND	--	ND	--
3,3'-DICHLOROBENZIDINE	91-94-1	ND	--	ND	--	ND	--	ND	--
3-NITROANILINE	99-09-2	ND	--	ND	--	ND	--	ND	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	--	ND	--	ND	--	ND	--
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	--	ND	--	ND	--	ND	--
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	--	ND	--	ND	--	ND	--
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	--	ND	--	ND	--	ND	--
4-METHYLPHENOL	106-44-5	ND	--	ND	--	ND	--	ND	--
4-NITROANILINE	100-01-6	ND	--	ND	--	ND	--	ND	--
4-NITROPHENOL	100-02-7	ND	--	ND	--	ND	--	ND	--
ACENAPHTHENE	83-32-9	ND	--	ND	--	14	0.0025	ND	--
ACENAPHTHYLENE	208-96-8	38	0.00	ND	--	ND	--	ND	--
ANTHRACENE	120-12-7	ND	--	ND	--	ND	--	ND	--
BENZO(A)ANTHRACENE	56-55-3	ND	--	ND	--	ND	--	ND	--
BENZO(A)PYRENE	50-32-8	ND	--	ND	--	ND	--	ND	--
BENZO(B)FLUORANTHENE	205-99-2	ND	--	ND	--	ND	--	ND	--
BENZO(G,H,I)PERYLENE	191-24-2	ND	--	ND	--	ND	--	ND	--
BENZO(K)FLUORANTHENE	207-08-9	ND	--	ND	--	ND	--	ND	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	--	ND	--	ND	--	ND	--
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	--	ND	--	ND	--	ND	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	--	ND	--	ND	--	ND	--
BUTYLBENZYLPHTHALATE	85-68-7	ND	--	ND	--	ND	--	ND	--
CARBAZOLE	86-74-8	ND	--	ND	--	ND	--	ND	--
CHRYSENE	218-01-9	ND	--	ND	--	ND	--	ND	--
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	--	ND	--	ND	--	ND	--
DIBENZOFURAN	132-64-9	ND	--	ND	--	ND	--	ND	--
DIETHYLPHTHALATE	84-66-2	ND	--	ND	--	ND	--	ND	--
DIMETHYLPHTHALATE	131-11-3	ND	--	ND	--	ND	--	ND	--
DI-N-BUTYLPHTHALATE	84-74-2	ND	--	ND	--	ND	--	ND	--
DI-N-OCTYLPHTHALATE	117-84-0	ND	--	ND	--	ND	--	ND	--
FLUORANTHENE	206-44-0	ND	--	ND	--	ND	--	ND	--
FLUORENE	86-73-7	30	0.00	360	0.0343	ND	--	13	0.0039
HEXACHLOROBENZENE	118-74-1	ND	--	ND	--	ND	--	ND	--
HEXACHLOROBUTADIENE	87-68-3	ND	--	ND	--	ND	--	ND	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	--	ND	--	ND	--	ND	--
HEXACHLOROETHANE	67-72-1	ND	--	ND	--	ND	--	ND	--
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	--	ND	--	ND	--	ND	--
ISOPHORONE	78-59-1	ND	--	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	610	0.03	5,800	0.5521	560	0.0997	330	0.1001
NITROBENZENE	98-95-3	ND	--	ND	--	ND	--	ND	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	--	ND	--	ND	--	ND	--
N-NITROSODIPHENYLAMINE	86-30-6	ND	--	ND	--	ND	--	ND	--
PENTACHLOROPHENOL	87-86-5	ND	--	ND	--	ND	--	ND	--
PHENANTHRENE	85-01-8	48	0.00	610	0.0581	53	0.0094	22	0.0067
PHENOL	108-95-2	ND	--	ND	--	ND	--	47	0.01
PYRENE	129-00-0	12	0.00	110	0.0105	7	0.0013	3	0.0010
Total SVOCs	--	--	0.07	--	1.58	--	0.34	--	0.31
Period Total SVOC Mass Removed (lbs)		0.1		1.6		0.3		0.3	
Cumulative Total VOC Mass Removed (lbs)		0.1		1.6		2.0		2.3	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200	
		CMR-SP200-211015		CMR-SP200-211208		CMR-SP200-220216		CMR-SP200-220411	
		10/15/2021		12/8/2021		2/16/2022		4/11/2022	
		21,138		43,176		80,754		137,543	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
EPH									
C11 THROUGH C22 AROMATIC HYDROCARBONS	C11-C22-AROM	89,000	4.15	32,000	3.05	81,000	14.42	56,000	16.98
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	50,000	2.33	28,000	2.67	55,000	9.79	17,000	5.15
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	190,000	8.85	130,000	12.37	320,000	56.97	87,000	26.38
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	330,000	15.38	--	--	460,000	81.89	160,000	48.52
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	410,000	19.11	210,000	19.99	460,000	81.89	160,000	48.52
Total EPHs	--	--	19.11	--	19.99	--	81.89	--	48.52
Period Total EPH Mass Removed (lbs)		19.1		20.0		81.9		48.5	
Cumulative Total EPH Mass Removed (lbs)		19.1		39.1		121.0		169.5	
VPH									
BENZENE	71-43-2	1,800	0.08	230	0.02	480	0.09	430	0.13
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	3,900	0.18	2,600	0.25	12,000	2.14	1,500	0.45
C9 THROUGH C10 AROMATIC HYDROCARBONS	C09-C10-AROM	9,300	0.43	40,000	3.81	88,000	15.67	9,400	2.85
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	9,400	0.44	26,000	2.47	130,000	23.14	6,800	2.06
ETHYL BENZENE	100-41-4	990	0.05	650	0.06	1,200	0.21	600	0.18
M,P-XYLENE	179601-23-1	4,100	0.19	4,100	0.39	5,900	1.05	3,200	0.97
METHYL TERT-BUTYL ETHER	1634-04-4	ND	--	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	510	0.02	2,300	0.22	5,200	0.93	470	0.14
ORTHO-XYLENE	95-47-6	1,300	0.06	1,700	0.16	2,200	0.39	1,000	0.30
TOLUENE	108-88-3	1,100	0.05	300	0.03	530	0.09	300	0.09
TOTAL PETROLEUM HYDROCARBONS	TPH	32,000	1.49	72,000	6.85	200,000	35.61	23,000	6.97
Total VPHs	--	--	1.49	--	6.85	--	35.61	--	6.97
Period Total VPH Mass Removed (lbs)		1.5		6.9		35.6		7.0	
Cumulative Total VPH Mass Removed (lbs)		1.5		8.3		44.0		50.9	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200	
		CMR-SP200-220517		CMR-SP200-220617		CMR-SP200-220727		CMR-SP200-220830	
		5/17/2022		6/17/2022		7/27/2022		8/30/2022	
		0		126,978		76,011		31,926	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
VOCs									
1,1,1-TRICHLOROETHANE	71-55-6	ND	R	ND	--	ND	--	ND	--
1,1,2,2-TETRACHLOROETHANE	79-34-5	ND	R	ND	--	ND	--	ND	--
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ND	R	ND	--	ND	--	ND	--
1,1,2-TRICHLOROETHANE	79-00-5	ND	R	ND	--	ND	--	ND	--
1,1-DICHLOROETHANE	75-34-3	ND	R	ND	--	ND	--	ND	--
1,1-DICHLOROETHENE	75-35-4	ND	R	ND	--	ND	--	ND	--
1,2,3-TRICHLOROBENZENE	87-61-6	ND	R	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	R	ND	--	ND	--	ND	--
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	ND	R	ND	--	ND	--	ND	--
1,2-DIBROMOETHANE	106-93-4	ND	R	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	R	ND	--	ND	--	ND	--
1,2-DICHLOROETHANE	107-06-2	ND	R	ND	--	ND	--	ND	--
1,2-DICHLOROPROPANE	78-87-5	ND	R	ND	--	ND	--	ND	--
1,3-DICHLOROBENZENE	541-73-1	ND	R	ND	--	ND	--	ND	--
1,4-DICHLOROBENZENE	106-46-7	ND	R	ND	--	ND	--	ND	--
1,4-DIOXANE	123-91-1	ND	R	ND	--	ND	--	ND	--
2-BUTANONE	78-93-3	ND	R	ND	--	ND	--	26	0.00
2-HEXANONE	591-78-6	ND	R	ND	--	ND	--	ND	--
4-METHYL-2-PENTANONE	108-10-1	ND	R	ND	--	ND	--	ND	--
ACETONE	67-64-1	ND	R	100	0.03	ND	--	91	0.01
BENZENE	71-43-2	310	R	120	0.0336	19	0.0032	94	0.0066
BROMOCHLOROMETHANE	74-97-5	ND	R	ND	--	ND	--	ND	--
BROMODICHLOROMETHANE	75-27-4	ND	R	ND	--	ND	--	ND	--
BROMOFORM	75-25-2	ND	R	ND	--	ND	--	ND	--
BROMOMETHANE	74-83-9	ND	R	ND	--	ND	--	ND	--
CARBON DISULFIDE	75-15-0	ND	R	ND	--	ND	--	ND	--
CARBON TETRACHLORIDE	56-23-5	ND	R	ND	--	ND	--	ND	--
CHLOROBENZENE	108-90-7	ND	R	ND	--	ND	--	ND	--
CHLOROETHANE	75-00-3	ND	R	ND	--	ND	--	0.46	0.00
CHLOROFORM	67-66-3	ND	R	ND	--	ND	--	ND	--
CHLOROMETHANE	74-87-3	ND	R	ND	--	ND	--	0.42	0.00
CIS-1,2-DICHLOROETHENE	156-59-2	ND	R	ND	--	ND	--	ND	--
CIS-1,3-DICHLOROPROPENE	10061-01-5	ND	R	ND	--	ND	--	ND	--
CUMENE	98-82-8	ND	R	99	0.0277	22	0.0037	58	0.0041
CYCLOHEXANE	110-82-7	ND	R	320	0.09	49	0.01	170	0.01
DIBROMOCHLOROMETHANE	124-48-1	ND	R	ND	--	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	R	ND	--	ND	--	ND	--
ETHYL BENZENE	100-41-4	340	R	660	0.1848	95	0.0159	330	0.0232
M,P-XYLENE	179601-23-1	2600	R	8200	2.30	1900	0.32	2500	0.18
METHYL ACETATE	79-20-9	ND	R	ND	--	ND	--	ND	--
METHYL TERT-BUTYL ETHER	1634-04-4	ND	R	ND	--	ND	--	ND	--
METHYLCYCLOHEXANE	108-87-2	ND	R	340	0.10	50	0.01	220	0.02
METHYLENE CHLORIDE	75-09-2	ND	R	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	280	R	3200	0.8958	960	0.1609	350	0.0246
ORTHO-XYLENE	95-47-6	800	R	2900	0.81	740	0.12	780	0.05
STYRENE	100-42-5	ND	R	ND	--	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	R	ND	--	ND	--	ND	--
TOLUENE	108-88-3	170	R	240	0.07	34	0.01	24	0.00
TRANS-1,2-DICHLOROETHENE	156-60-5	ND	R	ND	--	ND	--	ND	--
TRANS-1,3-DICHLOROPROPENE	10061-02-6	ND	R	ND	--	ND	--	ND	--
TRICHLOROETHENE	79-01-6	ND	R	ND	--	ND	--	ND	--
TRICHLOROFLUOROMETHANE	75-69-4	ND	R	ND	--	ND	--	ND	--
VINYL CHLORIDE	75-01-4	ND	R	ND	--	ND	--	ND	--
XYLENES (TOTAL)	1330-20-7	--	R	--	--	--	--	--	--
Total VOCs	--	--	0.00	--	4.529	--	0.648	--	0.327
Period Total VOC Mass Removed (lbs)		0.0		4.529		0.648		0.327	
Cumulative Total VOC Mass Removed (lbs)		4.7		4.53		5.18		5.50	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200	
		CMR-SP200-220517		CMR-SP200-220617		CMR-SP200-220727		CMR-SP200-220830	
		5/17/2022		6/17/2022		7/27/2022		8/30/2022	
		0		126,978		76,011		31,926	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
SVOCs									
1,2,4,5-TETRACHLOROBENZENE	95-94-3	ND	R	ND	--	--	--	--	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	R	ND	--	--	--	--	--
1,2-DICHLOROBENZENE	95-50-1	ND	R	ND	--	--	--	--	--
1,3-DICHLOROBENZENE	541-73-1	ND	R	ND	--	--	--	--	--
1,4-DICHLOROBENZENE	106-46-7	ND	R	ND	--	--	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ND	R	ND	--	ND	--	ND	--
2,3,4,6-TETRACHLOROPHENOL	58-90-2	ND	R	ND	--	--	--	--	--
2,4,5-TRICHLOROPHENOL	95-95-4	ND	R	ND	--	ND	--	ND	--
2,4,6-TRICHLOROPHENOL	88-06-2	ND	R	ND	--	ND	--	ND	--
