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September 16, 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 2nd Quarter 2024 Monitoring Report No. 10

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) 2nd Quarter 2024 Monitoring Report (QMR) No. 10 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 April 2024 and June 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: Kollin Schade - CMR

Attachments: AOC-16 Interim Measure 2nd Quarter 2024 Monitoring Report No. 10

AOC-16 INTERIM MEASURE 2ND QUARTER 2024 MONITORING REPORT NO. 10

CALUMET MONTANA REFINING, LLC
GREAT FALLS, MONTANA

September 16, 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:	Kollin Schade
Name:	Kollin Schade
Title:	Plant Manager – Calumet Montana Refining, LLC
Date:	9/16/24

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) 2nd Quarter 2024 Monitoring Report (QMR) No. 10 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 2nd Quarter of 2024, the DPE system operated approximately 78% of the available time. The DPE system extracted and discharged approximately 141,431 gallons of total fluids to CMR's wastewater treatment plant (WWTP). During this reporting period the DPE system also removed approximately 3.9 pounds of petroleum vapor. It also removed 0.11 pounds of volatile organic compounds (VOCs), 0.35 pounds of semi-volatile organic compounds (SVOCs), 27 pounds of volatile petroleum hydrocarbons (VPH), and 309.7 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 June 6, 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 and downgradient well MW-105 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 detected at a concentration of 1.6 µg/L, less than the DEQ-7 HHS and RBSL of 5 µg/L at monitoring well MW-106 installed within the trench. Monitoring well MW-105 installed downgradient of the passive treatment trench reported benzene at 48 µg/L exceeding the DEQ-7 HHS and RBSL of 5 µg/L. Within the trench (MW-106), VPH was not detected and C5-C8 Aliphatics were detected between the method detection limit and reported detection limit at a concentrations of 59.3 µg/L. The C5-C8 Aliphatics concentration was below the RBSL of 650 µg/L. Downgradient of the PTT (MW-105), the VPH concentration was 936 µg /L with a C5-C8 Aliphatic concentration of 664 µg/L, just exceeding the RBSL of 650 µg/L. Concentrations of contaminants of concern 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. 10 for the Calumet Great Falls Montana Refining facility located at 1900 10th Street NE, Great Falls, Montana to summarize the 2nd Quarter of operations in 2024 (April 1 through June 30, 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 2nd Quarter 2024 Monitoring Report No. 10 summarizes the sampling results, operations, and performance monitoring data that were gathered for the AOC-16 IM from April 1, 2024 through June 30, 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 April 1, 2024, through June 30, 2024, the DPE system was in operation approximately 78% of the time and extracted and discharged approximately 141,431 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. The system was also shut down on June 3, 2024 to conduct semi-annual maintenance on the Self-Recuperative Catalytic Oxidizer (SRCO).CMR maintenance greased the blower motor, cleaned the flame arrestor of dirt and grease, and checked the catalyst module for signs of plugging or fatigue.

2.1.2 Non-Routine/Unplanned Shutdowns

Between April 12, 2024 and April 30, 2024, due to a malfunctioning effluent transfer pump. The transfer pump was replaced on April 29, 2024 and the system was subsequently restarted.

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.

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 on a monthly basis in May and June 2024 to evaluate mass removal. Note that PID readings and a vapor analytical sample were not collected in April 2024 due to the downtime resulting from the malfunctioning transfer pump.

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 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-8 (101.16 ppm) on June 21, 2024. Excluding the elevated PID readings at DPE-8 in June 2024, all wells have dropped from greater than 400 parts per million (ppm) upon startup in October 2021 to less than 100 ppm in the 2nd Quarter of 2024.

Vapor samples were collected in May and June 2024 from SP-301. A sample was not collected in April 2024 due to the system shutdown caused by the transfer pump malfunction. 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 2nd 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 µg/m^3 in October 2021 to 923 µg/m^3 in May 2024. Similarly, n-hexane concentrations have decreased from 7,840,000 µg/m^3 in October 2021 to 1,610 µg/m^3 in May 2024. In the 2nd Quarter of 2024, n-hexane values varied between a high of 2,290 µg/m^3 in June 2024 and a low of 1,610 µg/m^3 in May 2024. Note that concentrations of BTEX, n-hexane, and n-heptane have generally rebounded from low concentrations (less than 20 µg/m3 for all compounds) observed in January 2024.

Based on historical system operation, it appears that contaminant recovery is a function of both overall reductions in volatile compounds in the subsurface and whether or not each well screen is submerged during sampling. To better understand the effect of submerged well screens, gauging ports were installed at each DPE well on August 23, 2024. Wells have been periodically gauged since than as shown on Table 3. Moving forward, it is recommended that the DPE wells be gauged during each monthly sampling event to further understand the effects of submerged well screens.

A review of this data indicates that some of the variability in contaminant recovery in the vapor phase over the operational life of the system is likely attributed to the time of sample collection.

Towards the end of the 1st quarter of 2024 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. The wells were re-gauged on May 10, 2024 during second quarter and the water table elevation at all of the wells, excluding well DPE-2, were below the drop tube elevation indicating that drawdown was significantly improved as compared to first quarter 2024. Only well DPE-2 had a fully submerged screen. The drop tube at DPE-2 be raised approximately 1.5 feet to improve dewatering at this well location as the drop tube intake is approximately 1.5 feet lower than the drop tube intakes at the other well locations.

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 3.9 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 seven of the eight wells appeared to be fully exposed during May and June 2024, the reductions are in contaminant recovery are likely predominantly due to overall reductions in volatile compounds in the subsurface whereas historical

reductions in contaminant mass were attributable to both saturated well screens and non-optimal operation. Continued frequent gauging of DPE fluid levels and flow balancing is recommended to continue to maximize contaminant recovery.

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 operational periods in April and early May, the SRCO post-catalyst outlet temperature remained at 650 degrees F while in operation. Flow rebalancing was iteratively performed and seven of eight wells were fully dewatered by early May 2024 corresponding to an increase in the post-catalyst process air temperature reaching a maximum value of approximately 713 degrees F on May 21, 2024. This indicates 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 as noted above, reductions are likely now attributable to overall reductions in volatile compounds in the subsurface as opposed 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. Continued flow balancing and periodic manual measurement of water level elevations in DPE wells 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 April, May and June 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 4. 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 0.11 pounds of VOCs, 0.35 pounds of SVOCs, 27 pounds of VPH, and 309.7 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. In this case, the smear zone is submerged and any VOCs in the vapor phase are VOCs volatilizing from the liquid instead of VOCs present in the vadose zone. When the system is predominantly pulling liquid, all VOCs measured are coming directly from the liquid. Since the beginning of operation, the fraction of VOCs in the liquid phase have gone down.

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 June 30, 2024, is calculated to be approximately 2,914 pounds, 14.2 pounds, 244 pounds, and 2,925 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 April, May, and June 2024. The depth to water and if observed, separate-phase LNAPL thickness measurements, were recorded. These measurements are presented in Table 5. Groundwater well locations with respect to the remedy components are shown on Figure 1. Groundwater contours are provided on Figure 5. In general, groundwater elevations throughout the 2nd quarter of 2024 were approaching historical highs.

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 1.36 gpm which is within the design flow rates. Average groundwater extraction rates during the reporting period were relatively high compared to previous reporting periods likely caused by the groundwater elevations approaching historical highs discussed in Section 2.2.2.

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 9.5 in-Hg in April, 14.1 in-Hg and 12.3 in-Hg in March below the design vacuum of 17 in-Hg. Flows in April 2024 averaged 48 SCFM, flows in May 2024 averaged 66 SCFM and flows in June averaged 100 SCFM. Increases in flow rates during the time periods were likely due to flow balancing and optimization during the same time period. As noted above, additional optimization to maximize drawdown throughout the trench to expose the maximum amount of the smear zone will be performed.

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 17 LNAPL collection wells located in the LNAPL recovery trench were gauged periodically throughout this reporting period (Figure 1). Fluid levels collected from the LNAPL wells are summarized in Table 6 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-13, LNAPL-14, LNAPL-15 and LNAPL-16 at least once during the reporting period. In general, sheens were not noted in May and June when the water table was elevated as compared to April. This would be expected as higher water tables submerge LNAPL.

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 3rd 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 June 6, 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 June 6, 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). Samples were also analyzed for the following parameters to assess the biodegradation dynamics of the COCs: filtered and unfiltered total iron, total manganese, dissolved iron, and dissolved manganese (via USEPA Method 6020B), sulfate and nitrate (via USEPA Method 9056A), biological oxygen demand (BOD) (via USEPA Method 5210B), alkalinity (via USEPA Method 2320B), methane (via method RSK - 175), and carbon dioxide (via USEPA Method 4500-CO2).

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 – June 2024

The groundwater analytical results for detected compounds from the June 2024 sampling event are provided in Table 7. Previous quarterly groundwater sampling results from October 2021 through February 2023 are also provided in Table 7 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 June 2024 and compare those detections to the DEQ-7 HHS in groundwater and RBSLs.

VOCs

Of the VOCs detected during the June 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 353 micrograms per liter (µg/L) exceeding the DEQ-7 HHS and RBSL of 5 µg/L. Benzene was detected from the location (MW-106) installed within the trench at a concentration of 1.6 µg/L, below the DEQ-7 HHS and RBSL. The monitoring well (MW-105) installed downgradient of the passive treatment trench reported benzene at 37.6 µg/L exceeding the DEQ-7 HHS and RBSL of 5 µg/L.

SVOCs

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

VPH, and EPH

The upgradient monitoring well (MW-41S) had detectable concentrations of volatile petroleum hydrocarbons (VPH) via method MTDEQ VPH of 6,690 µg/L with a C5-C8 Aliphatic concentration (adjusted) of 903 µg/L which just exceeds the RBSL of 650 µg/L. Within the trench (MW-106), VPH was not detected and C5-C8 Aliphatics were detected between the method detection limit and reporting limit at a concentration of 59.3 µg/L, less than the RBSL. Downgradient of the PTT (MW-105), VPH was detected at a concentration of 936 µg/L with a C5-C8 Aliphatics concentration (adjusted) of 664 µg/L which just exceeds the RBLS of 650 µg/L.

3.2.3 Evaluation of Concentration Trends Over Time

To evaluate concentration trends over time, the concentrations of benzene, C5-C8 Aliphatics, and VPH were plotted for each of the three monitoring wells (i.e., MW41S, MW-106, and MW-105). 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.

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

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

- Benzene decreased from 1,900 µg/L in October 2021 to 353 µg/L in June 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 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 June 2024:

- Benzene had not been detected during any sampling events until the June 2024 sampling event where benzene was detected at a concentration of 1.6 µg/L. Further monitoring is needed to understand the trends associated with this well.
- 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 or June 2024.
- 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 and in June 2024 at a concentration of 59.3 µg/L. 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 June 2024:

- Benzene have varied from a maximum of 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. A comparison of sampling results in the summer months indicate a maximum concentration of 570 µg/L in August 2020 before the installation of the PTT. Concentrations after the installation of the PTT in June of each year have decreased from 110 µg/L in June 2022, to 48 µg/L in June 2023 to 37.6 µg/L in June 2024.
- VPH appears variable with a maximum concentration of 1,900 µg/L in October 2021 to not detected in February 2024. 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 to not detected in February 2024. 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 8. 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. During the last two sampling events at all three wells, ORP was negative and dissolved oxygen was equal to zero indicating reducing conditions.

The groundwater analytical results for detected biodegradation parameters from June 2024 sampling event are provided in Table 9. Groundwater sampling results from previous sampling events are also provided in Table 9 for comparison purposes. Laboratory reports are included in Appendix A3.

As noted above, the PTT remediates groundwater utilizing a two-step process. As groundwater flows through the PTT, hydrocarbons and BTEX will partition from the dissolved phase by adsorption to the activated carbon particles. The contaminants are then anaerobically biodegraded through chemical oxidation stimulated by the added bio-stimulating electron acceptors (nitrate and sulfate). The order that petroleum degrading microbes utilize electron acceptors follows with their redox potential in the following order 1) aerobic degradation; 2) denitrification; 3) manganese reduction; 4) iron reduction; 5) sulfate reduction; and 6) methanogenesis.

Relative to the baseline October 2021 monitoring event, the following parameters measured in the PTT well MW-106 indicate ongoing biodegradation within the trench between October 2021 and June 2024 as follows:

- Nitrate concentrations initially decreased from 210,000 µg/L in October 2021 to non-detect in June 2024. Sulfate concentrations also initially decreased from 2,900,000 µg/L in October 2021 to 210,000 µg/L in June 2022 down to 62,900 µg/L in June 2024. This reduction in the amended electron acceptor concentration was expected and serves as a positive indicator that biodegradation is occurring via denitrification and sulfate reduction. While sulfate concentrations have decreased, concentrations remain sufficiently elevated indicating that the amended electron acceptor is still available to continue to promote biodegradation. These results indicate biodegradation processes have shifted from denitrification to sulfate reduction.
- Both dissolved iron and manganese concentrations appear have increased since PTT installation. Dissolved iron has increased from 65 µg/L in October 2021 to 1300 µg/L in June 2023 to 4040 µg/L in June 2024. Dissolved manganese has increased from 1400 ug/L µg/L in October 2021 to 2290 µg/L in June 2024. Increased concentrations of iron and manganese in groundwater indicate that iron and manganese reduction is occurring because the reduced forms of these compounds have greater solubility than the oxidized forms. The increases in iron and manganese concentrations indicate that iron and manganese reduction are becoming a more dominant biodegradation pathway.
- Carbon dioxide is a byproduct of degradation reactions and serves as an indicator of ongoing degradation. Concentrations are variable ranging from a high of 960,000 µg/L in June 2023 to a low of 87,000 µg/L in December 2022. These elevated concentrations serve as a positive indicator of ongoing biodegradation. Trends will continue to be monitored.

- Methane concentrations appear to be increasing (5.8 µg/L in October 2021, 62 µg/L in June 2022, 110 µg/L in December 2022, 71 µg/L in June 2023, 252 µg/L in December 2023, and 818 µg/L in June 2024). Increases in methane concentration are expected when the aquifer reaches methanogenic conditions. Increases in methane concentrations may serve as an early indicator that methanogenesis is becoming a more dominant biodegradation pathway[2].

In general, these lines of evidence indicate that predominant biodegradation pathways are shifting away from denitrification and towards the lower energy electron acceptors. This may explain the slight rebound in concentrations at MW-106.