2,4-DICHLOROPHENOL	120-83-2	ND	R	ND	--	ND	--	ND	--
2,4-DIMETHYLPHENOL	105-67-9	ND	R	ND	--	ND	--	ND	--
2,4-DINITROPHENOL	51-28-5	ND	R	ND	--	ND	--	ND	--
2,4-DINITROTOLUENE	121-14-2	ND	R	ND	--	ND	--	ND	--
2,6-DINITROTOLUENE	606-20-2	ND	R	ND	--	ND	--	ND	--
2-CHLORONAPHTHALENE	91-58-7	ND	R	ND	--	ND	--	ND	--
2-CHLOROPHENOL	95-57-8	ND	R	ND	--	ND	--	ND	--
2-METHYLNAPHTHALENE	91-57-6	20,000	R	2,400	0.6718	2,000	0.3351	21,000	1.4781
2-METHYLPHENOL	95-48-7	ND	R	ND	--	ND	--	ND	--
2-NITROANILINE	88-74-4	ND	R	ND	--	ND	--	ND	--
2-NITROPHENOL	88-75-5	ND	R	ND	--	ND	--	ND	--
3,3'-DICHLOROBENZIDINE	91-94-1	ND	R	ND	--	ND	--	ND	--
3-NITROANILINE	99-09-2	ND	R	ND	--	ND	--	ND	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	R	ND	--	ND	--	ND	--
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	R	ND	--	ND	--	ND	--
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	R	ND	--	ND	--	ND	--
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	R	ND	--	ND	--	ND	--
4-METHYLPHENOL	106-44-5	ND	R	ND	--	ND	--	ND	--
4-NITROANILINE	100-01-6	ND	R	ND	--	ND	--	ND	--
4-NITROPHENOL	100-02-7	ND	R	ND	--	ND	--	ND	--
ACENAPHTHENE	83-32-9	380	R	93	0.0260	ND	--	ND	--
ACENAPHTHYLENE	208-96-8	ND	R	ND	--	ND	--	ND	--
ANTHRACENE	120-12-7	ND	R	ND	--	ND	--	ND	--
BENZO(A)ANTHRACENE	56-55-3	ND	R	ND	--	ND	--	ND	--
BENZO(A)PYRENE	50-32-8	ND	R	ND	--	ND	--	ND	--
BENZO(B)FLUORANTHENE	205-99-2	ND	R	ND	--	ND	--	ND	--
BENZO(G,H,I)PERYLENE	191-24-2	ND	R	ND	--	ND	--	ND	--
BENZO(K)FLUORANTHENE	207-08-9	ND	R	ND	--	ND	--	ND	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	R	ND	--	ND	--	ND	--
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	R	ND	--	ND	--	ND	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	R	ND	--	ND	--	ND	--
BUTYLBENZYLPHTHALATE	85-68-7	ND	R	ND	--	ND	--	ND	--
CARBAZOLE	86-74-8	ND	R	ND	--	ND	--	ND	--
CHRYSENE	218-01-9	ND	R	ND	--	ND	--	ND	--
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	R	ND	--	ND	--	ND	--
DIBENZOFURAN	132-64-9	ND	R	ND	--	ND	--	ND	--
DIETHYLPHTHALATE	84-66-2	ND	R	ND	--	ND	--	ND	--
DIMETHYLPHTHALATE	131-11-3	ND	R	ND	--	ND	--	ND	--
DI-N-BUTYLPHTHALATE	84-74-2	ND	R	ND	--	ND	--	ND	--
DI-N-OCTYLPHTHALATE	117-84-0	ND	R	ND	--	ND	--	ND	--
FLUORANTHENE	206-44-0	ND	R	ND	--	ND	--	ND	--
FLUORENE	86-73-7	910	R	130	0.0364	110	0.0184	1,100	0.0774
HEXACHLOROBENZENE	118-74-1	ND	R	ND	--	ND	--	ND	--
HEXACHLOROBUTADIENE	87-68-3	ND	R	ND	--	ND	--	ND	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	R	ND	--	ND	--	ND	--
HEXACHLOROETHANE	67-72-1	ND	R	ND	--	ND	--	ND	--
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	R	ND	--	ND	--	ND	--
ISOPHORONE	78-59-1	ND	R	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	12,000	R	1,100	0.3079	830	0.1391	9,800	0.6898
NITROBENZENE	98-95-3	ND	R	ND	--	ND	--	ND	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	R	ND	--	ND	--	ND	--
N-NITROSODIPHENYLAMINE	86-30-6	ND	R	ND	--	ND	--	ND	--
PENTACHLOROPHENOL	87-86-5	ND	R	ND	--	ND	--	ND	--
PHENANTHRENE	85-01-8	1,500	R	250	0.0700	230	0.0385	2,000	0.1408
PHENOL	108-95-2	ND	R	ND	--	ND	--	ND	--
PYRENE	129-00-0	230	R	ND	--	44	0.0074	ND	--
Total SVOCs	--	--	0.00	--	1.11	--	0.54	--	2.39
Period Total SVOC Mass Removed (lbs)		0.0		1.1		0.5		2.4	
Cumulative Total VOC Mass Removed (lbs)		2.3		3.4		4.0		6.3	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200	
		CMR-SP200-220517		CMR-SP200-220617		CMR-SP200-220727		CMR-SP200-220830	
		5/17/2022		6/17/2022		7/27/2022		8/30/2022	
		0		126,978		76,011		31,926	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
EPH									
C11 THROUGH C22 AROMATIC HYDROCARBONS	C11-C22-AROM	740,000	R --	530,000	148.36	120,000	20.11	--	--
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	660,000	R --	37,000	10.36	80,000	13.41	--	--
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	3,700,000	R --	240,000	67.18	340,000	56.97	--	--
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	5,100,000	R --	810,000	226.75	540,000	90.49	--	--
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	5,900,000	R --	670,000	187.56	590,000	98.87	2,550,000	179.48
Total EPHs	--	--	0.00	--	187.56	--	98.87	--	179.48
Period Total EPH Mass Removed (lbs)		0.0		187.6		98.9		179.5	
Cumulative Total EPH Mass Removed (lbs)		169.5		357.1		455.9		635.4	
VPH									
BENZENE	71-43-2	330	R --	58	0.02	ND	--	--	--
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	2,600	R --	1,300	0.36	ND	--	2,860	0.20
C9 THROUGH C10 AROMATIC HYDROCARBONS	C09-C10-AROM	29,000	R --	20,000	5.60	5,700	0.96	--	--
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	28,000	R --	8,600	2.41	4,300	0.72	29,500	2.08
ETHYL BENZENE	100-41-4	510	R --	110	0.03	ND	--	--	--
M,P-XYLENE	179601-23-1	3,200	R --	1,300	0.36	310	0.05	--	--
METHYL TERT-BUTYL ETHER	1634-04-4	ND	R --	ND	--	ND	--	--	--
NAPHTHALENE	91-20-3	1,600	R --	1,300	0.36	550	0.09	--	--
ORTHO-XYLENE	95-47-6	1,100	R --	550	0.15	160	0.03	--	--
TOLUENE	108-88-3	180	R --	52	0.01	ND	--	--	--
TOTAL PETROLEUM HYDROCARBONS	TPH	56,000	R --	29,000	8.12	9,500	1.59	62,800	4.42
Total VPHs	--	--	0.00	--	8.12	--	1.59	--	4.42
Period Total VPH Mass Removed (lbs)		0.0		8.1		1.6		4.4	
Cumulative Total VPH Mass Removed (lbs)		50.9		59.0		60.6		65.1	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200		SP200
		CMR-SP200-220830		CMR-SP200-221214		CMR-SP200-221214		CMR-SP200-221214		CMR-DS2-
		9/30/2022		10/31/2022		11/30/2022		12/14/2022		12/14/2022
		39,179		4,319		17		159,877		--
										Field Duplicate
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)
VOCs										
1,1,1-TRICHLOROETHANE	71-55-6	ND	--	ND	--	ND	--	ND	--	ND
1,1,2,2-TETRACHLOROETHANE	79-34-5	ND	--	ND	--	ND	--	ND	--	ND
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ND	--	ND	--	ND	--	ND	--	ND
1,1,2-TRICHLOROETHANE	79-00-5	ND	--	ND	--	ND	--	ND	--	ND
1,1-DICHLOROETHANE	75-34-3	ND	--	ND	--	ND	--	ND	--	ND
1,1-DICHLOROETHENE	75-35-4	ND	--	ND	--	ND	--	ND	--	ND
1,2,3-TRICHLOROBENZENE	87-61-6	ND	--	ND	--	ND	--	ND	--	ND
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--	ND	--	ND
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	ND	--	ND	--	ND	--	ND	--	ND
1,2-DIBROMOETHANE	106-93-4	ND	--	ND	--	ND	--	ND	--	ND
1,2-DICHLOROBENZENE	95-50-1	ND	--	ND	--	ND	--	ND	--	ND
1,2-DICHLOROETHANE	107-06-2	ND	--	ND	--	ND	--	ND	--	ND
1,2-DICHLOROPROPANE	78-87-5	ND	--	ND	--	ND	--	ND	--	ND
1,3-DICHLOROBENZENE	541-73-1	ND	--	ND	--	ND	--	ND	--	ND
1,4-DICHLOROBENZENE	106-46-7	ND	--	ND	--	ND	--	ND	--	ND
1,4-DIOXANE	123-91-1	ND	--	ND	--	ND	--	ND	--	ND
2-BUTANONE	78-93-3	26	0.00	ND	--	ND	--	ND	--	ND
2-HEXANONE	591-78-6	ND	--	ND	--	ND	--	ND	--	ND
4-METHYL-2-PENTANONE	108-10-1	ND	--	ND	--	ND	--	ND	--	ND
ACETONE	67-64-1	91	0.01	ND	--	ND	--	ND	--	ND
BENZENE	71-43-2	94	0.0081	200	0.0019	200	0.0000	200	0.0705	180
BROMOCHLOROMETHANE	74-97-5	ND	--	ND	--	ND	--	ND	--	ND
BROMODICHLOROMETHANE	75-27-4	ND	--	ND	--	ND	--	ND	--	ND
BROMOFORM	75-25-2	ND	--	ND	--	ND	--	ND	--	ND
BROMOMETHANE	74-83-9	ND	--	ND	--	ND	--	ND	--	ND
CARBON DISULFIDE	75-15-0	ND	--	ND	--	ND	--	ND	--	ND
CARBON TETRACHLORIDE	56-23-5	ND	--	ND	--	ND	--	ND	--	ND
CHLOROBENZENE	108-90-7	ND	--	ND	--	ND	--	ND	--	ND
CHLOROETHANE	75-00-3	0.46	0.00	ND	--	ND	--	ND	--	ND
CHLOROFORM	67-66-3	ND	--	ND	--	ND	--	ND	--	ND
CHLOROMETHANE	74-87-3	0.42	0.00	ND	--	ND	--	ND	--	ND
CIS-1,2-DICHLOROETHENE	156-59-2	ND	--	ND	--	ND	--	ND	--	ND
CIS-1,3-DICHLOROPROPENE	10061-01-5	ND	--	ND	--	ND	--	ND	--	ND
CUMENE	98-82-8	58	0.0050	81	0.0008	81	0.0000	81	0.0285	21
CYCLOHEXANE	110-82-7	170	0.01	190	0.00	190	0.00	190	0.07	53
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--	ND	--	ND	--	ND
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--	ND	--	ND	--	ND
ETHYL BENZENE	100-41-4	330	0.0285	490	0.0047	490	0.0000	490	0.1727	210
M,P-XYLENE	179601-23-1	2500	0.22	2700	0.03	2700	0.00	2700	0.95	1000
METHYL ACETATE	79-20-9	ND	--	ND	--	ND	--	ND	--	ND
METHYL TERT-BUTYL ETHER	1634-04-4	ND	--	ND	--	ND	--	ND	--	ND
METHYLCYCLOHEXANE	108-87-2	220	0.02	240	0.00	240	0.00	240	0.08	52
METHYLENE CHLORIDE	75-09-2	ND	--	ND	--	ND	--	ND	--	ND
NAPHTHALENE	91-20-3	350	0.0302	890	0.0085	890	0.0000	890	0.3137	270
ORTHO-XYLENE	95-47-6	780	0.07	590	0.01	590	0.00	590	0.21	250
STYRENE	100-42-5	ND	--	ND	--	ND	--	ND	--	ND
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--	ND	--	ND
TOLUENE	108-88-3	24	0.00	22	0.00	22	0.00	22	0.01	ND
TRANS-1,2-DICHLOROETHENE	156-60-5	ND	--	ND	--	ND	--	ND	--	ND
TRANS-1,3-DICHLOROPROPENE	10061-02-6	ND	--	ND	--	ND	--	ND	--	ND
TRICHLOROETHENE	79-01-6	ND	--	ND	--	ND	--	ND	--	ND
TRICHLOROFLUOROMETHANE	75-69-4	ND	--	ND	--	ND	--	ND	--	ND
VINYL CHLORIDE	75-01-4	ND	--	ND	--	ND	--	ND	--	ND
XYLENES (TOTAL)	1330-20-7	--	--	--	--	--	--	--	--	--
Total VOCs		--	0.401	--	0.051	--	0.000	--	1.904	--
Period Total VOC Mass Removed (lbs)		0.401		0.051		0.000		1.904		--
Cumulative Total VOC Mass Removed (lbs)		5.91		5.96		5.96		7.86		--

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200		SP200	
		CMR-SP200-220830		CMR-SP200-221214		CMR-SP200-221214		CMR-SP200-221214		CMR-DS2- CMR-DS2-2	
		9/30/2022		10/31/2022		11/30/2022		12/14/2022		12/14/2022	
		39,179		4,319		17		159,877		--	
										Field Duplicate	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	
SVOCs											
1,2,4,5-TETRACHLOROBENZENE	95-94-3	--	--	--	--	--	--	--	--	--	--
1,2,4-TRICHLOROBENZENE	120-82-1	--	--	--	--	--	--	--	--	--	--
1,2-DICHLOROBENZENE	95-50-1	--	--	--	--	--	--	--	--	--	--
1,3-DICHLOROBENZENE	541-73-1	--	--	--	--	--	--	--	--	--	--
1,4-DICHLOROBENZENE	106-46-7	--	--	--	--	--	--	--	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ND	--	ND	--	ND	--	ND	--	ND	ND
2,3,4,6-TETRACHLOROPHENOL	58-90-2	--	--	--	--	--	--	--	--	--	--
2,4,5-TRICHLOROPHENOL	95-95-4	ND	--	ND	--	ND	--	ND	--	ND	ND
2,4,6-TRICHLOROPHENOL	88-06-2	ND	--	ND	--	ND	--	ND	--	ND	ND
2,4-DICHLOROPHENOL	120-83-2	ND	--	ND	--	ND	--	ND	--	ND	ND
2,4-DIMETHYLPHENOL	105-67-9	ND	--	ND	--	ND	--	ND	--	ND	ND
2,4-DINITROPHENOL	51-28-5	ND	--	ND	--	ND	--	ND	--	ND	ND
2,4-DINITROTOLUENE	121-14-2	ND	--	ND	--	ND	--	ND	--	ND	ND
2,6-DINITROTOLUENE	606-20-2	ND	--	ND	--	ND	--	ND	--	ND	ND
2-CHLORONAPHTHALENE	91-58-7	ND	--	ND	--	ND	--	ND	--	ND	ND
2-CHLOROPHENOL	95-57-8	ND	--	ND	--	ND	--	ND	--	ND	ND
2-METHYLNAPHTHALENE	91-57-6	21,000	1.8138	2,000	0.0190	2,000	0.0001	2,000	0.0049	2,000	2,000
2-METHYLPHENOL	95-48-7	ND	--	ND	--	ND	--	ND	--	ND	ND
2-NITROANILINE	88-74-4	ND	--	ND	--	ND	--	ND	--	ND	ND
2-NITROPHENOL	88-75-5	ND	--	ND	--	ND	--	ND	--	ND	ND
3,3'-DICHLOROBENZIDINE	91-94-1	ND	--	ND	--	ND	--	ND	--	ND	ND
3-NITROANILINE	99-09-2	ND	--	ND	--	ND	--	ND	--	ND	ND
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	--	ND	--	ND	--	ND	--	ND	ND
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	--	ND	--	ND	--	ND	--	ND	ND
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	--	ND	--	ND	--	ND	--	ND	ND
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	--	ND	--	ND	--	ND	--	ND	ND
4-METHYLPHENOL	106-44-5	ND	--	ND	--	ND	--	ND	--	ND	ND
4-NITROANILINE	100-01-6	ND	--	ND	--	ND	--	ND	--	ND	ND
4-NITROPHENOL	100-02-7	ND	--	ND	--	ND	--	ND	--	ND	ND
ACENAPHTHENE	83-32-9	ND	--	51	0.0005	51	0.0000	51	0.0180	ND	ND
ACENAPHTHYLENE	208-96-8	ND	--	ND	--	ND	--	ND	--	ND	ND
ANTHRACENE	120-12-7	ND	--	ND	--	ND	--	ND	--	ND	ND
BENZO(A)ANTHRACENE	56-55-3	ND	--	ND	--	ND	--	ND	--	ND	ND
BENZO(A)PYRENE	50-32-8	ND	--	ND	--	ND	--	ND	--	ND	ND
BENZO(B)FLUORANTHENE	205-99-2	ND	--	ND	--	ND	--	ND	--	ND	ND
BENZO(G,H,I)PERYLENE	191-24-2	ND	--	ND	--	ND	--	ND	--	ND	ND
BENZO(K)FLUORANTHENE	207-08-9	ND	--	ND	--	ND	--	ND	--	ND	ND
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	--	ND	--	ND	--	ND	--	ND	ND
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	--	ND	--	ND	--	ND	--	ND	ND
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	--	ND	--	ND	--	ND	--	ND	ND
BUTYLBENZYLPHTHALATE	85-68-7	ND	--	ND	--	ND	--	ND	--	ND	ND
CARBAZOLE	86-74-8	ND	--	ND	--	ND	--	ND	--	ND	ND
CHRYSENE	218-01-9	ND	--	ND	--	ND	--	ND	--	ND	ND
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	--	ND	--	ND	--	ND	--	ND	ND
DIBENZOFURAN	132-64-9	ND	--	ND	--	ND	--	ND	--	ND	ND
DIETHYLPHTHALATE	84-66-2	ND	--	ND	--	ND	--	ND	--	ND	ND
DIMETHYLPHTHALATE	131-11-3	ND	--	ND	--	ND	--	ND	--	ND	ND
DI-N-BUTYLPHTHALATE	84-74-2	ND	--	ND	--	ND	--	ND	--	ND	ND
DI-N-OCTYLPHTHALATE	117-84-0	ND	--	ND	--	ND	--	ND	--	ND	ND
FLUORANTHENE	206-44-0	ND	--	ND	--	ND	--	ND	--	ND	ND
FLUORENE	86-73-7	1,100	0.0950	170	0.0016	170	0.0000	170	0.0599	110	110
HEXACHLOROBENZENE	118-74-1	ND	--	ND	--	ND	--	ND	--	ND	ND
HEXACHLOROBUTADIENE	87-68-3	ND	--	ND	--	ND	--	ND	--	ND	ND
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	--	ND	--	ND	--	ND	--	ND	ND
HEXACHLOROETHANE	67-72-1	ND	--	ND	--	ND	--	ND	--	ND	ND
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	--	ND	--	ND	--	ND	--	ND	ND
ISOPHORONE	78-59-1	ND	--	ND	--	ND	--	ND	--	ND	ND
NAPHTHALENE	91-20-3	9,800	0.8465	1,100	0.0105	1,100	0.0000	1,100	0.3877	1,000	1,000
NITROBENZENE	98-95-3	ND	--	ND	--	ND	--	ND	--	ND	ND
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	--	ND	--	ND	--	ND	--	ND	ND
N-NITROSODIPHENYLAMINE	86-30-6	ND	--	ND	--	ND	--	ND	--	ND	ND
PENTACHLOROPHENOL	87-86-5	ND	--	ND	--	ND	--	ND	--	ND	ND
PHENANTHRENE	85-01-8	2,000	0.1727	220	0.0021	220	0.0000	220	0.0775	210	210
PHENOL	108-95-2	ND	--	ND	--	ND	--	ND	--	ND	ND
PYRENE	129-00-0	ND	--	34	0.0003	34	0.0000	34	0.0120	33	33
Total SVOCs		--	2.93	--	0.03	--	0.00	--	1.26	--	--
Period Total SVOC Mass Removed (lbs)		2.9		0.0		0.0		1.3		--	
Cumulative Total VOC Mass Removed (lbs)		9.3		9.3		9.3		10.6		--	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200		SP200	
		CMR-SP200-220830		CMR-SP200-221214		CMR-SP200-221214		CMR-SP200-221214		CMR-SP200-221214	
		9/30/2022		10/31/2022		11/30/2022		12/14/2022		12/14/2022	
		39,179		4,319		17		159,877		--	
Analyte		CAS No.		Result (ug/L)		Mass (lb)		Result (ug/L)		Mass (lb)	
EPH											
C11 THROUGH C22 AROMATIC HYDROCARBONS	C11-C22-AROM	--	--	103,000	0.98	103,000	0.00	103,000	36.30	--	--
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	--	--	50,100	0.48	50,100	0.00	50,100	17.66	--	--
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	--	--	264,000	2.51	264,000	0.01	264,000	93.05	--	--
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	--	--	417,000	3.97	417,000	0.02	417,000	146.98	--	--
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	2,550,000	220.25	362,000	3.45	362,000	0.01	362,000	127.59	--	--
Total EPHs	--	--	220.25	--	3.45	--	0.01	--	127.59	--	--
Period Total EPH Mass Removed (lbs)		220.3		3.4		0.0		127.6		--	
Cumulative Total EPH Mass Removed (lbs)		855.7		859.1		859.1		986.7		--	
VPH											
BENZENE	71-43-2	--	--	--	--	--	--	--	--	--	--
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	2,860	0.25	ND	--	ND	--	ND	--	7,480	--
C9 THROUGH C10 AROMATIC HYDROCARBONS	C09-C10-AROM	--	--	--	--	--	--	--	--	--	--
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	29,500	2.55	42,500	0.40	42,500	0.00	42,500	14.98	65,500	--
ETHYL BENZENE	100-41-4	--	--	--	--	--	--	--	--	--	--
M,P-XYLENE	179601-23-1	--	--	--	--	--	--	--	--	--	--
METHYL TERT-BUTYL ETHER	1634-04-4	--	--	--	--	--	--	--	--	--	--
NAPHTHALENE	91-20-3	--	--	--	--	--	--	--	--	--	--
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--	--	--	--	--
TOLUENE	108-88-3	--	--	--	--	--	--	--	--	--	--
TOTAL PETROLEUM HYDROCARBONS	TPH	62,800	5.42	119,000	1.13	119,000	0.00	119,000	41.94	163,000	--
Total VPHs	--	--	5.42	--	1.13	--	0.00	--	41.94	--	--
Period Total VPH Mass Removed (lbs)		5.4		1.1		0.0		41.9		--	
Cumulative Total VPH Mass Removed (lbs)		70.5		71.6		71.6		113.6		--	