[2] Note that while methane concentrations are increasing, the concentrations observed to date do not indicate that explosive conditions are present within the well or confined spaces. The United States Department of Interior (2001) has established a warning level of 10,000 micrograms per liter (µg/L) of methane in groundwater, while concentrations of methane greater than 28,000 µg/L indicates that potentially explosive or flammable quantities of the gas are being liberated at the well and/or may be liberated in confined spaces. The concentrations observed to date (maximum of 252 µg/L) are well below these warning and action levels. Monitoring on a semi-annual basis will be continued to verify that methane concentrations remain well below these levels.

4. CONCLUSION AND RECOMMENDATIONS

During this reporting period from April 1, 2024, through June 30, 2024, the DPE system operated approximately 78% of the available time. During this reporting period, the DPE system extracted and discharged approximately 141,431 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 3.9 pounds of VOCs in the vapor phase, and 0.11 pounds of VOCs, 0.35 pounds of SVOCs, 27 pounds of VPH, and 309.7 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 June 30, 2024, is calculated to be approximately 2,914 pounds, 14.2 pounds, 244 pounds, and 2,925 pounds, respectively. Total influent vapor VOC concentrations were approximately 4 orders of magnitude lower than during startup during this quarter. Flow rebalancing and optimization has resulted in the majority of the wells operating under dewatered conditions indicating that reductions in contaminant mass recovery are predominantly due to reduced contaminant mass present in the subsurface.

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 when the system can be transitioned to less than full time operation pending MDEQ approval.

5. REFERENCES

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United States Department of the Interior. 2001. Office of Surface Mining Reclamation and Enforcement. Technical Measures for the Investigation and Mitigation of Fugitive Methane Hazards in Areas of Coal Mining. September.

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

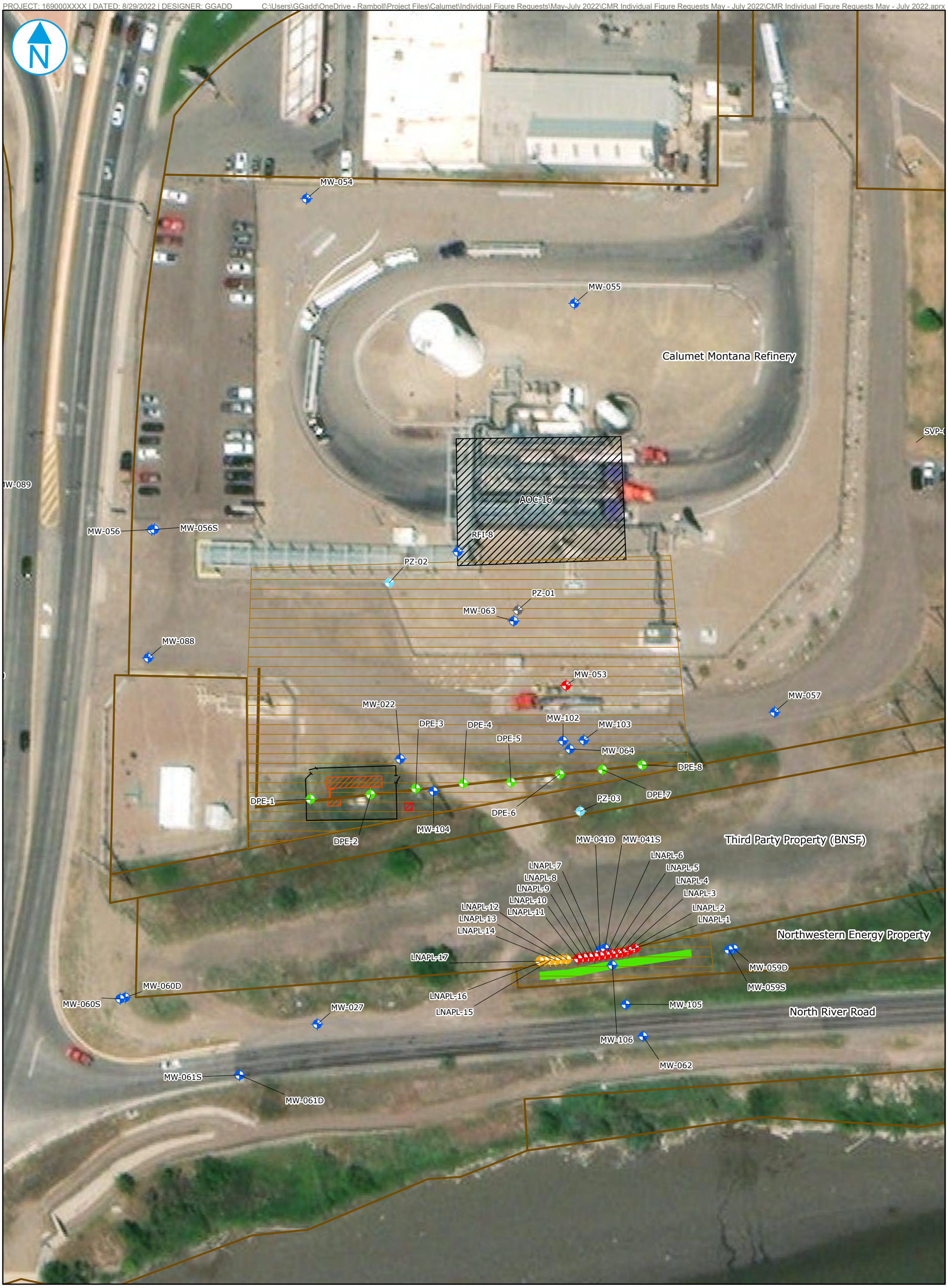
Figure 5A-C: Groundwater Contours

Figure 6: SRCO Operational Parameters

Figure 7: DPE System Operational Parameters

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

0 25 50 100 Feet

AOC 16 SITE LAYOUT

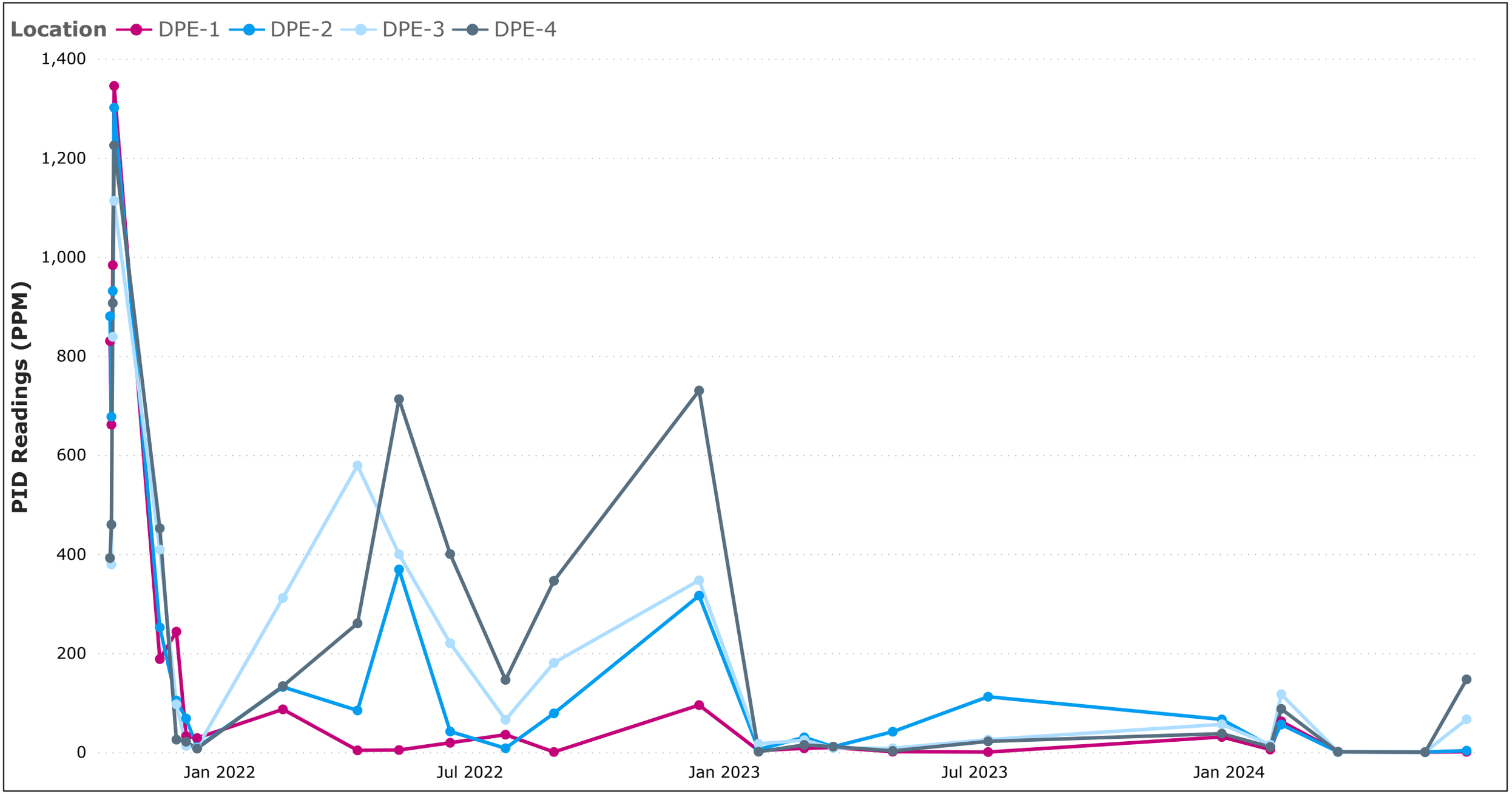
FIGURE 01

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

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

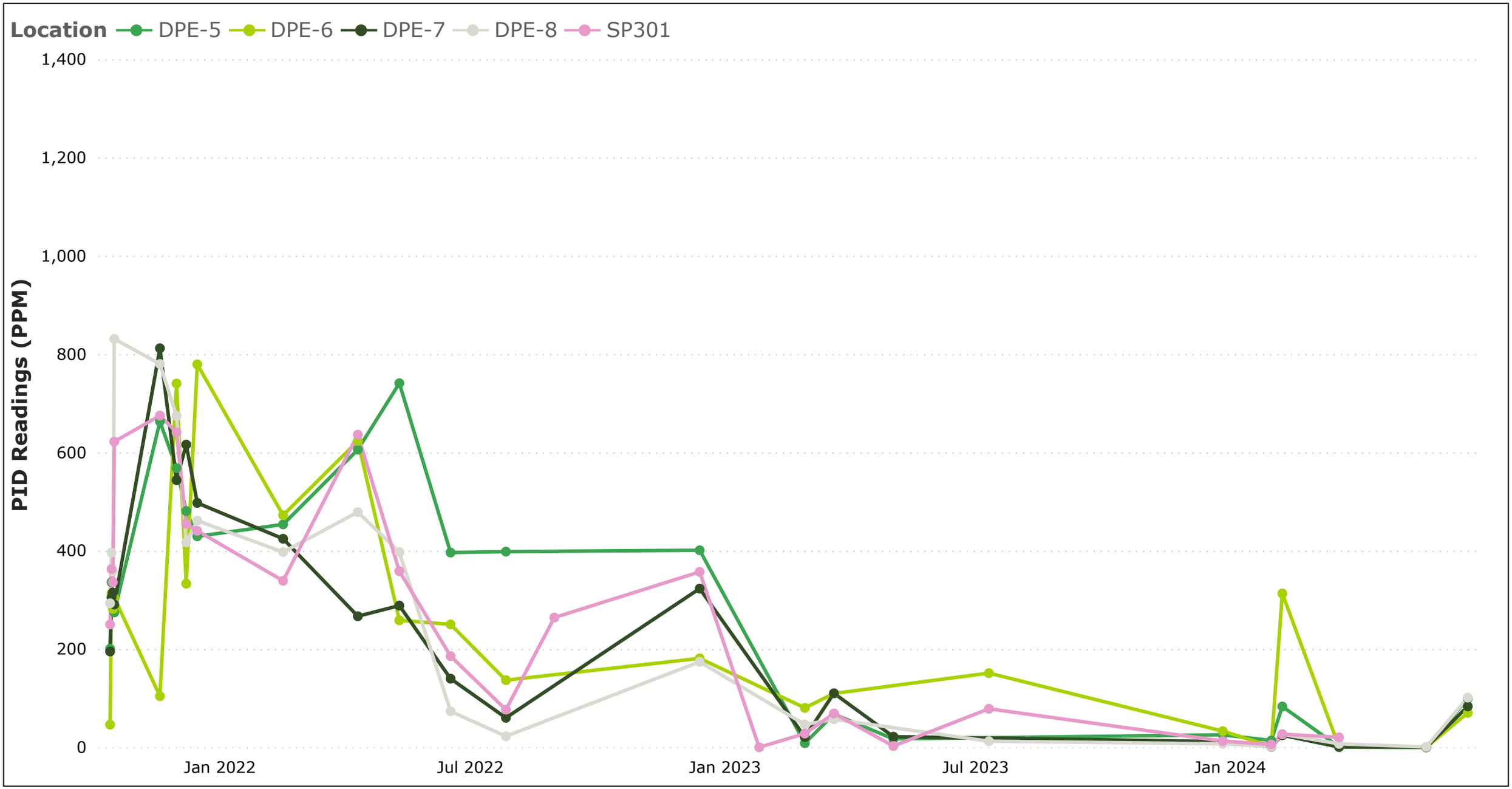
RAMBOLL

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



Notes:
PPM: parts per million
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