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes	SP200		SP200		SP200		SP200		
	CMR-SP200-230126		CMR-SP200-230228		CMR-SP200-230321		CMR-SP200-230503		
	1/26/2023		2/28/2023		3/21/2023		5/3/2023		
	88,291		48,336		89,975		127,742		
	Notes								
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
VOCs									
1,1,1-TRICHLOROETHANE	71-55-6	ND	--	ND	--	ND	--	ND	--
1,1,2,2-TETRACHLOROETHANE	79-34-5	ND	--	ND	--	ND	--	1.9	0.00
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ND	--	ND	--	ND	--	ND	--
1,1,2-TRICHLOROETHANE	79-00-5	ND	--	ND	--	ND	--	ND	--
1,1-DICHLOROETHANE	75-34-3	ND	--	ND	--	ND	--	ND	--
1,1-DICHLOROETHENE	75-35-4	ND	--	ND	--	ND	--	ND	--
1,2,3-TRICHLOROBENZENE	87-61-6	ND	--	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--	ND	--
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	ND	--	ND	--	ND	--	ND	--
1,2-DIBROMOETHANE	106-93-4	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROETHANE	107-06-2	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROPROPANE	78-87-5	ND	--	ND	--	ND	--	ND	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	ND	--	ND	--	ND	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	ND	--	ND	--	ND	--
1,4-DIOXANE	123-91-1	ND	--	ND	--	ND	--	ND	--
2-BUTANONE	78-93-3	ND	--	ND	--	ND	--	18	0.01
2-HEXANONE	591-78-6	ND	--	ND	--	ND	--	9.8	0.00
4-METHYL-2-PENTANONE	108-10-1	ND	--	ND	--	ND	--	5	0.00
ACETONE	67-64-1	40	0.01	ND	--	ND	--	45	0.01
BENZENE	71-43-2	23	0.0045	6	0.0006	21	0.0042	90	0.0253
BROMOCHLOROMETHANE	74-97-5	ND	--	ND	--	ND	--	ND	--
BROMODICHLOROMETHANE	75-27-4	ND	--	ND	--	ND	--	0.49	0.00
BROMOFORM	75-25-2	5.1	0.00	ND	--	ND	--	ND	--
BROMOMETHANE	74-83-9	ND	--	ND	--	ND	--	ND	--
CARBON DISULFIDE	75-15-0	ND	--	ND	--	ND	--	ND	--
CARBON TETRACHLORIDE	56-23-5	ND	--	ND	--	ND	--	ND	--
CHLOROBENZENE	108-90-7	ND	--	ND	--	ND	--	ND	--
CHLOROETHANE	75-00-3	ND	--	ND	--	ND	--	ND	--
CHLOROFORM	67-66-3	ND	--	ND	--	ND	--	ND	--
CHLOROMETHANE	74-87-3	ND	--	ND	--	ND	--	ND	--
CIS-1,2-DICHLOROETHENE	156-59-2	ND	--	ND	--	ND	--	ND	--
CIS-1,3-DICHLOROPROPENE	10061-01-5	ND	--	ND	--	ND	--	ND	--
CUMENE	98-82-8	15	0.0029	ND	--	ND	--	2.6	0.0007
CYCLOHEXANE	110-82-7	39	0.01	ND	--	ND	--	5.1	0.00
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--	ND	--	ND	--
ETHYL BENZENE	100-41-4	34	0.0066	ND	--	37	0.0073	29	0.0082
M,P-XYLENE	179601-23-1	1000	0.19	100	0.01	240	0.05	140	0.04
METHYL ACETATE	79-20-9	ND	--	ND	--	ND	--	ND	--
METHYL TERT-BUTYL ETHER	1634-04-4	ND	--	ND	--	ND	--	ND	--
METHYLCYCLOHEXANE	108-87-2	44	0.01	ND	--	ND	--	4.7	0.00
METHYLENE CHLORIDE	75-09-2	ND	--	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	1300	0.2530	130	0.0139	110	0.0218	61	0.0172
ORTHO-XYLENE	95-47-6	310	0.06	48	0.01	81	0.02	40	0.01
STYRENE	100-42-5	ND	--	ND	--	ND	--	1.3	0.00
TETRACHLOROETHENE	127-18-4	ND	--	ND	--				

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes	SP200		SP200		SP200		SP200		
	CMR-SP200-230126		CMR-SP200-230228		CMR-SP200-230321		CMR-SP200-230503		
	1/26/2023		2/28/2023		3/21/2023		5/3/2023		
	88,291		48,336		89,975		127,742		
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
SVOCs									
1,2,4,5-TETRACHLOROBENZENE	95-94-3	--	--	--	--	--	--	--	--
1,2,4-TRICHLOROBENZENE	120-82-1	--	--	--	--	--	--	--	--
1,2-DICHLOROBENZENE	95-50-1	--	--	--	--	--	--	--	--
1,3-DICHLOROBENZENE	541-73-1	--	--	--	--	--	--	--	--
1,4-DICHLOROBENZENE	106-46-7	--	--	--	--	--	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ND	--	ND	--	ND	--	ND	--
2,3,4,6-TETRACHLOROPHENOL	58-90-2	--	--	--	--	--	--	--	--
2,4,5-TRICHLOROPHENOL	95-95-4	ND	--	ND	--	ND	--	ND	--
2,4,6-TRICHLOROPHENOL	88-06-2	ND	--	ND	--	ND	--	ND	--
2,4-DICHLOROPHENOL	120-83-2	ND	--	ND	--	ND	--	ND	--
2,4-DIMETHYLPHENOL	105-67-9	ND	--	ND	--	450	0.0893	ND	--
2,4-DINITROPHENOL	51-28-5	ND	--	ND	--	ND	--	ND	--
2,4-DINITROTOLUENE	121-14-2	ND	--	ND	--	ND	--	ND	--
2,6-DINITROTOLUENE	606-20-2	ND	--	ND	--	ND	--	ND	--
2-CHLORONAPHTHALENE	91-58-7	ND	--	ND	--	ND	--	ND	--
2-CHLOROPHENOL	95-57-8	ND	--	ND	--	ND	--	ND	--
2-METHYLNAPHTHALENE	91-57-6	1,100	0.2141	390	0.0416	440	0.0873	ND	--
2-METHYLPHENOL	95-48-7	ND	--	ND	--	ND	--	ND	--
2-NITROANILINE	88-74-4	ND	--	ND	--	ND	--	ND	--
2-NITROPHENOL	88-75-5	ND	--	ND	--	ND	--	ND	--
3,3'-DICHLOROBENZIDINE	91-94-1	ND	--	ND	--	ND	--	ND	--
3-NITROANILINE	99-09-2	ND	--	ND	--	ND	--	ND	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	--	ND	--	ND	--	ND	--
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	--	ND	--	ND	--	ND	--
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	--	ND	--	ND	--	ND	--
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	--	ND	--	ND	--	ND	--
4-METHYLPHENOL	106-44-5	ND	--	ND	--	ND	--	22	0.01
4-NITROANILINE	100-01-6	ND	--	ND	--	ND	--	ND	--
4-NITROPHENOL	100-02-7	ND	--	ND	--	ND	--	ND	--
ACENAPHTHENE	83-32-9	ND	--	10	0.0011	ND	--	ND	--
ACENAPHTHYLENE	208-96-8	ND	--	ND	--	ND	--	ND	--
ANTHRACENE	120-12-7	ND	--	ND	--	ND	--	ND	--
BENZO(A)ANTHRACENE	56-55-3	ND	--	ND	--	ND	--	ND	--
BENZO(A)PYRENE	50-32-8	ND	--	ND	--	ND	--	ND	--
BENZO(B)FLUORANTHENE	205-99-2	ND	--	ND	--	ND	--	ND	--
BENZO(G,H,I)PERYLENE	191-24-2	ND	--	ND	--	ND	--	ND	--
BENZO(K)FLUORANTHENE	207-08-9	ND	--	ND	--	ND	--	ND	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	--	ND	--	ND	--	ND	--
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	--	ND	--	ND	--	ND	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	--	ND	--	ND	--	17	0.00
BUTYLBENZYLPHthalate	85-68-7	ND	--	ND	--	ND	--	ND	--
CARBAZOLE	86-74-8	ND	--	ND	--	ND	--	ND	--
CHRYSENE	218-01-9	ND	--	ND	--	ND	--	ND	--
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	--	ND	--	ND	--	ND	--
DIBENZOFURAN	132-64-9	ND	--	ND	--	ND	--	ND	--
DIETHYLPHthalate	84-66-2	ND	--	ND	--	ND	--	ND	--
DIMETHYLPHthalate	131-11-3	ND	--	ND	--	ND	--	ND	--
DI-N-BUTYLPHthalate	84-74-2	ND	--	ND	--	ND	--	ND	--
DI-N-OCTYLPHthalate	117-84-0	ND	--	ND	--	ND	--	ND	--
FLUORANTHENE	206-44-0	14	0.00	ND	--	ND	--	ND	--
FLUORENE	86-73-7	ND	--	29	0.0031	ND	--	ND	--
HEXACHLOROBENZENE	118-74-1	ND	--	ND	--	ND	--	ND	--
HEXACHLOROBUTADIENE	87-68-3	ND	--	ND	--	ND	--	ND	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	--	ND	--	ND	--	ND	--
HEXACHLOROETHANE	67-72-1	ND	--	ND	--	ND	--	ND	--
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	--	ND	--	ND	--	ND	--
ISOPHORONE	78-59-1	ND	--	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	460	0.0895	160	0.0170	220	0.0436	ND	--
NITROBENZENE	98-95-3	ND	--	ND	--	ND	--	ND	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	--	ND	--	ND	--	ND	--
N-NITROSODIPHENYLAMINE	86-30-6	ND	--	ND	--	ND	--	25	0.01
PENTACHLOROPHENOL	87-86-5	ND	--	ND	--	ND	--	ND	--
PHENANTHRENE	85-01-8	130	0.0253	45	0.0048	40	0.0079	ND	--
PHENOL	108-95-2	ND	--	ND	--	ND	--	12	0.00
PYRENE	129-00-0	32	0.0062	8	0.0009	9	0.0017	3	0.0007
Total SVOCs	--	--	0.34	--	0.07	--	0.23	--	--
Period Total SVOC Mass Removed (lbs)		0.3		0.1		0.2		0.0	
Cumulative Total VOC Mass Removed (lbs)		10.9		11.0		11.2		11.2	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200	
		CMR-SP200-230126		CMR-SP200-230228		CMR-SP200-230321		CMR-SP200-230503	
		1/26/2023		2/28/2023		3/21/2023		5/3/2023	
		88,291		48,336		89,975		127,742	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
EPH									
C11 THROUGH C22 AROMATIC HYDROCARBONS	C11-C22-AROM	209,000	40.68	49,500	5.27	92,500	18.35	22,300	6.28
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	--	--	--	--	--	--	--	--
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	--	--	--	--	--	--	--	--
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	713,000	138.78	200,000	21.31	560,000	111.08	99,100	27.91
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	977,000	190.17	240,000	25.57	569,000	112.87	138,000	38.86
Total EPHs	--	--	190.17	--	25.57	--	112.87	--	38.86
Period Total EPH Mass Removed (lbs)		190.2		25.6		112.9		38.9	
Cumulative Total EPH Mass Removed (lbs)		1176.9		1202.5		1315.3		1354.2	
VPH									
BENZENE	71-43-2	--	--	--	--	--	--	--	--
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	1,690	0.33	ND	--	894	0.18	718	0.20
C9 THROUGH C10 AROMATIC HYDROCARBONS	C09-C10-AROM	--	--	--	--	--	--	--	--
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	38,400	7.47	42,000	4.48	10,500	2.08	8,120	2.29
ETHYL BENZENE	100-41-4	--	--	--	--	--	--	--	--
M,P-XYLENE	179601-23-1	--	--	--	--	--	--	--	--
METHYL TERT-BUTYL ETHER	1634-04-4	--	--	--	--	--	--	--	--
NAPHTHALENE	91-20-3	--	--	--	--	--	--	--	--
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--	--	--
TOLUENE	108-88-3	--	--	--	--	--	--	--	--
TOTAL PETROLEUM HYDROCARBONS	TPH	76,500	14.89	85,600	9.12	21,100	4.19	15,700	4.42
Total VPHs	--	--	14.89	--	9.12	--	4.19	--	4.42
Period Total VPH Mass Removed (lbs)		14.9		9.1		4.2		4.4	
Cumulative Total VPH Mass Removed (lbs)		128.4		137.6		141.8		146.2	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-230531		CMR-SP200-290623		CMR-SP200-110723	
		5/31/2023		6/23/2023		7/11/2023	
		151,878		306,490		125,244	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
VOCs							
1,1,1-TRICHLOROETHANE	71-55-6	ND	--	ND	--	ND	--
1,1,2,2-TETRACHLOROETHANE	79-34-5	ND	--	ND	--	21	0.01
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ND	--	ND	--	ND	--
1,1,2-TRICHLOROETHANE	79-00-5	ND	--	ND	--	ND	--
1,1-DICHLOROETHANE	75-34-3	ND	--	ND	--	ND	--
1,1-DICHLOROETHENE	75-35-4	ND	--	ND	--	ND	--
1,2,3-TRICHLOROBENZENE	87-61-6	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	ND	--	ND	--	ND	--
1,2-DIBROMOETHANE	106-93-4	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	ND	--	ND	--
1,2-DICHLOROETHANE	107-06-2	ND	--	ND	--	ND	--
1,2-DICHLOROPROPANE	78-87-5	ND	--	ND	--	ND	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	ND	--	ND	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	ND	--	ND	--
1,4-DIOXANE	123-91-1	ND	--	ND	--	ND	--
2-BUTANONE	78-93-3	ND	--	ND	--	ND	--
2-HEXANONE	591-78-6	ND	--	ND	--	ND	--
4-METHYL-2-PENTANONE	108-10-1	ND	--	ND	--	ND	--
ACETONE	67-64-1	ND	--	ND	--	ND	--
BENZENE	71-43-2	27	0.0090	84.9	0.0574	53	0.0146
BROMOCHLOROMETHANE	74-97-5	ND	--	ND	--	ND	--
BROMODICHLOROMETHANE	75-27-4	ND	--	ND	--	ND	--
BROMOFORM	75-25-2	ND	--	ND	--	ND	--
BROMOMETHANE	74-83-9	ND	--	ND	--	ND	--
CARBON DISULFIDE	75-15-0	ND	--	ND	--	ND	--
CARBON TETRACHLORIDE	56-23-5	ND	--	ND	--	ND	--
CHLOROBENZENE	108-90-7	ND	--	ND	--	ND	--
CHLOROETHANE	75-00-3	ND	--	ND	--	ND	--
CHLOROFORM	67-66-3	ND	--	ND	--	ND	--
CHLOROMETHANE	74-87-3	ND	--	ND	--	ND	--
CIS-1,2-DICHLOROETHENE	156-59-2	ND	--	ND	--	ND	--
CIS-1,3-DICHLOROPROPENE	10061-01-5	ND	--	ND	--	ND	--
CUMENE	98-82-8	17	0.0057	8.73	0.0059	37	0.0102
CYCLOHEXANE	110-82-7	16	0.01	ND	--	28	0.01
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--	ND	--
ETHYL BENZENE	100-41-4	78	0.0261	101	0.0682	300	0.0828
M,P-XYLENE	179601-23-1	770	0.26	--	--	1500	0.41
METHYL ACETATE	79-20-9	ND	--	ND	--	ND	--
METHYL TERT-BUTYL ETHER	1634-04-4	ND	--	ND	--	ND	--
METHYLCYCLOHEXANE	108-87-2	19	0.01	ND	--	35	0.01
METHYLENE CHLORIDE	75-09-2	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	760	0.2545	--	--	430	0.1187
ORTHO-XYLENE	95-47-6	270	0.09	157	0.11	550	0.15
STYRENE	100-42-5	ND	--	ND	--	17	0.00
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--
TOLUENE	108-88-3	6.1	0.00	ND	--	29	0.01
TRANS-1,2-DICHLOROETHENE	156-60-5	ND	--	ND	--	ND	--
TRANS-1,3-DICHLOROPROPENE	10061-02-6	ND	--	ND	--	ND	--
TRICHLOROETHENE	79-01-6	ND	--	ND	--	ND	--
TRICHLOROFLUOROMETHANE	75-69-4	ND	--	ND	--	ND	--
VINYL CHLORIDE	75-01-4	ND	--	ND	--	ND	--
XYLENES (TOTAL)	1330-20-7	--	--	--	--	--	--
Total VOCs	--	--	0.657	--	0.238	--	0.828
Period Total VOC Mass Removed (lbs)		0.657		0.238		0.828	
Cumulative Total VOC Mass Removed (lbs)		9.33		9.57		10.40	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-230531		CMR-SP200-290623		CMR-SP200-110723	
		5/31/2023		6/23/2023		7/11/2023	
		151,878		306,490		125,244	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
SVOCs							
1,2,4,5-TETRACHLOROBENZENE	95-94-3	--	--	--	--	--	--
1,2,4-TRICHLOROBENZENE	120-82-1	--	--	--	--	--	--
1,2-DICHLOROBENZENE	95-50-1	--	--	--	--	--	--
1,3-DICHLOROBENZENE	541-73-1	--	--	--	--	--	--
1,4-DICHLOROBENZENE	106-46-7	--	--	--	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ND	--	ND	--	ND	--
2,3,4,6-TETRACHLOROPHENOL	58-90-2	--	--	--	--	--	--
2,4,5-TRICHLOROPHENOL	95-95-4	ND	--	ND	--	ND	--
2,4,6-TRICHLOROPHENOL	88-06-2	ND	--	ND	--	ND	--
2,4-DICHLOROPHENOL	120-83-2	ND	--	ND	--	ND	--
2,4-DIMETHYLPHENOL	105-67-9	ND	--	28	0.0189	ND	--
2,4-DINITROPHENOL	51-28-5	ND	--	ND	--	ND	--
2,4-DINITROTOLUENE	121-14-2	ND	--	ND	--	ND	--
2,6-DINITROTOLUENE	606-20-2	ND	--	ND	--	ND	--
2-CHLORONAPHTHALENE	91-58-7	ND	--	ND	--	ND	--
2-CHLOROPHENOL	95-57-8	ND	--	ND	--	ND	--
2-METHYLNAPHTHALENE	91-57-6	1,200	0.4018	80	0.0543	4,000	1.1044
2-METHYLPHENOL	95-48-7	ND	--	ND	--	ND	--
2-NITROANILINE	88-74-4	ND	--	ND	--	ND	--
2-NITROPHENOL	88-75-5	ND	--	ND	--	ND	--
3,3'-DICHLOROBENZIDINE	91-94-1	ND	--	ND	--	ND	--
3-NITROANILINE	99-09-2	ND	--	ND	--	ND	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	--	ND	--	ND	--
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	--	ND	--	ND	--
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	--	ND	--	ND	--
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	--	ND	--	ND	--
4-METHYLPHENOL	106-44-5	ND	--	--	--	ND	--
4-NITROANILINE	100-01-6	ND	--	ND	--	ND	--
4-NITROPHENOL	100-02-7	ND	--	ND	--	ND	--
ACENAPHTHENE	83-32-9	ND	--	ND	--	ND	--
ACENAPHTHYLENE	208-96-8	ND	--	ND	--	ND	--
ANTHRACENE	120-12-7	ND	--	ND	--	ND	--
BENZO(A)ANTHRACENE	56-55-3	ND	--	ND	--	ND	--
BENZO(A)PYRENE	50-32-8	ND	--	ND	--	ND	--
BENZO(B)FLUORANTHENE	205-99-2	ND	--	ND	--	ND	--
BENZO(G,H,I)PERYLENE	191-24-2	ND	--	ND	--	ND	--
BENZO(K)FLUORANTHENE	207-08-9	ND	--	ND	--	ND	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	--	ND	--	ND	--
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	--	ND	--	ND	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	--	ND	--	ND	--
BUTYLBENZYLPHTHALATE	85-68-7	ND	--	ND	--	ND	--
CARBAZOLE	86-74-8	ND	--	ND	--	ND	--
CHRYSENE	218-01-9	ND	--	ND	--	ND	--
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	--	ND	--	ND	--
DIBENZOFURAN	132-64-9	ND	--	ND	--	ND	--
DIETHYLPHTHALATE	84-66-2	ND	--	ND	--	ND	--
DIMETHYLPHTHALATE	131-11-3	ND	--	ND	--	ND	--
DI-N-BUTYLPHTHALATE	84-74-2	ND	--	ND	--	ND	--
DI-N-OCTYLPHTHALATE	117-84-0	ND	--	ND	--	ND	--
FLUORANTHENE	206-44-0	ND	--	ND	--	ND	--
FLUORENE	86-73-7	ND	--	6	0.0041	ND	--
HEXACHLOROBENZENE	118-74-1	ND	--	ND	--	ND	--
HEXACHLOROBUTADIENE	87-68-3	ND	--	ND	--	ND	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	--	ND	--	ND	--
HEXACHLOROETHANE	67-72-1	ND	--	ND	--	ND	--
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	--	ND	--	ND	--
ISOPHORONE	78-59-1	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	570	0.1909	74	0.0500	2,100	0.5798
NITROBENZENE	98-95-3	ND	--	ND	--	ND	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	--	ND	--	ND	--
N-NITROSODIPHENYLAMINE	86-30-6	ND	--	ND	--	ND	--
PENTACHLOROPHENOL	87-86-5	ND	--	ND	--	ND	--
PHENANTHRENE	85-01-8	110	0.0368	5	0.0034	350	0.0966
PHENOL	108-95-2	ND	--	ND	--	ND	--
PYRENE	129-00-0	22	0.0074	1	0.0008	67	0.0185
Total SVOCs	--	--	0.64	--	0.13	--	1.80
Period Total SVOC Mass Removed (lbs)			0.6		0.1		1.8
Cumulative Total VOC Mass Removed (lbs)			11.9		12.0		13.8