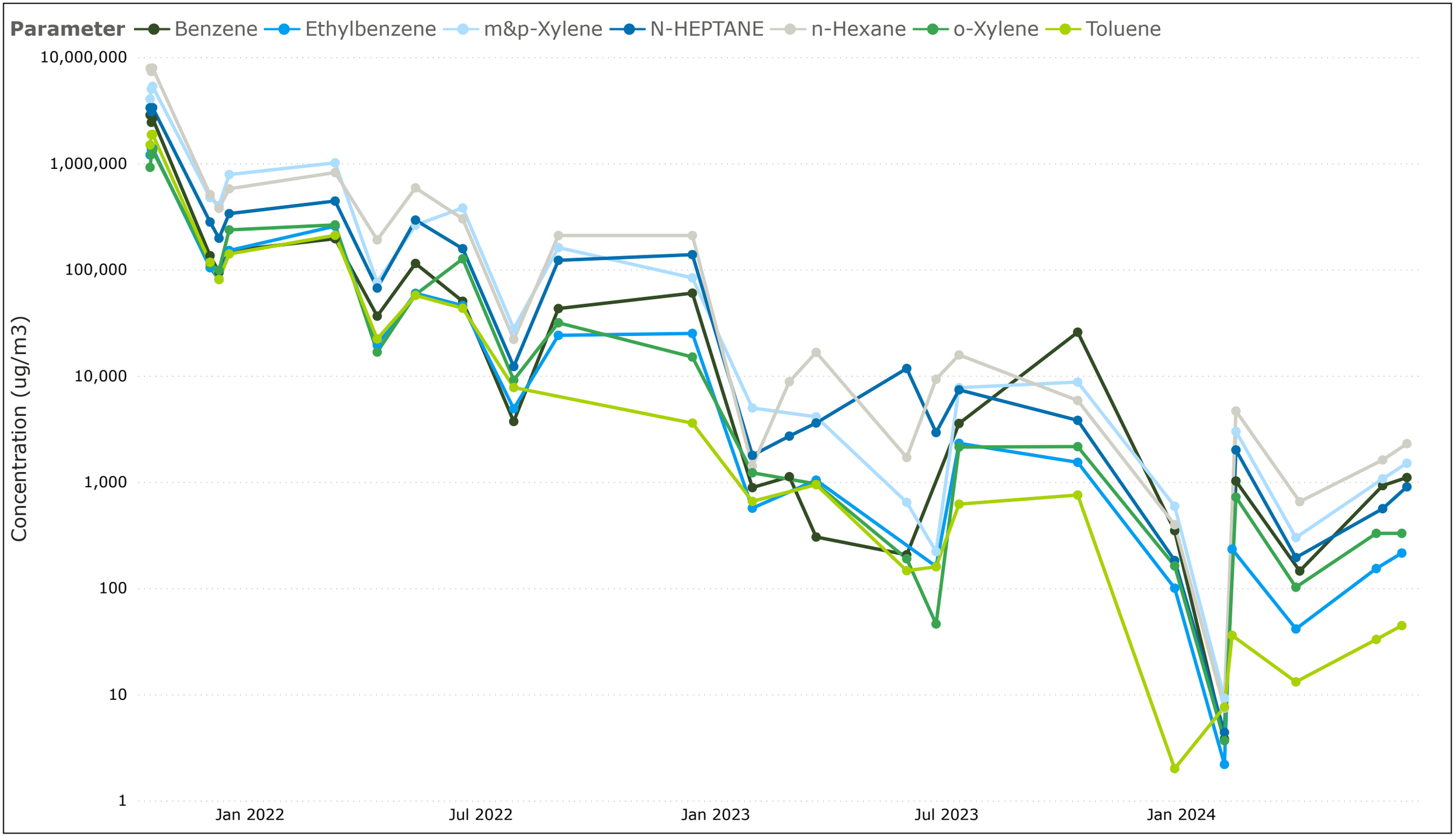
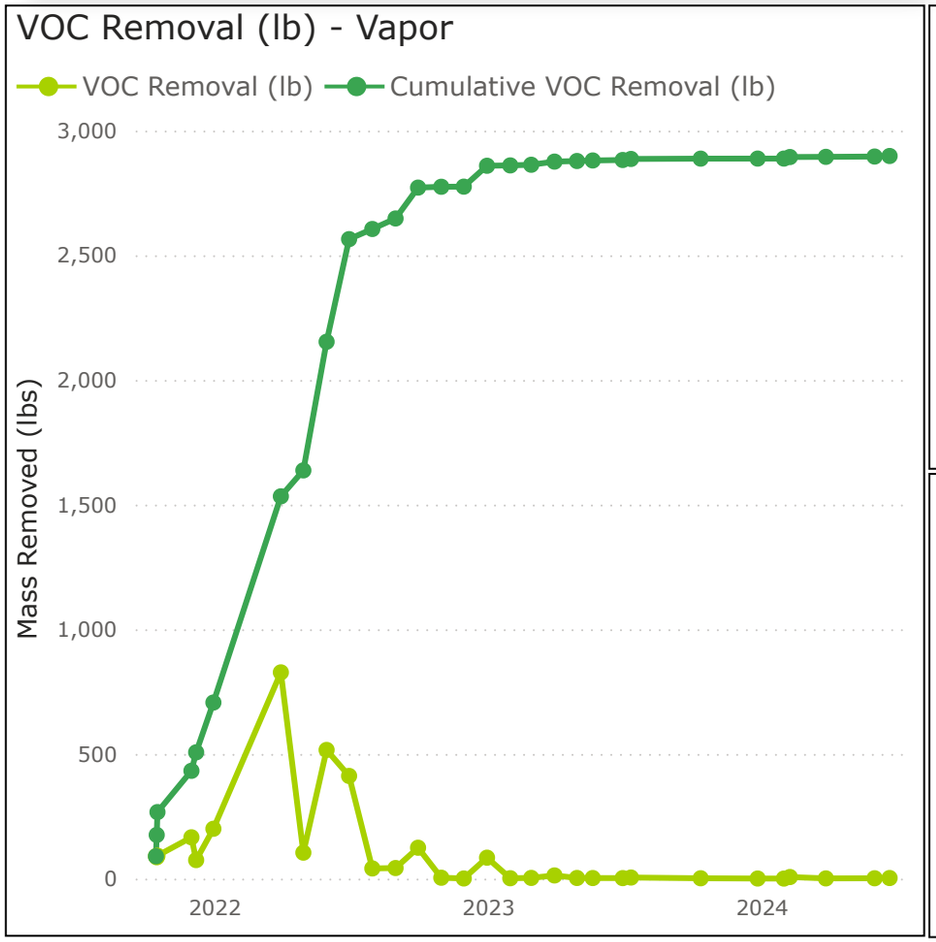
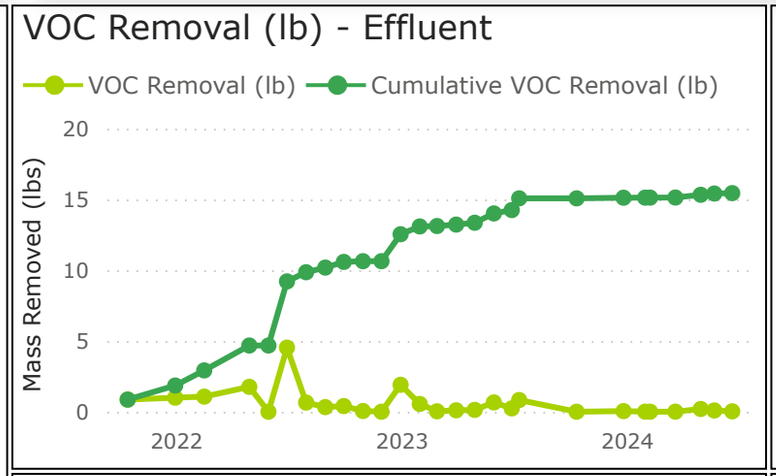


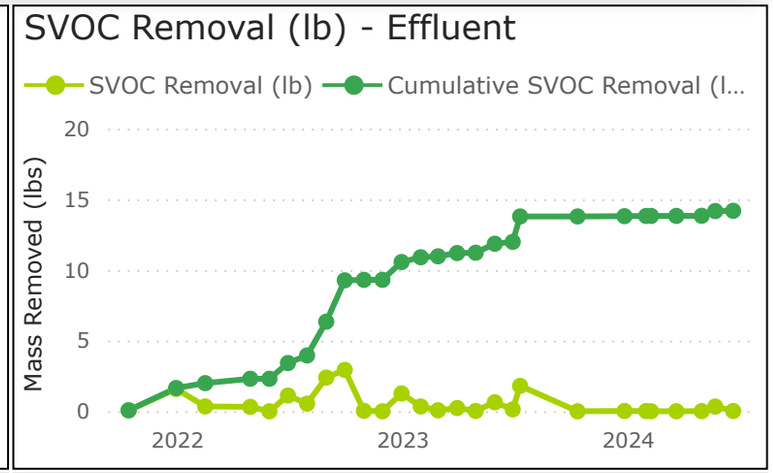
Figure 4: Vapor and Liquid Effluent Mass Removal

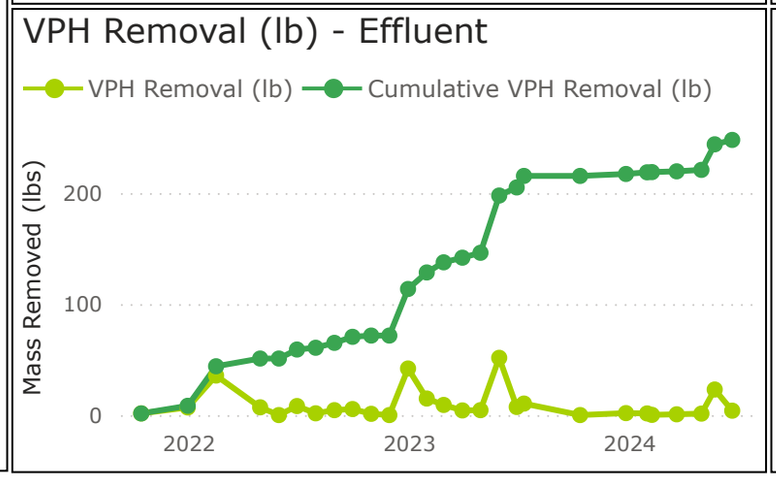
Vapor Mass Removal

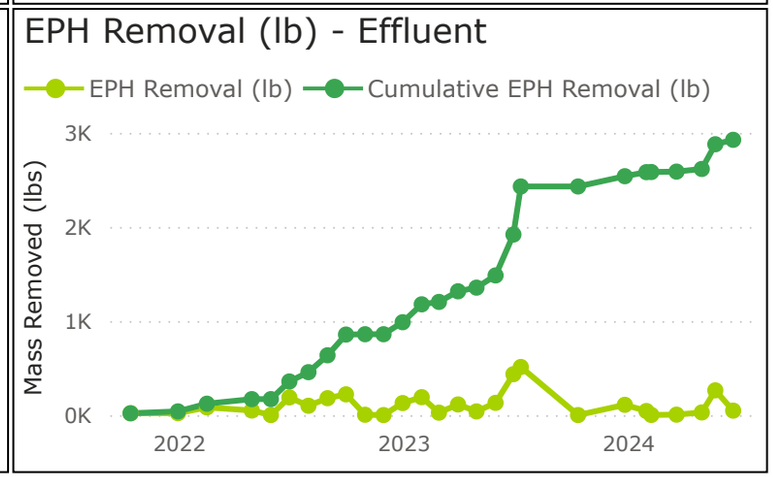


Liquid Effluent Mass Removal









Total VOCs Removed (lbs)	Total SVOCs Removed (lbs)	Total VPHs Removed (lbs)	Total EPHs Removed (lbs)
2,914	14.2	248	2,925

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.

Groundwater Contours (5 ft)
Flow Arrow
Monitoring Well
Recovery Well
AOC

Notes
1) Measurements collected on April 2024
2) The shallow most screen intervals at well clusters MW-41S/D and MW-59S/D were used to generate the potentiometric surface contour map (i.e. MW-41S)

0 22.5 45 Feet

GROUNDWATER CONTOURS - APRIL 2024

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

FIGURE 05a

RAMBOLL US CORPORATION
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RAMBOLL

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PROJECT: 1690015898 | DATED: 7/30/2024 | DESIGNER: CHURCHKE

Groundwater Contours (5 ft)
Flow Arrow
Monitoring Well
Recovery Well
AOC

Notes
1) Measurements collected on May 2024
2) The shallow most screen intervals at well clusters MW-41S/D and MW-59S/D were used to generate the potentiometric surface contour map (i.e. MW-41S)

0 22.5 45 Feet

GROUNDWATER CONTOURS - MAY 2024

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

FIGURE 05b

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

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PROJECT: 1690015898 | DATED: 7/30/2024 | DESIGNER: CHURCHKE

Groundwater Contours (5 ft)
Flow Arrow
Monitoring Well
Recovery Well
AOC

Notes
1) Measurements collected on June 2024
2) The shallow most screen intervals at well clusters MW-41S/D and MW-59S/D were used to generate the potentiometric surface contour map (i.e. MW-41S)