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-230531		CMR-SP200-290623		CMR-SP200-110723	
		5/31/2023		6/23/2023		7/11/2023	
		151,878		306,490		125,244	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
EPH							
C11 THROUGH C22 AROMATIC HYDROCARBONS	C11-C22-AROM	77,000	25.78	83,500	56.42	331,000	91.39
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	--	--	--	--	--	--
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	--	--	--	--	--	--
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	348,000	116.52	354,000	239.19	--	--
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	388,000	129.91	643,000	434.46	1,850,000	510.81
Total EPHs	--	--	129.91	--	434.46	--	510.81
Period Total EPH Mass Removed (lbs)		129.9		434.5		510.8	
Cumulative Total EPH Mass Removed (lbs)		1484.1		1918.6		2429.4	
VPH							
BENZENE	71-43-2	--	--	--	--	--	--
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	3,690	1.24	ND	--	2,160	0.60
C9 THROUGH C10 AROMATIC HYDROCARBONS	C09-C10-AROM	--	--	--	--	--	--
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	112,000	37.50	3,790	2.56	12,300	3.40
ETHYL BENZENE	100-41-4	--	--	--	--	--	--
M,P-XYLENE	179601-23-1	--	--	--	--	--	--
METHYL TERT-BUTYL ETHER	1634-04-4	--	--	--	--	--	--
NAPHTHALENE	91-20-3	--	--	--	--	--	--
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--
TOLUENE	108-88-3	--	--	--	--	--	--
TOTAL PETROLEUM HYDROCARBONS	TPH	154,000	51.56	10,800	7.30	37,500	10.35
Total VPHs	--	--	51.56	--	7.30	--	10.35
Period Total VPH Mass Removed (lbs)		51.6		7.3		10.4	
Cumulative Total VPH Mass Removed (lbs)		197.7		205.0		215.4	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200	
		CMQ-SP200-101223		CUR-SP200-122723	
		10/12/2023		12/27/2023	
		33,349		54,067	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
VOCs					
1,1,1-TRICHLOROETHANE	71-55-6	ND	--	ND	--
1,1,2,2-TETRACHLOROETHANE	79-34-5	ND	--	ND	--
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ND	--	ND	--
1,1,2-TRICHLOROETHANE	79-00-5	ND	--	ND	--
1,1-DICHLOROETHANE	75-34-3	ND	--	ND	--
1,1-DICHLOROETHENE	75-35-4	ND	--	ND	--
1,2,3-TRICHLOROBENZENE	87-61-6	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	ND	--	ND	--
1,2-DIBROMOETHANE	106-93-4	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	ND	--
1,2-DICHLOROETHANE	107-06-2	ND	--	ND	--
1,2-DICHLOROPROPANE	78-87-5	ND	--	ND	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	ND	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	ND	--
1,4-DIOXANE	123-91-1	--	--	--	--
2-BUTANONE	78-93-3	ND	--	ND	--
2-HEXANONE	591-78-6	--	--	ND	--
4-METHYL-2-PENTANONE	108-10-1	ND	--	ND	--
ACETONE	67-64-1	ND	--	ND	--
BENZENE	71-43-2	0.452	0.0000	300	0.0358
BROMOCHLOROMETHANE	74-97-5	--	--	ND	--
BROMODICHLOROMETHANE	75-27-4	ND	--	ND	--
BROMOFORM	75-25-2	ND	--	ND	--
BROMOMETHANE	74-83-9	ND	--	ND	--
CARBON DISULFIDE	75-15-0	--	--	1.35	0.0002
CARBON TETRACHLORIDE	56-23-5	ND	--	ND	--
CHLOROBENZENE	108-90-7	ND	--	ND	--
CHLOROETHANE	75-00-3	ND	--	ND	--
CHLOROFORM	67-66-3	ND	--	ND	--
CHLOROMETHANE	74-87-3	ND	--	ND	--
CIS-1,2-DICHLOROETHENE	156-59-2	ND	--	ND	--
CIS-1,3-DICHLOROPROPENE	10061-01-5	ND	--	ND	--
CUMENE	98-82-8	ND	--	3.42	0.0004
CYCLOHEXANE	110-82-7	--	--	--	--
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--
ETHYL BENZENE	100-41-4	ND	--	23.7	0.0028
M,P-XYLENE	179601-23-1	--	--	--	--
METHYL ACETATE	79-20-9	--	--	--	--
METHYL TERT-BUTYL ETHER	1634-04-4	ND	--	ND	--
METHYLCYCLOHEXANE	108-87-2	--	--	--	--
METHYLENE CHLORIDE	75-09-2	ND	--	ND	--
NAPHTHALENE	91-20-3	0.357	0.0000	47.6	0.0057
ORTHO-XYLENE	95-47-6	--	--	--	--
STYRENE	100-42-5	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	--	ND	--
TOLUENE	108-88-3	ND	--	ND	--
TRANS-1,2-DICHLOROETHENE	156-60-5	ND	--	ND	--
TRANS-1,3-DICHLOROPROPENE	10061-02-6	ND	--	ND	--
TRICHLOROETHENE	79-01-6	ND	--	ND	--
TRICHLOROFLUOROMETHANE	75-69-4	ND	--	ND	--
VINYL CHLORIDE	75-01-4	ND	--	ND	--
XYLENES (TOTAL)	1330-20-7	--	--	--	--
Total VOCs	--	--	0.000	--	0.045
Period Total VOC Mass Removed (lbs)		0.000		0.045	
Cumulative Total VOC Mass Removed (lbs)		10.40		10.44	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200 CMQ-SP200-101223 10/12/2023 33,349		SP200 CUR-SP200-122723 12/27/2023 54,067	
		Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
SVOCs					
1,2,4,5-TETRACHLOROBENZENE	95-94-3	--	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	--	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	--	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ND	--	ND	--
2,3,4,6-TETRACHLOROPHENOL	58-90-2	--	--	ND	--
2,4,5-TRICHLOROPHENOL	95-95-4	--	--	ND	--
2,4,6-TRICHLOROPHENOL	88-06-2	ND	--	ND	--
2,4-DICHLOROPHENOL	120-83-2	ND	--	ND	--
2,4-DIMETHYLPHENOL	105-67-9	ND	--	47	0.0056
2,4-DINITROPHENOL	51-28-5	ND	--	ND	--
2,4-DINITROTOLUENE	121-14-2	ND	--	ND	--
2,6-DINITROTOLUENE	606-20-2	ND	--	ND	--
2-CHLORONAPHTHALENE	91-58-7	ND	--	ND	--
2-CHLOROPHENOL	95-57-8	ND	--	ND	--
2-METHYLNAPHTHALENE	91-57-6	--	--	57	0.0068
2-METHYLPHENOL	95-48-7	--	--	ND	--
2-NITROANILINE	88-74-4	--	--	ND	--
2-NITROPHENOL	88-75-5	ND	--	ND	--
3,3'-DICHLOROBENZIDINE	91-94-1	ND	--	ND	--
3-NITROANILINE	99-09-2	--	--	ND	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	--	ND	--
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	--	ND	--
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	--	ND	--
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	--	ND	--
4-METHYLPHENOL	106-44-5	--	--	--	--
4-NITROANILINE	100-01-6	--	--	ND	--
4-NITROPHENOL	100-02-7	ND	--	ND	--
ACENAPHTHENE	83-32-9	ND	--	8	0.0010
ACENAPHTHYLENE	208-96-8	ND	--	ND	--
ANTHRACENE	120-12-7	ND	--	ND	--
BENZO(A)ANTHRACENE	56-55-3	ND	--	ND	--
BENZO(A)PYRENE	50-32-8	ND	--	ND	--
BENZO(B)FLUORANTHENE	205-99-2	ND	--	ND	--
BENZO(G,H,I)PERYLENE	191-24-2	ND	--	ND	--
BENZO(K)FLUORANTHENE	207-08-9	ND	--	ND	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	--	ND	--
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	--	ND	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	--	ND	--
BUTYLBENZYLPHTHALATE	85-68-7	ND	--	ND	--
CARBAZOLE	86-74-8	--	--	--	--
CHRYSENE	218-01-9	ND	--	ND	--
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	--	ND	--
DIBENZOFURAN	132-64-9	--	--	ND	--
DIETHYLPHTHALATE	84-66-2	ND	--	ND	--
DIMETHYLPHTHALATE	131-11-3	ND	--	ND	--
DI-N-BUTYLPHTHALATE	84-74-2	ND	--	ND	--
DI-N-OCTYLPHTHALATE	117-84-0	ND	--	ND	--
FLUORANTHENE	206-44-0	ND	--	ND	--
FLUORENE	86-73-7	ND	--	16	0.0019
HEXACHLOROBENZENE	118-74-1	ND	--	ND	--
HEXACHLOROBUTADIENE	87-68-3	ND	--	ND	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	--	ND	--
HEXACHLOROETHANE	67-72-1	ND	--	ND	--
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	--	ND	--
ISOPHORONE	78-59-1	ND	--	ND	--
NAPHTHALENE	91-20-3	7	0.0005	19	0.0023
NITROBENZENE	98-95-3	ND	--	ND	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	--	ND	--
N-NITROSODIPHENYLAMINE	86-30-6	ND	--	ND	--
PENTACHLOROPHENOL	87-86-5	ND	--	ND	--
PHENANTHRENE	85-01-8	ND	--	11	0.0013
PHENOL	108-95-2	ND	--	ND	--
PYRENE	129-00-0	ND	--	4	0.0005
Total SVOCs	--	--	0.00054	--	0.019
Period Total SVOC Mass Removed (lbs)		0.00054		0.019	
Cumulative Total VOC Mass Removed (lbs)		13.79		13.81	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200	
		CMQ-SP200-101223		CUR-SP200-122723	
		10/12/2023		12/27/2023	
		33,349		54,067	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
EPH					
C11 THROUGH C22 AROMATIC HYDROCARBONS	C11-C22-AROM	--	--	1,170,000	139.46
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	--	--	102,000	12.16
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	--	--	306,000	36.47
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	--	--	--	--
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	508.0	0.037	914,000	108.94
Total EPHs	--	--	0.04	--	108.94
Period Total EPH Mass Removed (lbs)		0.037		108.9	
Cumulative Total EPH Mass Removed (lbs)		2429.4		2538.3	
VPH					
BENZENE	71-43-2	--	--	--	--
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	ND	--	ND	--
C9 THROUGH C10 AROMATIC HYDROCARBONS	C09-C10-AROM	30.3	0.00	3,790	0.45
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	43.4	0.00	10,300	1.23
ETHYL BENZENE	100-41-4	--	--	--	--
M,P-XYLENE	179601-23-1	--	--	--	--
METHYL TERT-BUTYL ETHER	1634-04-4	--	--	--	--
NAPHTHALENE	91-20-3	--	--	--	--
ORTHO-XYLENE	95-47-6	--	--	--	--
TOLUENE	108-88-3	--	--	--	--
TOTAL PETROLEUM HYDROCARBONS	TPH	74.8	0.0055	14,800	1.76
Total VPHs	--	--	0.0055	--	1.76
Period Total VPH Mass Removed (lbs)		0.0055		1.76	
Cumulative Total VPH Mass Removed (lbs)		215.4		217.2	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-013124		CMR-SP200-240208		CMR-SP200-240320	
		1/31/2024		2/8/2024		3/20/2024	
		19,177		32,365		36,438	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
VOCs							
1,1,1-TRICHLOROETHANE	71-55-6	ND	--	ND	--	ND	--
1,1,2,2-TETRACHLOROETHANE	79-34-5	ND	--	ND	--	5.94	0.00
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ND	--	ND	--	ND	--
1,1,2-TRICHLOROETHANE	79-00-5	ND	--	ND	--	ND	--
1,1-DICHLOROETHANE	75-34-3	ND	--	ND	--	ND	--
1,1-DICHLOROETHENE	75-35-4	ND	--	ND	--	ND	--
1,2,3-TRICHLOROBENZENE	87-61-6	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	ND	--	ND	--	ND	--
1,2-DIBROMOETHANE	106-93-4	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	ND	--	ND	--
1,2-DICHLOROETHANE	107-06-2	ND	--	ND	--	ND	--
1,2-DICHLOROPROPANE	78-87-5	ND	--	ND	--	ND	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	ND	--	ND	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	ND	--	ND	--
1,4-DIOXANE	123-91-1	--	--	--	--	--	--
2-BUTANONE	78-93-3	ND	--	2.07	0.00	4.35	0.00
2-HEXANONE	591-78-6	ND	--	ND	--	ND	--
4-METHYL-2-PENTANONE	108-10-1	ND	--	3.07	0.00	4.72	0.00
ACETONE	67-64-1	ND	--	ND	--	28.4	0.00
BENZENE	71-43-2	10.6	0.0004	2.51	0.0002	1.31	0.0001
BROMOCHLOROMETHANE	74-97-5	ND	--	ND	--	ND	--
BROMODICHLOROMETHANE	75-27-4	ND	--	ND	--	ND	--
BROMOFORM	75-25-2	ND	--	ND	--	ND	--
BROMOMETHANE	74-83-9	ND	--	ND	--	ND	--
CARBON DISULFIDE	75-15-0	ND	--	ND	--	ND	--
CARBON TETRACHLORIDE	56-23-5	ND	--	ND	--	ND	--
CHLOROBENZENE	108-90-7	ND	--	ND	--	ND	--
CHLOROETHANE	75-00-3	ND	--	ND	--	ND	--
CHLOROFORM	67-66-3	ND	--	ND	--	ND	--
CHLOROMETHANE	74-87-3	ND	--	ND	--	ND	--
CIS-1,2-DICHLOROETHENE	156-59-2	ND	--	ND	--	ND	--
CIS-1,3-DICHLOROPROPENE	10061-01-5	ND	--	ND	--	ND	--
CUMENE	98-82-8	ND	--	0.709	0.0001	1.24	0.0001
CYCLOHEXANE	110-82-7	--	--	--	--	--	--
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--	ND	--
ETHYL BENZENE	100-41-4	7	0.0003	2.56	0.0002	6.22	0.0005
M,P-XYLENE	179601-23-1	--	--	--	--	--	--
METHYL ACETATE	79-20-9	--	--	--	--	--	--
METHYL TERT-BUTYL ETHER	1634-04-4	ND	--	ND	--	ND	--
METHYLCYCLOHEXANE	108-87-2	--	--	--	--	--	--
METHYLENE CHLORIDE	75-09-2	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	97.5	0.0041	10.3	0.0007	13.0	0.0010
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--
STYRENE	100-42-5	ND	--	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--
TOLUENE	108-88-3	ND	--	2.67	0.00	4.39	0.00
TRANS-1,2-DICHLOROETHENE	156-60-5	ND	--	ND	--	ND	--
TRANS-1,3-DICHLOROPROPENE	10061-02-6	ND	--	ND	--	ND	--
TRICHLOROETHENE	79-01-6	ND	--	ND	--	ND	--
TRICHLOROFLUOROMETHANE	75-69-4	ND	--	ND	--	ND	--
VINYL CHLORIDE	75-01-4	ND	--	ND	--	ND	--
XYLENES (TOTAL)	1330-20-7	--	--	--	--	--	--
Total VOCs	--	--	0.005	--	0.002	--	0.006
Period Total VOC Mass Removed (lbs)		0.005		0.002		0.006	
Cumulative Total VOC Mass Removed (lbs)		10.45		10.45		10.45	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-013124		CMR-SP200-240208		CMR-SP200-240320	
		1/31/2024		2/8/2024		3/20/2024	
		19,177		32,365		36,438	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
SVOCs							
1,2,4,5-TETRACHLOROBENZENE	95-94-3	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	--	--	--	--	--	--
1,3-DICHLOROBENZENE	541-73-1	--	--	--	--	--	--
1,4-DICHLOROBENZENE	106-46-7	--	--	--	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ND	--	ND	--	ND	--
2,3,4,6-TETRACHLOROPHENOL	58-90-2	ND	--	ND	--	ND	--
2,4,5-TRICHLOROPHENOL	95-95-4	ND	--	ND	--	ND	--
2,4,6-TRICHLOROPHENOL	88-06-2	ND	--	ND	--	ND	--
2,4-DICHLOROPHENOL	120-83-2	ND	--	ND	--	ND	--
2,4-DIMETHYLPHENOL	105-67-9	ND	--	24.2	0.0017	15.3	0.0012
2,4-DINITROPHENOL	51-28-5	ND	--	ND	--	ND	--
2,4-DINITROTOLUENE	121-14-2	ND	--	ND	--	ND	--
2,6-DINITROTOLUENE	606-20-2	ND	--	ND	--	ND	--
2-CHLORONAPHTHALENE	91-58-7	ND	--	ND	--	ND	--
2-CHLOROPHENOL	95-57-8	ND	--	ND	--	ND	--
2-METHYLNAPHTHALENE	91-57-6	156	0.0066	ND	--	1.88	0.0002
2-METHYLPHENOL	95-48-7	ND	--	ND	--	ND	--
2-NITROANILINE	88-74-4	ND	--	ND	--	ND	--
2-NITROPHENOL	88-75-5	ND	--	ND	--	ND	--
3,3'-DICHLOROBENZIDINE	91-94-1	ND	--	ND	--	ND	--
3-NITROANILINE	99-09-2	ND	--	ND	--	ND	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	--	ND	--	ND	--
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	--	ND	--	ND	--
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	--	ND	--	ND	--
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	--	ND	--	ND	--
4-METHYLPHENOL	106-44-5	--	--	--	--	--	--
4-NITROANILINE	100-01-6	ND	--	ND	--	ND	--
4-NITROPHENOL	100-02-7	ND	--	ND	--	ND	--
ACENAPHTHENE	83-32-9	ND	--	ND	--	ND	--
ACENAPHTHYLENE	208-96-8	ND	--	ND	--	ND	--
ANTHRACENE	120-12-7	ND	--	ND	--	ND	--
BENZO(A)ANTHRACENE	56-55-3	ND	--	ND	--	ND	--
BENZO(A)PYRENE	50-32-8	ND	--	ND	--	ND	--
BENZO(B)FLUORANTHENE	205-99-2	ND	--	ND	--	ND	--
BENZO(G,H,I)PERYLENE	191-24-2	ND	--	ND	--	ND	--
BENZO(K)FLUORANTHENE	207-08-9	ND	--	ND	--	ND	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	--	ND	--	ND	--
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	--	ND	--	ND	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	--	ND	--	ND	--
BUTYLBENZYLPHTHALATE	85-68-7	ND	--	ND	--	ND	--
CARBAZOLE	86-74-8	--	--	--	--	--	--
CHRYSENE	218-01-9	ND	--	ND	--	ND	--
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	--	ND	--	ND	--
DIBENZOFURAN	132-64-9	ND	--	ND	--	ND	--
DIETHYLPHTHALATE	84-66-2	ND	--	ND	--	ND	--
DIMETHYLPHTHALATE	131-11-3	ND	--	ND	--	ND	--
DI-N-BUTYLPHTHALATE	84-74-2	ND	--	ND	--	ND	--
DI-N-OCTYLPHTHALATE	117-84-0	ND	--	ND	--	ND	--
FLUORANTHENE	206-44-0	ND	--	ND	--	ND	--
FLUORENE	86-73-7	61	0.0026	ND	--	ND	--
HEXACHLOROBENZENE	118-74-1	ND	--	ND	--	ND	--
HEXACHLOROBUTADIENE	87-68-3	ND	--	ND	--	ND	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	--	ND	--	ND	--
HEXACHLOROETHANE	67-72-1	ND	--	ND	--	ND	--
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	--	ND	--	ND	--
ISOPHORONE	78-59-1	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	50	0.0021	2	0.0001	1	0.0001
NITROBENZENE	98-95-3	ND	--	ND	--	ND	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	--	ND	--	ND	--
N-NITROSODIPHENYLAMINE	86-30-6	ND	--	ND	--	ND	--
PENTACHLOROPHENOL	87-86-5	ND	--	ND	--	ND	--
PHENANTHRENE	85-01-8	50	0.0021	ND	--	1	0.0001
PHENOL	108-95-2	ND	--	ND	--	ND	--
PYRENE	129-00-0	26	0.0011	1	0.00	0	0.00
Total SVOCs	--	--	0.014	--	0.0019	--	0.002
Period Total SVOC Mass Removed (lbs)		0.014		0.0019		0.002	
Cumulative Total VOC Mass Removed (lbs)		13.82		13.82		13.82	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-013124		CMR-SP200-240208		CMR-SP200-240320	
		1/31/2024		2/8/2024		3/20/2024	
		19,177		32,365		36,438	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
EPH							
C11 THROUGH C22 AROMATIC HYDROCARBONS	C11-C22-AROM	252,000	10.65	4,390	0.31	10,500	0.84
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	228,000	9.64	4,780	0.34	10,200	0.82
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	539,000	22.79	10,900	0.78	34,100	2.74
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	1,020,000	43.12	20,100	1.43	54,800	4.40
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	1,020,000	43.12	20,100	1.43	54,800	4.40
Total EPHs	--	--	43.12	--	1.43	--	4.40
Period Total EPH Mass Removed (lbs)		43.1		1.43		4.4	
Cumulative Total EPH Mass Removed (lbs)		2581.5		2582.9		2587.3	
VPH							
BENZENE	71-43-2	--	--	--	--	--	--
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	401	0.02	95	0.01	ND	--
C9 THROUGH C10 AROMATIC HYDROCARBONS	C09-C10-AROM	6,670	0.28	500	0.04	1,990	0.16
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	27,800	1.18	2,080	0.15	6,610	0.53
ETHYL BENZENE	100-41-4	--	--	--	--	--	--
M,P-XYLENE	179601-23-1	--	--	--	--	--	--
METHYL TERT-BUTYL ETHER	1634-04-4	--	--	--	--	--	--
NAPHTHALENE	91-20-3	--	--	--	--	--	--
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--
TOLUENE	108-88-3	--	--	--	--	--	--
TOTAL PETROLEUM HYDROCARBONS	TPH	35,100	1.48	2,710	0.19	8,620	0.69
Total VPHs	--	--	1.48	--	0.19	--	0.69
Period Total VPH Mass Removed (lbs)		1.48		0.19		0.69	
Cumulative Total VPH Mass Removed (lbs)		218.6		218.8		219.5	