0 22.5 45 Feet

GROUNDWATER CONTOURS - JUNE 2024

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

FIGURE 05c

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

RAMBOLL

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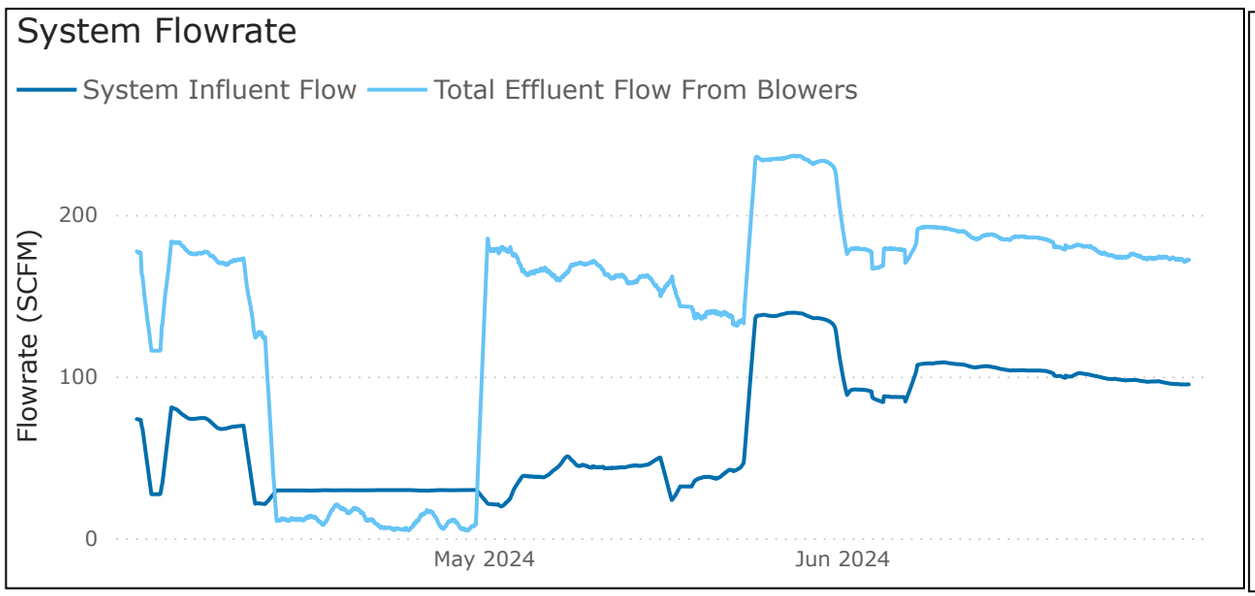
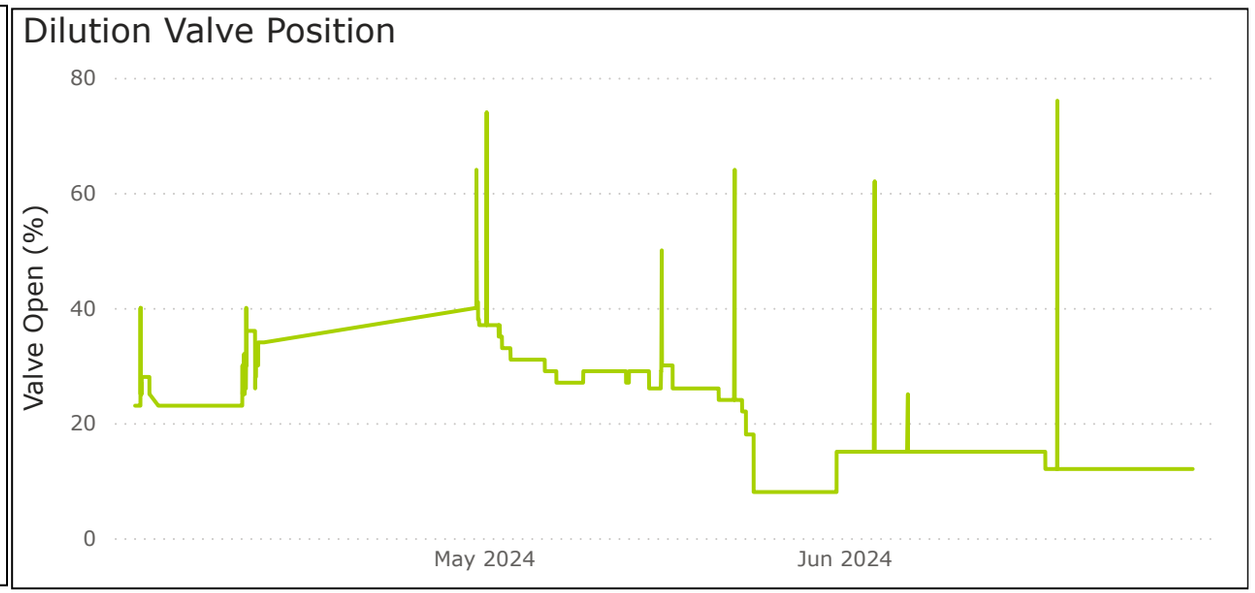
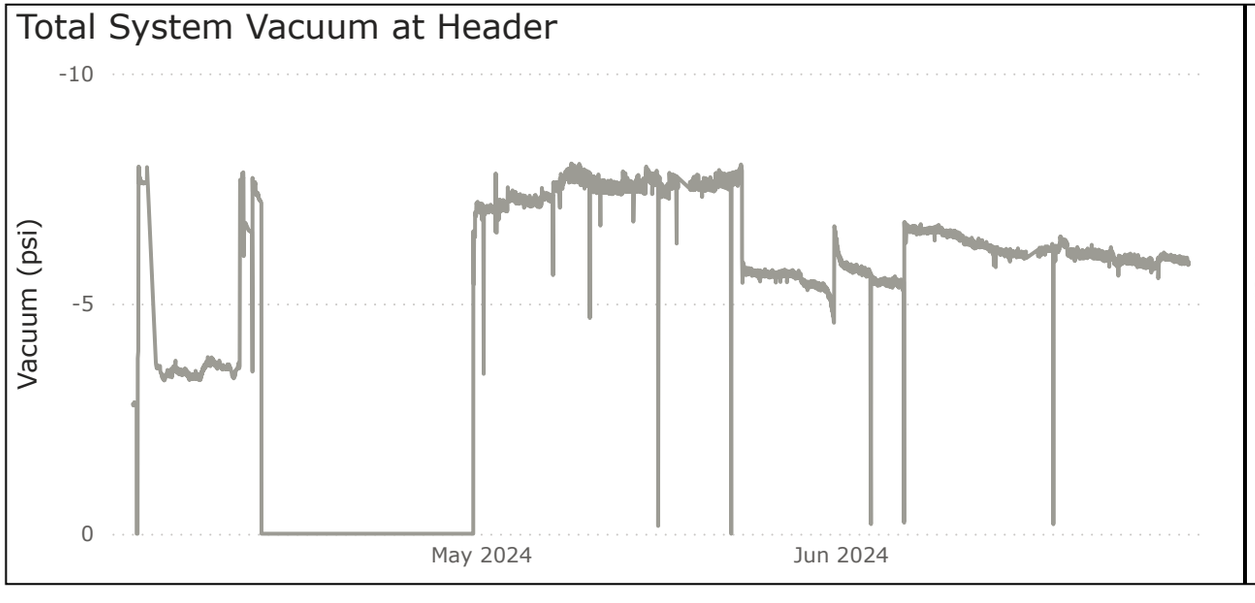
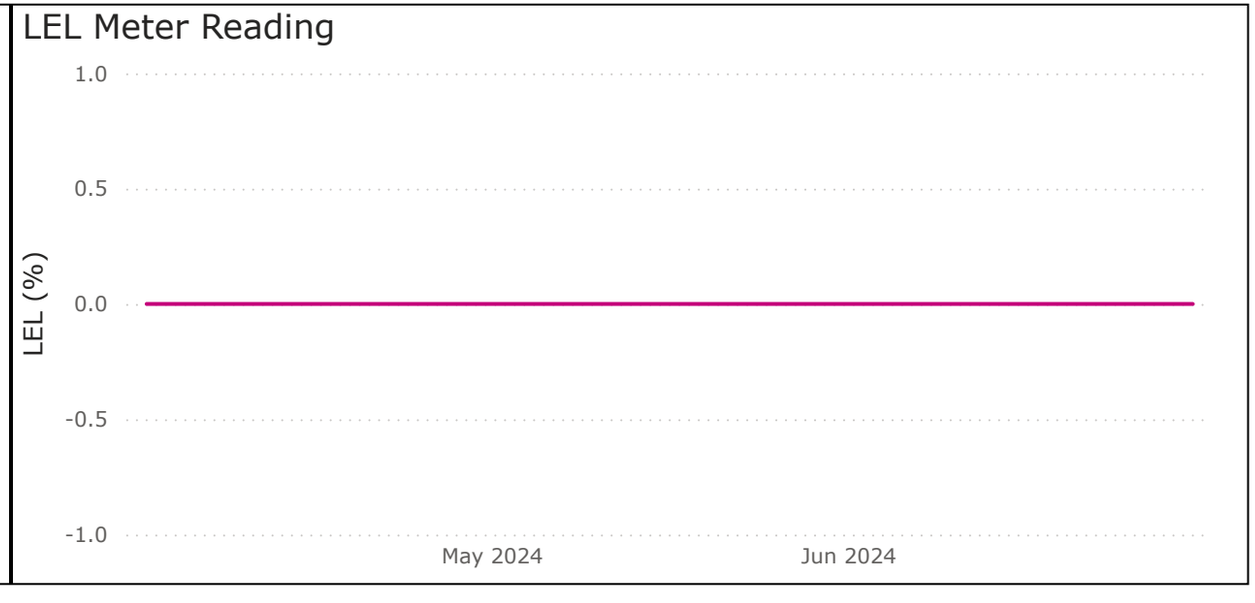
PROJECT: 1690015898 | DATED: 7/30/2024 | DESIGNER: CHURCHKE

Figure 6: DPE System Operational Parameters







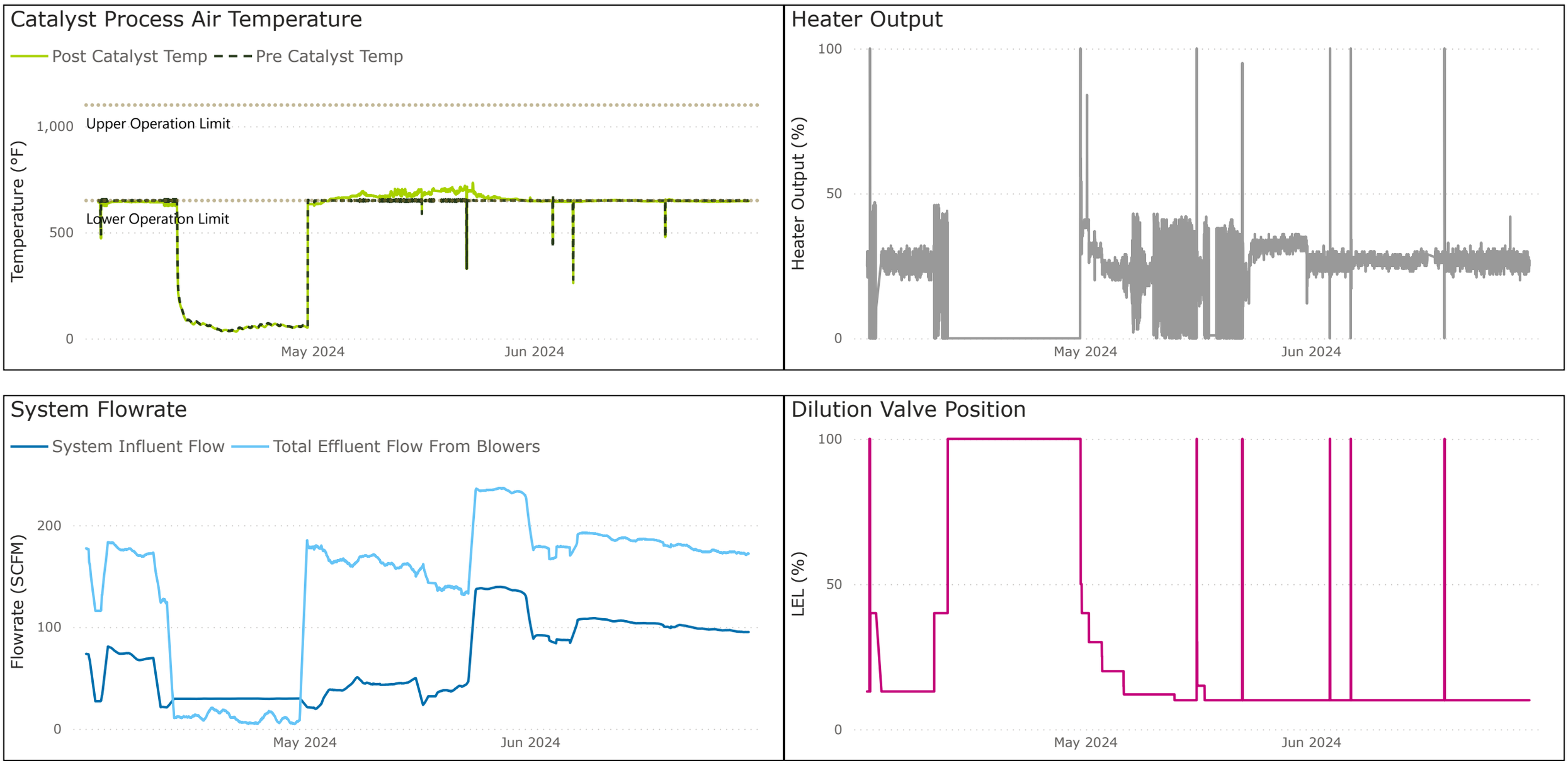


4/1/2024 6/30/2024

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).

4/1/2024 6/30/2024

LNAPL Thickness (ft)

- 0.0
- 0.0 - 0.25
- 0.25 - 0.50
- 0.50 - 0.75

0 15 30 Feet

MAXIMUM LNAPL THICKNESS
LNAPL RECOVERY WELLS
Q2 2024

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

FIGURE 08

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RAMBOLL

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PROJECT: 1690015898 | DATED: 7/17/2024 | DESIGNER: CHURCHKE