Appendix C
Historical Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

Notes:

*Effluent volumes represent volume of groundwater extracted during the start-up (October 2021), commissioning (November 2021 - December 2021), and first quarter of standard operation (January 2022 - March 2022). Effluent volumes beginning April 2022 represent volume extracted during the month which the sample was taken.

1. Results from May 17, 2022 appear anomalously high and separate phase non-aqueous phase liquid was identified in the sampling jar; therefore, these results do not appear representative of dissolved phase concentrations and were rejected. Due to the rejected May 2022 results, the effluent volume associated with the April 2022 sampling event represents the volume recovered from April 1, 2022 - May 15, 2022 and effluent volume associated with the June 17, 2022 sampling event represents the volume recovered from May 16, 2022 through June 30, 2022.

2. Sample was not collected during September 2022, therefore results from August 2022 were used for mass removal calculations.

3. Sample was not collected during October 2022 and November 2022, therefore results from December 2022 were used for mass removal calculations.

4. April 2023 sample was collected on May 3, 2023

5. Samples were not collected during August and September 2023, therefore results from July 2023 were used for mass removal calculations

6. Samples were not collected during November 2023, therefore results from December 2023 were used for mass removal calculations

Sample Calculation

$$\text{Mass Removed (lb)} = 1800 \frac{\text{ug}}{\text{L}} \times 10^{-6} \frac{\text{g}}{\text{ug}} \times \frac{1}{453.6} \frac{\text{lb}}{\text{g}} \times 21138 \text{ L}$$

Abbreviations:

EPH : Extractable Petroleum Hydrocarbon
ND : Non Detect
SVOCs : Semi-volatile Organic Compounds
ug/L : micrograms per liter
VOCs : Volatile Organic Compounds
VPH : Volatile Petroleum Hydrocarbons

APPENDIX D

GROUNDWATER SAMPLING PURGE LOGS



Calumet Montana Refinery, LLC
Great Falls, Montana

Low Flow Groundwater Sampling Field Log

Monitoring Well - MW-41S

Sampling Information

Date (MM/DD/YY) - 02/28/24
Personnel - Kyle Groves & Corey League
Weather - Cloudy, Windy, 40's F
Sampling Device - Geotech Peristaltic Pump

Pump on - 12:21
Pump off - 13:15

Well Information

Well Casing PID - -- ppm
Well Diameter - 2 inch
Screened Zone - 4 - 14 ft BGS

Measured Depth to Bottom - 16.53 ft BTOC
Depth to LNAPL - -- ft BTOC
Depth to Water - 7.18 ft BTOC
Depth to Pump Intake - 13.0 ft BTOC

Well Evacuation Data

Stabilization Criteria										
		± 0.1 SU	± 3 %	± 10 % < 5 NTU	N/A	± 10 mV	± 10 % < 0.5 mg/L	0.3 ft		
Time	Vol. L	Rate ml/min	pH Std	Cond. ms/cm	Turb. NTU	Temp. C	ORP mV	DO mg/L	DTW ft	Appearance or Comments
12:25	0.3	65	7.03	0.935	--	6.6	-69.3	0.18	7.54	Clear
12:30	0.3	65	7.03	0.919	--	7.6	-90.6	0.16	7.68	Clear
12:35	0.3	65	6.98	0.918	--	7.8	-92.3	0.17	7.86	Clear
12:40	0.3	65	6.97	0.917	--	8.1	-93.2	0.13	8.09	Clear

Notes / Sample Information

Appearance at Start - Clear
Appearance After Purging - Clear
Total Volume Purged - 1.2 L
Purge Rate - 65 ml/min
Analysis - VOCs (8260);
VPH (Montana VPH);

Sample ID - CMR-MW-41S-240228
Sample Time - 12:45

Additional Sample - None
Additional Sample ID - None
SVOCs (8270);
EPH (Montana EPH)

Equipment Information

Multi-Gas Meter / PID # - NA
Water Quality Meter # - YSI PRO PLUS

Oil / Water Interface Probe # - Heron
Peristaltic Pump # - GeoTech

Notes



Calumet Montana Refinery, LLC
Great Falls, Montana

Low Flow Groundwater Sampling Field Log

Monitoring Well - MW-105

Sampling Information

Date (MM/DD/YY) - 02/28/24
Personnel - Kyle Groves & Corey League
Weather - Cloudy, Windy, 40's F
Sampling Device - Geotech Peristaltic Pump

Pump on - 14:55
Pump off - 16:00

Well Information

Well Casing PID - -- ppm
Well Diameter - 2 inch
Screened Zone - 5 - 10 ft BGS

Measured Depth to Bottom - 9.80 ft BTOC
Depth to LNAPL - -- ft BTOC
Depth to Water - 5.90 ft BTOC
Depth to Pump Intake - 8.5 ft BTOC

Well Evacuation Data

Stabilization Criteria										
		± 0.1 SU	± 3 %	± 10 % < 5 NTU	N/A	± 10 mV	± 10 % < 0.5 mg/L	0.3 ft		
Time	Vol. L	Rate ml/min	pH Std	Cond. ms/cm	Turb. NTU	Temp. C	ORP mV	DO mg/L	DTW ft	Appearance or Comments
15:00	0.4	75	6.89	1.583	--	8.9	95.1	1.83	6.33	Clear
3:05	0.3	65	6.92	1.588	--	8.7	90.8	2.23	6.59	Clear
3:10	0.3	65	6.93	1.583	--	8.6	93.2	2.69	6.80	Clear
3:15	0.3	65	6.93	1.585	--	8.4	94.7	2.72	7.02	Clear
3:20	0.3	65	6.93	1.584	--	8.2	96.7	2.84	7.22	Clear

Notes / Sample Information

Appearance at Start - Clear
Appearance After Purging - Clear
Total Volume Purged - 1.6 L
Purge Rate - 65 ml/min

Analysis - VOCs (8260);
VPH (Montana VPH);

Sample ID - CMR-MW-105-240228
Sample Time - 9:20

Additional Sample - None
Additional Sample ID - _____

SVOCs (8270);
EPH (Montana EPH)

Equipment Information

Multi-Gas Meter / PID # - NA
Water Quality Meter # - YSI PRO PLUS

Oil / Water Interface Probe # - Heron
Peristaltic Pump # - GeoTech

Notes



Calumet Montana Refinery, LLC
Great Falls, Montana

Low Flow Groundwater Sampling Field Log

Monitoring Well - MW-106

Sampling Information

Date (MM/DD/YY) - 02/28/24
Personnel - Kyle Groves & Corey League
Weather - Cloudy, Windy, 40's F
Sampling Device - Geotech Peristaltic Pump

Pump on - 13:40
Pump off - 14:30

Well Information

Well Casing PID - -- ppm
Well Diameter - 2 inch
Screened Zone - 2 - 12 ft BGS

Measured Depth to Bottom - 12.37 ft BTOC
Depth to LNAPL - -- ft BTOC
Depth to Water - 4.11 ft BTOC
Depth to Pump Intake - 8.0 ft BTOC

Well Evacuation Data

Stabilization Criteria										
		± 0.1 SU	± 3 %	± 10 % < 5 NTU	N/A	± 10 mV	± 10 % < 0.5 mg/L	0.3 ft		
Time	Vol. L	Rate ml/min	pH Std	Cond. ms/cm	Turb. NTU	Temp. C	ORP mV	DO mg/L	DTW ft	Appearance or Comments
13:45	0.4	75	6.95	1.37	--	8.0	-96.6	0.66	4.32	Clear
13:52	0.5	75	6.94	1.37	--	8.1	-98.2	0.44	4.39	Clear
13:57	0.4	75	6.95	1.37	--	8.0	-97.0	0.24	4.46	Clear
14:02	0.4	75	6.92	1.37	--	8.1	-96.2	0.41	4.55	Clear

Notes / Sample Information

Appearance at Start - Clear
Appearance After Purging - Clear

Total Volume Purged - 1.7 L
Purge Rate - 75 ml/min

Analysis - VOCs (8260);
VPH (Montana VPH);

Sample ID - CMR-MW-106-240228
Sample Time - 14:10

Additional Sample - None
Additional Sample ID - None

SVOCs (8270);
EPH (Montana EPH)

Equipment Information

Multi-Gas Meter / PID # - NA
Water Quality Meter # - YSI PRO PLUS

Oil / Water Interface Probe # - Heron
Peristaltic Pump # - GeoTech

Notes