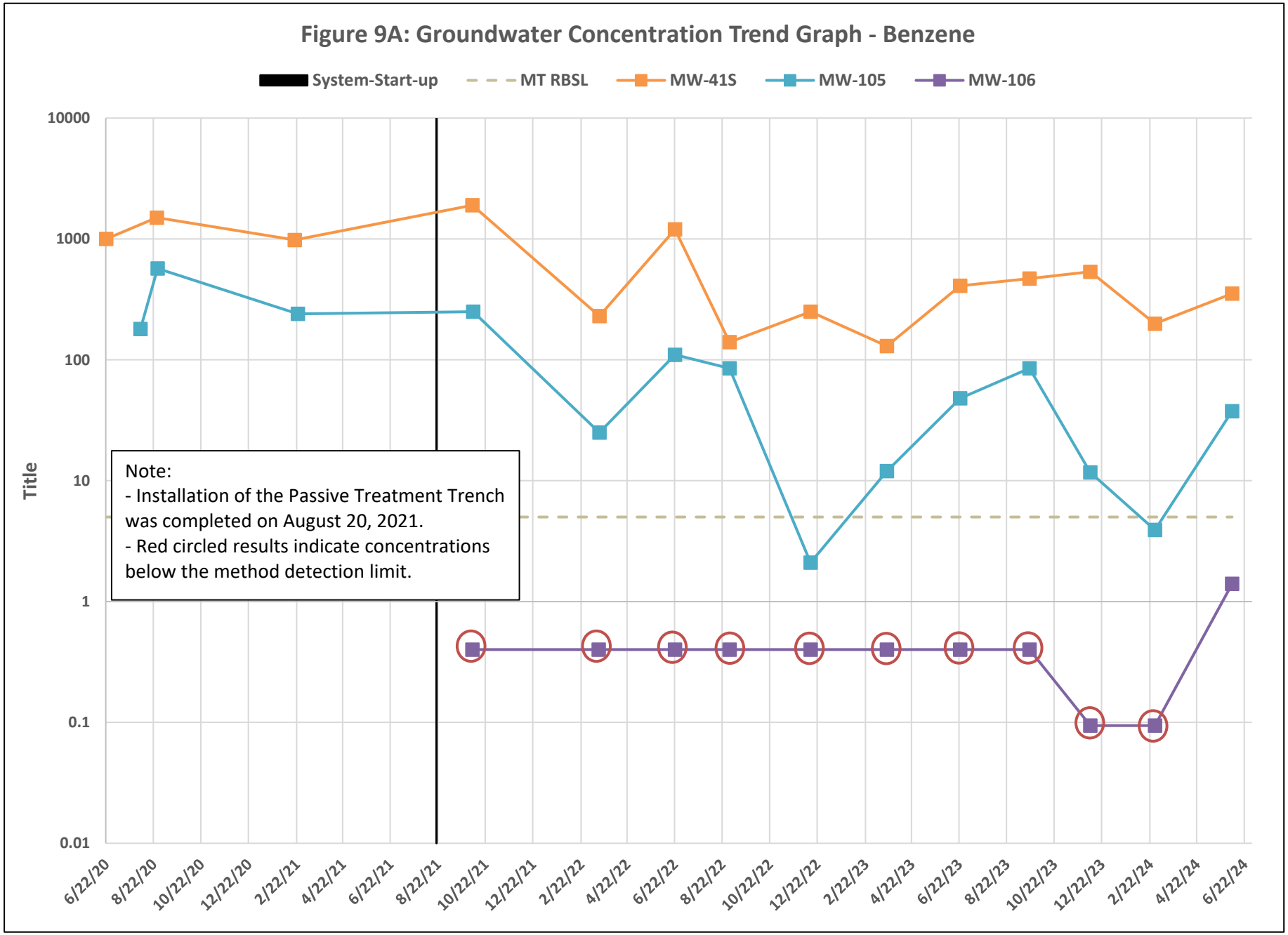
Figure 9A: Groundwater Concentration Trend Graph - Benzene
System-Start-up
MT RBSL
MW-41S
MW-105
MW-106
Title
10000
1000
100
10
1
0.1
0.01
6/22/20
8/22/20
10/22/20
12/22/20
2/22/21
4/22/21
6/22/21
8/22/21
10/22/21
12/22/21
2/22/22
4/22/22
6/22/22
8/22/22
10/22/22
12/22/22
2/22/23
4/22/23
6/22/23
8/22/23
10/22/23
12/22/23
2/22/24
4/22/24
6/22/24
Note:
- Installation of the Passive Treatment Trench was completed on August 20, 2021.
- Red circled results indicate concentrations below the method detection limit.

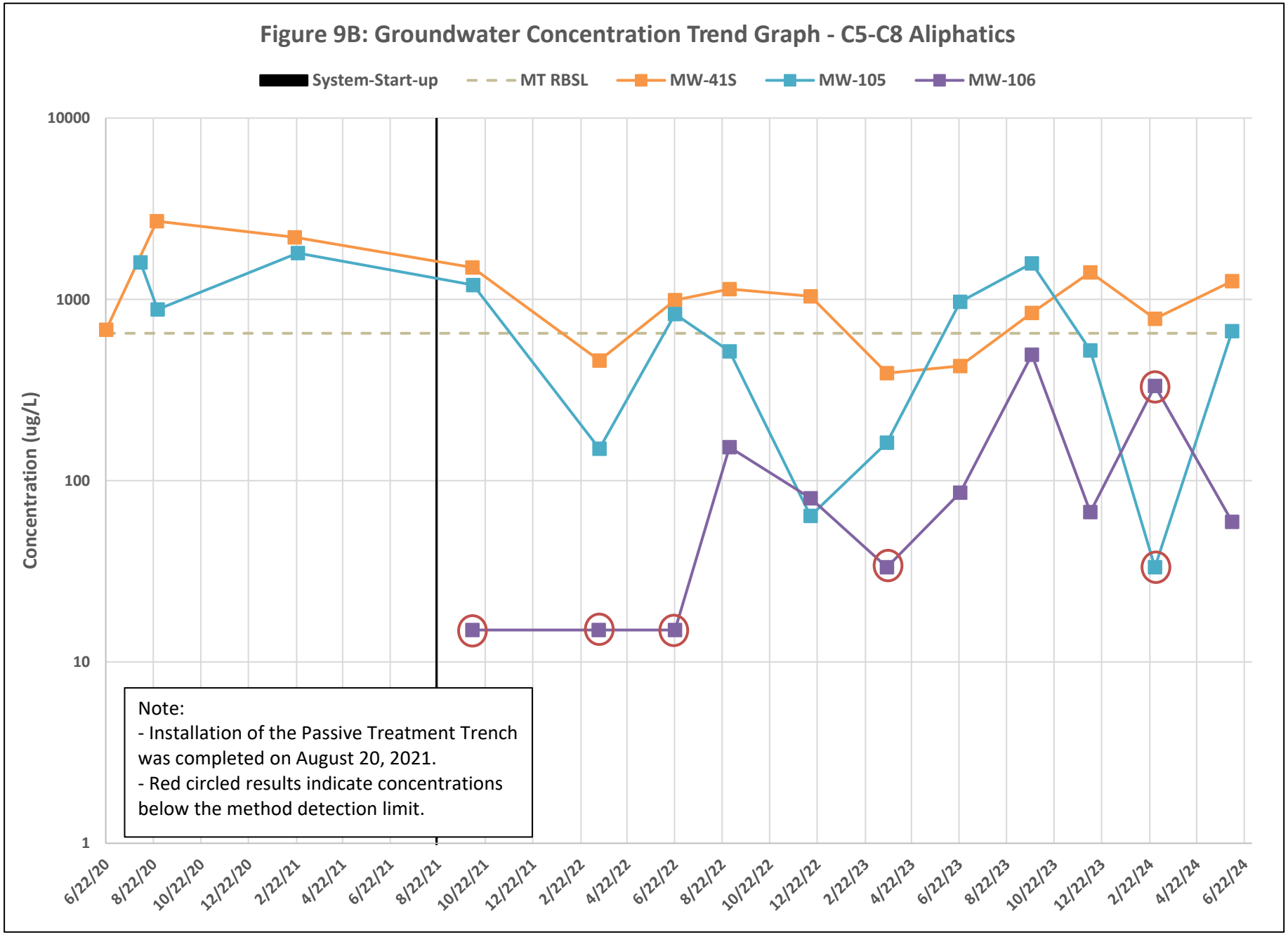
Figure 9B: Groundwater Concentration Trend Graph - C5-C8 Aliphatics
System-Start-up
MT RBSL
MW-41S
MW-105
MW-106
Concentration (ug/L)
10000
1000
100
10
1
6/22/20
8/22/20
10/22/20
12/22/20
2/22/21
4/22/21
6/22/21
8/22/21
10/22/21
12/22/21
2/22/22
4/22/22
6/22/22
8/22/22
10/22/22
12/22/22
2/22/23
4/22/23
6/22/23
8/22/23
10/22/23
12/22/23
2/22/24
4/22/24
6/22/24
Note:
- Installation of the Passive Treatment Trench was completed on August 20, 2021.
- Red circled results indicate concentrations below the method detection limit.

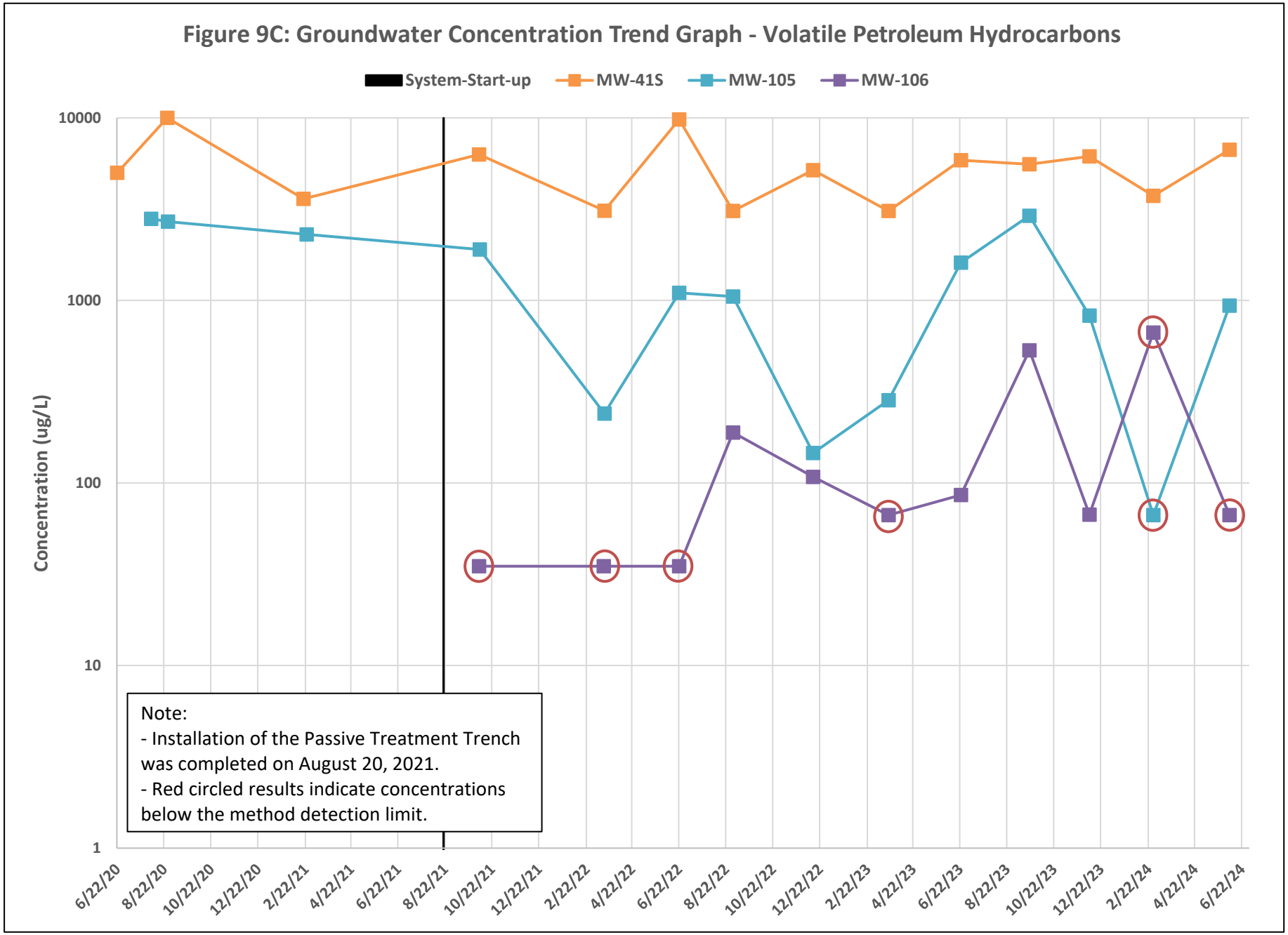
Figure 9C: Groundwater Concentration Trend Graph - Volatile Petroleum Hydrocarbons
System-Start-up
MW-41S
MW-105
MW-106
Concentration (ug/L)
10000
1000
100
10
1
6/22/20
8/22/20
10/22/20
12/22/20
2/22/21
4/22/21
6/22/21
8/22/21
10/22/21
12/22/21
2/22/22
4/22/22
6/22/22
8/22/22
10/22/22
12/22/22
2/22/23
4/22/23
6/22/23
8/22/23
10/22/23
12/22/23
2/22/24
4/22/24
6/22/24
Note:
- Installation of the Passive Treatment Trench was completed on August 20, 2021.
- Red circled results indicate concentrations below the method detection limit.

TABLES

Table 1: DPE System Operational Data

Table 2: Summary of Analytical Results and Contaminant Mass Removal – Vapor

Table 2: DPE Fluid Levels

Table 3: Summary of Analytical Results and Contaminant Mass Removal – Liquid

Table 4: Fluid Level Measurements at AOC-16 Area

Table 5: Fluid Measurements at LNAPL Wells

Table 6: Summary of Groundwater Analytical Results - Petroleum COCs

Table 7: Summary of Groundwater Analytical Results – Field Parameters

Table 8: Summary of Groundwater Analytical Results - Attenuation 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**	**--**	**--**	**--**
April 1 -30, 2024	39%	48	9.5	0.59	9,800	623,252	640
May 1 - 31, 2024	99%	66	14.1	2.04	90,449		672
June 1 - 30, 2024	99%	100	12.3	0.96	41,182		648
April 1 - June 30, 2024	**78%**	**75**	**10.0**	**1.36**	**141,431**		**657**

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	SP301		SP301	
	Ramboll Sample ID	CMR-SP301-240531		CMR-SP301-240620	
	Sample Date	5/31/2024		6/20/2024	
	Average Blower Flow (scfm)[1]	66		100	
	Period Operational Time (hrs)[2]	1018		714	
	Notes				
VOCs	**CAS No.**	**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
1,1,2,2-Tetrachloroethane	79-34-5	1 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	2 U	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	1 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	1 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	5 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	325	0.08	157	0.04
1,2-Dibromoethane (EDB)	106-93-4	2 U	0.00	2 U	0.00
1,2-Dichlorobenzene	95-50-1	1 U	0.00	1 U	0.00
1,2-Dichloroethane	107-06-2	1 U	0.00	1 U	0.00
1,2-Dichloropropane	78-87-5	1 U	0.00	1 U	0.00
1,3,5-Trimethylbenzene	108-67-8	318	0.08	200	0.05
1,3-Butadiene	106-99-0	4 U	0.00	4 U	0.00
1,3-Dichlorobenzene	541-73-1	1 U	0.00	1 U	0.00
1,4-Dichlorobenzene	106-46-7	1 U	0.00	1 U	0.00
2-Butanone (MEK)	78-93-3	5	0.00	4 U	0.00
2-Hexanone	591-78-6	5 U	0.00	5 U	0.00
2-Propanol	67-63-0	3 U	0.00	3 U	0.00
4-Ethyltoluene	622-96-8	91	0.02	195	0.05
4-Methyl-2-pentanone (MIBK)	108-10-1	5 U	0.00	5 U	0.00
Acetone	67-64-1	14	0.00	23	0.01
Benzene	71-43-2	923	0.23	1,100	0.29
Benzyl chloride	100-44-7	1 U	0.00	1 U	0.00
Bromodichloromethane	75-27-4	1 U	0.00	1 U	0.00
Bromoform	75-25-2	6 U	0.00	6 U	0.00
Bromomethane	74-83-9	1 U	0.00	1 U	0.00
Carbon disulfide	75-15-0	1	0.00	1 U	0.00
Carbon tetrachloride	56-23-5	1 U	0.00	1 U	0.00
Chlorobenzene	108-90-7	1 U	0.00	1 U	0.00
Chloroethane	75-00-3	1 U	0.00	1 U	0.00
Chloroform	67-66-3	1 U	0.00	1 U	0.00
Chloromethane	74-87-3	1	0.00	0 U	0.00
cis-1,2-Dichloroethene	156-59-2	1 U	0.00	1 U	0.00
cis-1,3-Dichloropropene	10061-01-5	1 U	0.00	1 U	0.00
Cyclohexane	110-82-7	1,210	0.30	1,230	0.33
Dibromochloromethane	124-48-1	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	2	0.00	3	0.00
Dichlorotetrafluoroethane	76-14-2	1 U	0.00	1 U	0.00
Ethanol	64-17-5	9	0.00	5 U	0.00
Ethyl acetate	141-78-6	-- --	--	-- --	--
Ethylbenzene	100-41-4	153	0.04	214	0.06
Hexachloro-1,3-butadiene	87-68-3	7 U	0.00	7 U	0.00
m&p-Xylene	179601-23-1	1,070	0.27	1,500	0.40
Methylene Chloride	75-09-2	1 U	0.00	1 U	0.00
Methyl-tert-butyl ether	1634-04-4	1 U	0.00	1 U	0.00
Naphthalene	91-20-3	3 U	0.00	3 U	0.00
n-Heptane	142-82-5	560	0.14	900	0.24
n-Hexane	110-54-3	1,610	0.41	2,290	0.61
o-Xylene	95-47-6	328	0.08	328	0.09
Propylene	115-07-1	9	0.00	2 U	0.00
Styrene	100-42-5	2 U	0.00	2 U	0.00
Tetrachloroethene	127-18-4	1 U	0.00	1 U	0.00
Tetrahydrofuran	109-99-9	1 U	0.00	1 U	0.00
Toluene	108-88-3	33	0.01	44	0.01
trans-1,2-Dichloroethene	156-60-5	1 U	0.00	1 U	0.00
trans-1,3-Dichloropropene	10061-02-6	1 U	0.00	1 U	0.00
Trichloroethene	79-01-6	1 U	0.00	1 U	0.00
Trichlorofluoromethane	75-69-4	1	0.00	1 U	0.00
Vinyl acetate	108-05-4	2 U	0.00	2 U	0.00
Vinyl chloride	75-01-4	1 U	0.00	1 U	0.00
Total VOCs	--	--	1.70	--	2.20
Period Total VOC Mass Removed (lbs)		**1.7**		**2.2**	
Cumulative Total VOC Mass Removed (lbs)[4]		**2,896**		**2,899**	

Notes:
1. Blower flowrate is continuously recorded by the system PLC. Average blower flowrate during the period is used for the calculations
2. Operational time represents system runtime (in hour) for the month during with the sample was taken. Runtime for the May 2024 sample includes both April 2024 and May 2024 sample as no sample was collected in April 2024 due to an unexpected transfer pump failure.
3. Historical analytical results and mass recoveries are included in Appendix B.
4. 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/m^3 : micrograms per cubic meter
Sample Calculation

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

Table 3
DPE Fluid Levels
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Date	DTP (ft BTOC)	DTW (ft BTOC)	Installed DTB (ft BTOC)	Drop Tube Intake (ft BTOC)	Notes
DPE-1	8/24/2023	7.75	7.83	12.08	10.58	System not operational
DPE-2	8/24/2023	--	7.40	13.54	12.04	
DPE-3	8/24/2023	7.18	7.20	11.25	9.75	
DPE-4	8/24/2023	7.20	7.73	12.60	11.10	
DPE-5	8/24/2023	6.68	6.69	11.38	9.88	
DPE-6	8/24/2023	5.70	5.73	10.21	8.71	
DPE-7	8/24/2023	5.73	5.78	11.79	10.29	
DPE-8	8/24/2023	--	5.60	10.44	8.94	
DPE-1	9/20/2023	--	6.67	12.08	10.58	--
DPE-2	9/20/2023	--	7.30	13.54	12.04	--
DPE-3	9/20/2023	--	7.03	11.25	9.75	--
DPE-4	9/20/2023	--	7.14	12.60	11.10	--
DPE-5	9/20/2023	--	6.88	11.38	9.88	--
DPE-6	9/20/2023	5.72	5.75	10.21	8.71	--
DPE-7	9/20/2023	--	5.70	11.79	10.29	--
DPE-8	9/20/2023	--	5.64	10.44	8.94	--
DPE-1	3/14/2024	6.83	6.90	12.08	10.58	--
DPE-2	3/14/2024	--	7.46	13.54	12.04	--
DPE-3	3/14/2024	--	7.19	11.25	9.75	--
DPE-4	3/14/2024	7.20	7.20	12.60	11.10	--
DPE-5	3/14/2024	--	10.53	11.38	9.88	--
DPE-6	3/14/2024	--	9.39	10.21	8.71	--
DPE-7	3/14/2024	--	10.96	11.79	10.29	--
DPE-8	3/14/2024	--	8.29	10.44	8.94	--
DPE-1	4/2/2024	--	8.38	12.08	10.58	--
DPE-2	4/2/2024	--	8.82	13.54	12.04	--
DPE-6	4/2/2024	--	8.04	10.21	8.71	--
DPE-1	5/10/2024	--	11.19	12.08	10.58	--
DPE-2	5/10/2024	--	11.45	13.54	12.04	--
DPE-3	5/10/2024	--	10.44	11.25	9.75	--
DPE-4	5/10/2024	--	11.85	12.60	11.10	--
DPE-5	5/10/2024	--	10.58	11.38	9.88	--
DPE-6	5/10/2024	--	7.87	10.21	8.71	--
DPE-7	5/10/2024	--	10.53	11.79	10.29	--
DPE-8	5/10/2024	--	7.97	10.44	8.94	--

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 4
Summary of Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

	Location	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-240430		CMR-SP200-240522		CMR-SP200-240620	
	Sample Date	4/30/2024		5/22/2024		6/20/2024	
	Effluent Volume (L)*	37,097		342,387		155,891	
	Notes						
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	--	ND	--
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	258	0.02	ND	--	ND	--
2-HEXANONE	591-78-6	ND	--	ND	--	ND	--
4-METHYL-2-PENTANONE	108-10-1	9.64	0.00	ND	--	ND	--
ACETONE	67-64-1	1820	0.15	ND	--	ND	--
BENZENE	71-43-2	250	0.02	68.50	0.05	11	0.00
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	3.76	0.00	ND	--	ND	--
CYCLOHEXANE	110-82-7	--	--	--	--	--	--
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--	ND	--
ETHYL BENZENE	100-41-4	25.9	0.00	16.80	0.01	ND	--
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	ND	--	33.9	0.03	70.0	0.02
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--
STYRENE	100-42-5	ND	--	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--
TOLUENE	108-88-3	3.29	0.00	ND	--	ND	--
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	--	--	**1.9E-01**	--	**9.0E-02**	--	**2.8E-02**
Period Total VOC Mass Removed (lbs)		**1.9E-01**		**9.0E-02**		**2.8E-02**	
Cumulative Total VOC Mass Removed (lbs)		**10.45**		**10.54**		**10.56**	

Table 4
Summary of Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

	Location	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-240430		CMR-SP200-240522		CMR-SP200-240620	
	Sample Date	4/30/2024		5/22/2024		6/20/2024	
	Effluent Volume (L)*	37,097		342,387		155,891	
	Notes						
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	--	ND	--	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	62	0.01	280.00	0.21	26.30	0.01
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	--	17.10	0.01	2.29	0.00
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	ND	--	ND	--	3.80	0.00
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	23.10	0.002	119.00	0.090	20.70	0.01
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	8	0.001	21.20	0.016	2.74	0.00
PHENOL	108-95-2	ND	--	ND	--	ND	--
PYRENE	129-00-0	6	0.000	5.11	0.00	ND	--
Total SVOCs	--	--	**0.008**	--	**0.33**	--	**0.02**
Period Total SVOC Mass Removed (lbs)		**8.1E-03**		**3.3E-01**		**1.9E-02**	
Cumulative Total VOC Mass Removed (lbs)		**13.82**		**14.15**		**14.17**	

Table 4
Summary of Analytical Results and Contaminant Mass Removal - Liquid
Calumet Montana Refining, LLC - Great Falls, Montana

	Location	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-240430		CMR-SP200-240522		CMR-SP200-240620	
	Sample Date	4/30/2024		5/22/2024		6/20/2024	
	Effluent Volume (L)*	37,097		342,387		155,891	
	Notes						
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	75,800	6.20	79,600	60.08	34,100	11.72
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	ALIPHATIC19-36U	62,000	5.07	44,800	33.82	22,300	7.66
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	205,000	16.77	224,000	169.08	80,600	27.70
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	TPH-U	343,000	28.05	348,000	262.68	137,000	47.08
TOTAL EXTRACTABLE HYDROCARBON	TPH	343,000	28.05	348,000	262.68	137,000	47.08
Total EPHs	--	--	**28.1**	--	**262.7**	--	**47.1**
Period Total EPH Mass Removed (lbs)		**28.1**		**262.7**		**47.1**	
Cumulative Total EPH Mass Removed (lbs)		**2581.5**		**2844.1**		**2891.2**	
VPH							
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	1,010	0.08	1,750.0	1.32	ND	--
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	11,400	0.93	20,600	15.55	7,240	2.49
C5-C8 ALIPHATICS (UNADJUSTED)	C05-C08-ALIP-U	1,260	0.103	1,820.0	1.37	ND	--
C9 THROUGH C10 AROMATIC HYDROCARBONS (UNADJUSTED)	C09-C10-AROM-U	3,230	0.26	7,670	5.79	4,170	1.43
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (UNADJUSTED)	C09-C12-ALIP-U	11,600	0.95	21,000	15.85	7,330	2.52
TOTAL PETROLEUM HYDROCARBONS	VPH	16,100	1.32	30,500	23.02	11,500	3.95
Total VPHs	--	--	**1.32**	--	**23.02**	--	**3.95**
Period Total VPH Mass Removed (lbs)		**1.3**		**23.0**		**4.0**	
Cumulative Total VPH Mass Removed (lbs)		**218.6**		**241.7**		**245.6**	

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

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

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 5
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-22	4/30/2024	--	6.84	--
MW-22	5/23/2024	--	8.20	--
MW-22	6/21/2024	--	7.77	--
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-41D	4/30/2024	--	10.20	--
MW-41D	5/23/2024	--	10.12	--
MW-41D	6/21/2024	--	10.09	--
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	--

Table 5
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	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	--
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-41S	4/30/2024	--	6.95	--
MW-41S	5/23/2024	--	6.93	--
MW-41S	6/21/2024	--	6.77	--
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	--

Table 5
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-53	3/20/2024	--	8.14	--
MW-53	4/30/2024	--	7.39	--
MW-53	5/23/2024	--	7.77	--
MW-53	6/21/2024	--	7.52	--
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	--
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-57	4/30/2024	--	9.42	--
MW-57	5/23/2024	--	9.20	--
MW-57	6/21/2024	--	9.27	--
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	--

Table 5
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-59D	9/19/2023	--	13.00	--
MW-59D	3/20/2024	--	13.15	--
MW-59D	4/30/2024	--	13.14	--
MW-59D	5/23/2024	--	13.01	--
MW-59D	6/21/2024	--	13.14	--
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	--
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-59S	4/30/2024	--	6.17	--
MW-59S	5/23/2024	--	6.03	--
MW-59S	6/21/2024	--	6.12	--
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	--

Table 5
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-63	3/20/2024	--	5.82	--
MW-63	4/30/2024	--	5.54	--
MW-63	5/23/2024	--	5.11	--
MW-63	6/21/2024	--	5.42	--
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	5/31/2023	--		--
MW-64	6/19/2023	--		--
MW-64	7/10/2023	--	--	--
MW-64	8/19/2023	--	--	--
MW-64	9/19/2023	--	--	--
MW-64	3/20/2024	--	9.40	--
MW-64	4/30/2024	--	8.00	--
MW-64	5/23/2024	--	7.81	--
MW-64	6/21/2024	--	8.54	--
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	--
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	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	--

Table 5
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	8/19/2023	--	8.60	--
MW-102	9/19/2023	--	7.60	--
MW-102	3/20/2024	--	dry	--
MW-102	4/30/2024	--	dry	--
MW-102	5/23/2024	--	dry	--
MW-102	6/21/2024	--	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-103	3/20/2024	--	--	--
MW-103	4/30/2024	--	NM	--
MW-103	5/23/2024	8.33	8.37	0.04
MW-103	6/21/2024	9.13	9.30	0.17
MW-104	9/29/2021	6.00	6.25	0.25
MW-104	10/15/2021	6.10	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
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	7/27/2022	--		--
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	--

Table 5
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	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-104	4/30/2024	5.49	5.51	0.02
MW-104	5/23/2024	--	NM	--
MW-104	6/21/2024	--	6.78	--
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-105	4/30/2024	--	5.06	--
MW-105	5/23/2024	--	3.45	--
MW-105	6/21/2024	--	0.92	--
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	--
MW-106	3/11/2022	--	5.80	--
MW-106	4/11/2022	--	5.70	--

Table 5
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	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	--
MW-106	4/30/2024	--	2.91	--
MW-106	5/23/2024	--	3.09	--
MW-106	6/21/2024	--	3.86	--

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 6
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	--	5.90	--		
LNAPL-1	5/22/2022	--	5.90	--		
LNAPL-1	5/29/2022	--	5.90	--		
LNAPL-1	6/5/2022	--	5.88	--		
LNAPL-1	6/12/2022	--	5.90	--		
LNAPL-1	6/19/2022	--	6.00	--		
LNAPL-1	6/26/2022	--	6.00	--		
LNAPL-1	7/3/2022	--	5.46	--		
LNAPL-1	7/10/2022	--	5.56	--		
LNAPL-1	7/17/2022	--	5.60	--		
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	--	6.80	--		
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	7.00	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	--	6.10	--		
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	--	5.20	--		
LNAPL-1	3/20/2024	--	5.21	--		Sheen
LNAPL-1	4/2/2024	--	5.33	--		Sheen
LNAPL-1	4/18/2024	--	4.97	--		
LNAPL-1	4/30/2024	--	4.91	--		
LNAPL-1	5/15/2024	--	4.15	--		
LNAPL-1	5/31/2024	--	4.55	--		Sheen
LNAPL-1	6/12/2024	--	4.78			Sheen
LNAPL-1	6/28/2024	--	4.78	--	--	Slight sheen
LNAPL-2	8/27/2021	--	8.18	--	--	
LNAPL-2	9/30/2021	--	6.42	--	--	
LNAPL-2	10/5/2021	--	6.30	--	--	
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	--	6.00	--	--	
LNAPL-2	5/22/2022	--	5.73	--	--	
LNAPL-2	5/29/2022	--	5.75	--	--	
LNAPL-2	6/5/2022	--	5.73	--	0.50	
LNAPL-2	6/12/2022	--	5.73	--	--	
LNAPL-2	6/19/2022	--	5.85	--	0.50	
LNAPL-2	6/26/2022	--	5.60	--	--	
LNAPL-2	7/3/2022	--	5.42	--	0.79	
LNAPL-2	7/10/2022	--	5.55	--	0.60	

Table 6
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	7/17/2022	--	5.41	--	0.70	
LNAPL-2	7/31/2022	--	5.70	--	--	
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	0.80	
LNAPL-2	9/10/2022	6.62	6.73	0.11	0.75	
LNAPL-2	9/18/2022	7.12	7.22	0.10	0.25	
LNAPL-2	9/25/2022	--	6.60	--	0.50	
LNAPL-2	10/2/2022	6.61	6.70	0.09	0.70	
LNAPL-2	10/9/2022	6.30	6.76	0.46	0.50	
LNAPL-2	11/14/2022	--	6.07	--	0.50	
LNAPL-2	12/6/2022	--	5.95	--	0.25	
LNAPL-2	2/26/2023	--	5.40	--	--	
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	--	5.20	--	--	
LNAPL-2	3/7/2024	--	5.05	--	--	
LNAPL-2	3/20/2024	--	5.06	--	--	Sheen
LNAPL-2	4/2/2024	--	5.15	--	--	Sheen
LNAPL-2	4/18/2024	--	4.80	--	--	
LNAPL-2	4/30/2024	--	4.76	--	--	
LNAPL-2	5/15/2024	--	3.98	--	--	
LNAPL-2	5/31/2024	--	4.45	--	--	
LNAPL-2	6/12/2024	--	4.60	--	--	Sheen
LNAPL-2	6/28/2024	--	4.62	--	--	
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	--	6.10	--	--	
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	--	5.80	--	--	
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	--	5.40	--	--	
LNAPL-3	7/17/2022	--	5.15	--	--	
LNAPL-3	7/31/2022	--	5.80	--	--	
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	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

Table 6
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-3	4/2/2024	--	5.15	--	--	
LNAPL-3	4/18/2024	--	4.80	--	--	
LNAPL-3	4/30/2024	--	4.80	--	--	
LNAPL-3	5/15/2024	--	3.98	--	--	
LNAPL-3	5/31/2024	--	4.39	--	--	
LNAPL-3	6/12/2024	--	4.59	--	--	Sheen
LNAPL-3	6/28/2024	--	4.66	--	--	
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	--	--	
LNAPL-4	1/3/2022	--	6.40	--	--	
LNAPL-4	2/8/2022	--	6.59	--	--	
LNAPL-4	5/15/2022	--	6.10	--	--	
LNAPL-4	5/22/2022	--	5.74	--	--	
LNAPL-4	5/29/2022	--	5.90	--	--	
LNAPL-4	6/5/2022	--	5.85	--	1.00	
LNAPL-4	6/12/2022	--	5.90	--	0.80	
LNAPL-4	6/19/2022	5.87	5.89	0.02	0.75	
LNAPL-4	6/26/2022	--	5.55	--	--	
LNAPL-4	7/3/2022	--	5.42	--	0.79	Oil film
LNAPL-4	7/10/2022	--	5.50	--	0.70	
LNAPL-4	7/17/2022	5.45	5.48	0.03	0.50	
LNAPL-4	7/31/2022	5.80	5.82	0.02	0.80	
LNAPL-4	8/7/2022	--	6.79	--	0.70	
LNAPL-4	8/14/2022	6.81	6.85	0.04	--	
LNAPL-4	9/4/2022	6.63	6.88	0.25	0.20	
LNAPL-4	9/10/2022	6.64	6.81	0.17	--	
LNAPL-4	9/18/2022	7.48	7.52	0.04	0.10	
LNAPL-4	9/25/2022	--	6.87	--	0.50	
LNAPL-4	10/2/2022	6.70	7.05	0.35	0.70	
LNAPL-4	10/9/2022	6.36	6.69	0.33	0.75	
LNAPL-4	11/14/2022	6.08	6.27	0.19	0.75	
LNAPL-4	12/6/2022	5.96	6.03	0.07	0.50	
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	0.50	
LNAPL-4	1/15/2023	5.80	5.82	0.02	1.00	
LNAPL-4	1/22/2023	5.88	5.92	0.04	0.60	
LNAPL-4	1/30/2023	--	5.39	--	0.60	
LNAPL-4	2/5/2023	5.62	5.71	0.09	0.50	
LNAPL-4	2/12/2023	5.49	5.51	0.02	1.00	
LNAPL-4	2/18/2023	--	5.71	--	0.70	
LNAPL-4	2/26/2023	5.49	5.50	0.01	0.05	
LNAPL-4	3/5/2023	5.84	5.87	0.03	0.25	
LNAPL-4	3/12/2023	--	5.82	--	1.00	
LNAPL-4	3/19/2023	--	5.61	--	0.25	
LNAPL-4	3/23/2023	--	5.62	--	0.00	
LNAPL-4	4/2/2023	5.50	5.51	0.01	0.00	
LNAPL-4	4/30/2023	4.30	4.40	0.10	0.00	
LNAPL-4	5/31/2023	--	4.41	--	0.00	
LNAPL-4	6/19/2023	--	3.79	--	0.00	
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-4	4/2/2024	--	5.21	--	--	
LNAPL-4	4/18/2024	--	4.80	--	--	
LNAPL-4	4/30/2024	--	4.96	--	--	
LNAPL-4	5/15/2024	--	3.96	--	--	
LNAPL-4	5/31/2024	--	4.42	--	--	
LNAPL-4	6/12/2024	--	4.95	--	--	
LNAPL-4	6/28/2024	--	4.67	--	--	

Table 6
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	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	12/15/2021	6.32	6.64	0.32	--	
LNAPL-5	1/3/2022	6.37	6.78	0.41	--	
LNAPL-5	2/8/2022	6.56	7.01	0.45	--	
LNAPL-5	3/7/2022	6.60	7.30	0.70	--	
LNAPL-5	4/11/2022	6.64	7.32	0.68	--	
LNAPL-5	5/15/2022	5.90	5.92	0.02	0.50	
LNAPL-5	5/22/2022	--	5.78	--	--	
LNAPL-5	5/29/2022	--	5.85	--	--	
LNAPL-5	6/19/2022	5.90	5.93	0.03	0.50	
LNAPL-5	6/26/2022	5.45	5.50	0.05	--	
LNAPL-5	7/3/2022	--	5.50	--	0.79	
LNAPL-5	7/10/2022	--	5.60	--	0.70	
LNAPL-5	7/17/2022	5.48	5.49	0.01	0.70	
LNAPL-5	7/31/2022	--	5.93	--	0.50	
LNAPL-5	8/7/2022	6.78	6.82	0.04	0.80	
LNAPL-5	9/4/2022	6.75	7.45	0.70	0.70	
LNAPL-5	9/10/2022	6.65	7.45	0.80	0.75	
LNAPL-5	9/18/2022	7.00	7.14	0.14	0.10	
LNAPL-5	9/25/2022	--	6.49	--	1.00	
LNAPL-5	10/2/2022	6.80	7.08	0.28	0.60	
LNAPL-5	10/9/2022	6.39	6.75	0.36	0.75	
LNAPL-5	11/14/2022	6.12	6.14	0.02	0.75	
LNAPL-5	12/6/2022	--	6.02	--	0.50	
LNAPL-5	12/25/2022	--	5.98	--	0.50	
LNAPL-5	1/15/2023	--	5.93	--		
LNAPL-5	1/22/2023	5.90	5.91	0.01	0.80	
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	1.00	
LNAPL-5	2/18/2023	5.74	5.77	0.03	0.70	
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	--	0.25	
LNAPL-5	3/23/2023	--	5.60	--	--	
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	--	5.10	--	--	Sheen
LNAPL-5	4/2/2024	--	5.22	--	--	
LNAPL-5	4/18/2024	--	4.89	--	--	
LNAPL-5	4/30/2024	--	4.81	--	--	
LNAPL-5	5/15/2024	--	4.00	--	--	
LNAPL-5	5/31/2024	--	4.40	--	--	
LNAPL-5	6/12/2024	--	4.64	--	--	
LNAPL-5	6/28/2024	--	4.59	--	--	
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	--	6.40	--	--	
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	2/8/2022	--	6.78	--	--	
LNAPL-6	5/15/2022	5.94	5.95	0.01	--	

Table 6
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	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	5.50	0.05	--	
LNAPL-6	7/3/2022	5.46	5.48	0.02	--	
LNAPL-6	7/10/2022	--	5.61	--	--	
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	0.80	
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	7.00	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	--	--	
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	0.25	
LNAPL-6	3/19/2023	--	5.90	--	--	
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-6	4/2/2024	--	5.35	--	--	Sheen
LNAPL-6	4/18/2024	--	4.92	--	--	
LNAPL-6	4/30/2024	--	4.91	--	--	
LNAPL-6	5/15/2024	--	4.10	--	--	
LNAPL-6	5/31/2024	--	4.55	--	--	
LNAPL-6	6/12/2024	--	4.75	--	--	
LNAPL-6	6/28/2024	--	4.82	--	--	
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	11/18/2021	6.18	6.58	0.40	--	
LNAPL-7	12/2/2021	6.18	6.58	0.40	--	
LNAPL-7	12/15/2021	6.28	6.65	0.38	--	
LNAPL-7	1/3/2022	6.32	6.77	0.45	--	
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	0.90	
LNAPL-7	5/22/2022	5.73	5.74	0.01	--	
LNAPL-7	5/29/2022	--	5.70	--	--	
LNAPL-7	6/5/2022	--	5.80	--	0.50	
LNAPL-7	6/12/2022	--	5.96	--	0.60	
LNAPL-7	6/19/2022	5.85	5.87	0.02	1.00	
LNAPL-7	6/26/2022	5.40	5.45	0.05	--	
LNAPL-7	7/3/2022	--	5.50	--	0.33	
LNAPL-7	7/10/2022	--	5.67	--	0.60	
LNAPL-7	7/17/2022	--	5.45	--	0.70	
LNAPL-7	7/31/2022	--	5.90	--	0.60	

Table 6
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	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	0.70	0.30	
LNAPL-7	9/10/2022	6.64	7.41	0.77	0.50	
LNAPL-7	9/18/2022	6.99	7.11	0.12	0.25	
LNAPL-7	9/25/2022	--	6.51	--	0.50	
LNAPL-7	10/2/2022	6.75	7.02	0.27	0.50	
LNAPL-7	10/9/2022	6.33	6.66	0.33	0.75	
LNAPL-7	11/14/2022	6.08	6.10	0.02	0.75	
LNAPL-7	12/6/2022	--	5.95	--	1.00	
LNAPL-7	12/25/2022	5.93	5.94	0.01	0.75	
LNAPL-7	1/15/2023	--	5.38	--	1.00	
LNAPL-7	1/22/2023	5.88	5.90	0.02	0.70	
LNAPL-7	1/30/2023	--	5.43	--	0.80	
LNAPL-7	2/12/2023	--	5.50	--	1.00	
LNAPL-7	2/18/2023	--	5.55	--	0.10	
LNAPL-7	2/26/2023	--	5.46	--	0.10	
LNAPL-7	3/5/2023	5.74	5.76	0.02	0.15	
LNAPL-7	3/12/2023	--	5.92	--	1.00	
LNAPL-7	3/19/2023	--	5.52	--	0.25	
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	--	--	
LNAPL-7	9/19/2023	--	5.35	--	--	
LNAPL-7	2/7/2024	--	5.40	--	--	
LNAPL-7	2/23/2024	--	5.20	--	--	Sheen
LNAPL-7	3/7/2024	--	5.02	--	--	
LNAPL-7	3/20/2024	--	5.05	--	--	Sheen
LNAPL-7	4/2/2024	--	5.16	--	--	
LNAPL-7	4/18/2024	--	4.77	--	--	
LNAPL-7	4/30/2024	--	4.73	--	--	
LNAPL-7	5/15/2024	--	3.90	--	--	
LNAPL-7	5/31/2024	--	4.34	--	--	
LNAPL-7	6/12/2024	--	4.54	--	--	
LNAPL-7	6/28/2024	--	4.61	--	--	
LNAPL-8	8/27/2021	--	8.10	--	--	
LNAPL-8	9/30/2021	--	6.30	--	--	
LNAPL-8	10/5/2021	--	6.20	--	--	
LNAPL-8	10/12/2021	--	6.11	--	--	
LNAPL-8	10/19/2021	--	6.05	--	--	
LNAPL-8	11/9/2021	5.88	5.90	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	0.60	
LNAPL-8	5/22/2022	--	5.65	--	--	
LNAPL-8	5/29/2022	5.75	5.80	0.05	--	
LNAPL-8	6/5/2022	5.75	5.76	0.01	0.25	
LNAPL-8	6/12/2022	--	5.96	--	0.80	
LNAPL-8	6/19/2022	5.77	5.80	0.03	--	
LNAPL-8	6/26/2022	--	5.40	--	--	
LNAPL-8	7/3/2022	--	5.67	--	0.79	
LNAPL-8	7/10/2022	--	5.61	--	0.40	
LNAPL-8	7/17/2022	--	5.33	--	0.30	
LNAPL-8	7/31/2022	--	5.92	--	0.80	
LNAPL-8	8/7/2022	6.84	6.88	0.04	0.10	
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	--	1.00	

Table 6
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-8	10/2/2022	6.69	6.96	0.27	0.80	
LNAPL-8	10/9/2022	6.24	6.57	0.33	0.50	
LNAPL-8	11/14/2022	--	6.10	--	0.75	
LNAPL-8	12/6/2022	--	5.86	--	1.00	
LNAPL-8	12/25/2022	--	5.84	--	0.50	
LNAPL-8	1/15/2023	--	5.74	--	--	
LNAPL-8	1/22/2023	5.88	5.90	0.02	0.60	
LNAPL-8	1/30/2023	--	5.40	--	--	
LNAPL-8	2/5/2023	--	5.60	--	0.50	
LNAPL-8	2/12/2023	--	5.44	--	--	
LNAPL-8	2/18/2023	--	5.43	--	0.80	
LNAPL-8	2/26/2023	5.37	5.38	0.01	--	
LNAPL-8	3/5/2023	5.82	5.84	0.02	0.15	
LNAPL-8	3/12/2023	5.83	5.84	0.01	--	
LNAPL-8	3/19/2023	--	5.52	--	0.25	
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-8	4/2/2024	--	5.10	--	--	
LNAPL-8	4/18/2024	--	4.64	--	--	
LNAPL-8	4/30/2024	--	4.61	--	--	
LNAPL-8	5/15/2024	--	3.81	--	--	
LNAPL-8	5/31/2024	--	4.20	--	--	
LNAPL-8	6/12/2024	--	4.45	--	--	
LNAPL-8	6/28/2024	--	4.53	--	--	
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	--	--	
LNAPL-9	10/28/2021	--	6.10	--	--	
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	0.04	--	
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	--	5.70	--	--	
LNAPL-9	5/29/2022	--	5.70	--	--	
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	--	5.40	--	--	
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	--	5.70	--	--	
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	6.80	0.20	--	
LNAPL-9	9/18/2022	--	6.83	--	--	
LNAPL-9	9/25/2022	--	6.67	--	--	
LNAPL-9	10/2/2022	6.45	6.75	0.30	--	
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	--	--	

Table 6
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	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	--	--	Sheen
LNAPL-9	4/2/2024	--	5.12	--	--	
LNAPL-9	4/18/2024	--	4.74	--	--	
LNAPL-9	4/30/2024	--	4.69	--	--	
LNAPL-9	5/15/2024	--	3.85	--	--	
LNAPL-9	5/31/2024	--	4.30	--	--	
LNAPL-9	6/12/2024	--	4.49	--	--	
LNAPL-9	6/28/2024	--	4.57	--	--	
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	0.38	--	
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	0.59	--	
LNAPL-10	2/25/2022	6.43	7.33	0.90	--	
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	1.00	
LNAPL-10	5/22/2022	5.69	5.70	0.01	--	
LNAPL-10	5/29/2022	5.62	5.65	0.03	--	
LNAPL-10	6/5/2022	--	5.89	--	1.00	
LNAPL-10	6/12/2022	6.00	6.03	0.03	0.80	
LNAPL-10	6/19/2022	5.76	6.00	0.24	0.75	
LNAPL-10	6/26/2022	--	5.35	--	--	
LNAPL-10	7/3/2022	5.45	5.48	0.03	0.79	
LNAPL-10	7/10/2022	5.62	5.63	0.01	0.60	
LNAPL-10	7/17/2022	5.37	5.39	0.02	0.70	
LNAPL-10	7/31/2022	6.00	6.01	0.01	0.80	
LNAPL-10	8/7/2022	6.91	7.15	0.24	0.60	
LNAPL-10	8/14/2022	7.61	7.80	0.19	--	
LNAPL-10	9/4/2022	6.70	7.30	0.60	0.40	
LNAPL-10	9/10/2022	6.51	7.21	0.70	0.75	
LNAPL-10	9/18/2022	7.08	7.18	0.10	0.25	
LNAPL-10	9/25/2022	--	6.34	--	0.50	
LNAPL-10	10/2/2022	6.88	7.09	0.21	0.60	
LNAPL-10	10/9/2022	6.30	6.61	0.31	0.75	
LNAPL-10	11/14/2022	--	6.10	--	0.50	
LNAPL-10	12/6/2022	--	5.96	--	1.00	
LNAPL-10	12/25/2022	--	5.90	--	0.25	
LNAPL-10	1/15/2023	--	5.72	--	1.00	
LNAPL-10	1/22/2023	--	5.94	--	0.30	
LNAPL-10	1/30/2023	--	5.44	--	0.40	
LNAPL-10	2/12/2023	5.60	5.62	0.02	1.00	
LNAPL-10	2/18/2023	--	5.47	--	0.70	
LNAPL-10	2/26/2023	5.41	5.42	0.01	0.25	

Table 6
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	3/5/2023	--	5.80	--	--	
LNAPL-10	3/12/2023	--	5.71	--	1.00	
LNAPL-10	3/19/2023	--	5.52	--	0.25	
LNAPL-10	3/23/2023	--	5.40	--	--	
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-10	4/2/2024	--	5.10	--	--	
LNAPL-10	4/18/2024	--	4.64	--	--	
LNAPL-10	4/30/2024	--	4.63	--	--	
LNAPL-10	5/15/2024	--	3.82	--	--	
LNAPL-10	5/31/2024	--	4.25	--	--	
LNAPL-10	6/12/2024	--	4.48	--	--	
LNAPL-10	6/28/2024	--	4.54	--	--	
LNAPL-11	8/27/2021	--	8.20	--	--	
LNAPL-11	9/30/2021	--	6.52	--	--	
LNAPL-11	10/5/2021	6.29	6.30	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	6.40	6.41	0.01	--	
LNAPL-11	10/22/2021	--	6.30	--	--	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	6.20	6.40	0.20	--	
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	0.40	--	
LNAPL-11	12/15/2021	6.38	6.78	0.41	--	
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	0.80	--	
LNAPL-11	4/11/2022	6.70	7.43	0.73	--	
LNAPL-11	5/15/2022	6.12	6.50	0.38	0.50	
LNAPL-11	5/22/2022	--	5.86	--	--	
LNAPL-11	5/29/2022	--	5.90	--	--	
LNAPL-11	6/5/2022	--	6.09	--	1.00	
LNAPL-11	6/12/2022	6.21	6.25	0.04	0.50	
LNAPL-11	6/19/2022	5.94	6.18	0.24	0.75	
LNAPL-11	6/26/2022	--	5.50	--	--	
LNAPL-11	7/3/2022	5.56	5.58	0.02	0.92	
LNAPL-11	7/10/2022	--	5.83	--	1.00	
LNAPL-11	7/17/2022	5.55	5.57	0.02	0.70	
LNAPL-11	7/31/2022	6.10	6.20	0.10	0.50	
LNAPL-11	8/7/2022	7.15	7.16	0.01	0.70	
LNAPL-11	8/14/2022	7.82	7.86	0.04	--	
LNAPL-11	9/4/2022	7.19	7.60	0.41	0.70	
LNAPL-11	9/10/2022	6.58	7.20	0.62	0.75	
LNAPL-11	9/18/2022	7.34	7.38	0.04	0.10	
LNAPL-11	9/25/2022	--	6.56	--	0.50	
LNAPL-11	10/2/2022	7.21	7.34	0.13	0.70	
LNAPL-11	10/9/2022	6.46	6.76	0.30	0.50	
LNAPL-11	11/14/2022	--	6.10	--	0.50	
LNAPL-11	12/6/2022	--	6.03	--	0.75	
LNAPL-11	12/25/2022	--	6.06	--	0.25	
LNAPL-11	1/15/2023	--	5.89	--	--	
LNAPL-11	1/22/2023	--	6.07	--	0.40	
LNAPL-11	1/30/2023	5.56	5.58	0.02	0.50	
LNAPL-11	2/12/2023	5.60	5.62	0.02	1.00	
LNAPL-11	2/18/2023	5.62	5.65	0.03	0.50	
LNAPL-11	2/26/2023	5.58	5.60	0.02	--	
LNAPL-11	3/5/2023	--	5.77	--	--	
LNAPL-11	3/12/2023	--	5.83	--	--	

Table 6
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	3/19/2023	--	5.63	--	0.25	
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	--	5.30	--	--	Sheen
LNAPL-11	3/7/2024	--	5.15	--	--	
LNAPL-11	3/20/2024	--	5.18	--	--	Sheen
LNAPL-11	4/2/2024	--	5.30	--	--	
LNAPL-11	4/18/2024	--	4.82	--	--	
LNAPL-11	4/30/2024	--	4.80	--	--	
LNAPL-11	5/15/2024	--	3.98	--	--	
LNAPL-11	5/31/2024	--	4.45	--	--	
LNAPL-11	6/12/2024	--	4.65	--	--	
LNAPL-11	6/28/2024	--	4.73	--	--	
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	--	5.30	--	--	
LNAPL-12	3/7/2024	--	5.17	--	--	
LNAPL-12	3/20/2024	--	5.16	--	--	Sheen
LNAPL-12	4/2/2024	--	5.30	--	--	
LNAPL-12	4/18/2024	--	4.77	--	--	
LNAPL-12	4/30/2024	--	4.84	--	--	
LNAPL-12	5/15/2024	--	3.92	--	--	
LNAPL-12	5/31/2024	--	4.38	--	--	
LNAPL-12	6/12/2024	--	4.63	--	--	
LNAPL-12	6/28/2024	--	4.71	--	--	
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	--	6.70	--	--	
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	--	5.50	--	--	
LNAPL-13	2/23/2024	--	5.26	--	--	
LNAPL-13	3/7/2024	--	5.13	--	--	

Table 6
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	3/20/2024	--	5.14	--	--	
LNAPL-13	4/2/2024	--	5.29	--	--	
LNAPL-13	4/18/2024	--	4.82	--	--	
LNAPL-13	4/30/2024	--	4.76	--	--	
LNAPL-13	5/15/2024	--	3.88	--	--	
LNAPL-13	5/31/2024	--	4.38	--	--	
LNAPL-13	6/12/2024	--	4.60	--	--	
LNAPL-13	6/28/2024	--	4.66	--	--	
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	--	5.80	--	--	
LNAPL-14	3/23/2023	--	5.50	--	--	
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	--	5.30	--	--	
LNAPL-14	3/7/2024	--	5.15	--	--	
LNAPL-14	3/20/2024	--	5.13	--	--	
LNAPL-14	4/2/2024	--	5.30	--	--	
LNAPL-14	4/18/2024	--	4.81	--	--	
LNAPL-14	4/30/2024	--	4.78	--	--	
LNAPL-14	5/15/2024	--	3.87	--	--	
LNAPL-14	5/31/2024	--	4.38	--	--	
LNAPL-14	6/12/2024	--	4.62	--	--	
LNAPL-14	6/28/2024	--	4.71	--	--	
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	--	5.60	--	--	
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	--	5.30	--	--	
LNAPL-15	3/7/2024	--	5.13	--	--	
LNAPL-15	3/20/2024	--	5.14	--	--	
LNAPL-15	4/2/2024	--	5.25	--	--	
LNAPL-15	4/18/2024	--	4.84	--	--	
LNAPL-15	4/30/2024	--	4.78	--	--	
LNAPL-15	5/15/2024	--	3.88	--	--	
LNAPL-15	5/31/2024	--	4.32	--	--	
LNAPL-15	6/12/2024	--	4.62	--	--	
LNAPL-15	6/28/2024	--	4.37	--	--	
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	--	--	

Table 6
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-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	--	5.60	--	--	
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	--	5.50	--	--	
LNAPL-16	2/23/2024	--	5.27	--	--	Sheen
LNAPL-16	3/7/2024	--	5.11	--	--	
LNAPL-16	3/20/2024	--	5.12	--	--	Sheen
LNAPL-16	4/2/2024	--	5.25	--	--	Sheen
LNAPL-16	4/18/2024	--	4.80	--	--	
LNAPL-16	4/30/2024	--	4.75	--	--	
LNAPL-16	5/15/2024	--	3.85	--	--	
LNAPL-16	5/31/2024	--	4.42	--	--	
LNAPL-16	6/12/2024	--	4.59	--	--	
LNAPL-16	6/28/2024	--	4.67	--	--	
LNAPL-17	8/14/2022	--	6.90	--	--	
LNAPL-17	8/20/2022	--	6.79	--	--	
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	--	--	
LNAPL-17	4/2/2024	--	5.20	--	--	Sheen
LNAPL-17	4/18/2024	--	4.79	--	--	
LNAPL-17	4/30/2024	--	4.72	--	--	
LNAPL-17	5/15/2024	--	3.82	--	--	
LNAPL-17	5/31/2024	--	4.30	--	--	
LNAPL-17	6/12/2024	--	4.55	--	--	
LNAPL-17	6/28/2024	--	4.62	--	--	

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 7
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location	Montana DEQ-7 Human Health Standards - Groundwater	Montana DEQ Tier 1 Groundwater RBSLs	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S
Field Sample ID			CMR-MW41S-200622	CMR-MW41S-200826	CMR-MW41S-210219	CMR-MW41S-211005	CMR-MW141S-220317	MW41S-GW-220622
Lab Sample ID			VF24007-001	VH28044-002	WB24062-035	WJ08015-001	XC21009-002	XF23073-001
Sample Method			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
Comments								
VOC								
Acetone			220 (40)	U (80)	94 J (80)	U (80)	76 (20)	HU (80)
Benzene	5	5	**1000 (4)**	**1500 (8)**	**980 (8)**	**1900 (8)**	**230 (2)**	**1200 H (8)**
Bromoform	80		U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)
2-Butanone			89 J (20)	U (40)	U (40)	U (40)	28 J (10)	HU (40)
n-Butylbenzene			---	---	---	---	---	---
sec-Butylbenzene			---	---	---	---	---	---
tert-Butylbenzene			---	---	---	---	---	---
Carbon Disulfide			U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)
Chloroform	70		4 J (4)	U (8)	U (8)	U (8)	U (2)	HU (8)
Chloromethane	600		U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)
Cumene			10 (4)	11 (8)	U (8)	14 (8)	U (2)	16 H (8)
Cyclohexane			24 (4)	77 J (8)	97 (8)	110 (8)	15 (2)	22 H (8)
p-Cymene			---	---	---	---	---	---
cis-1,2-Dichloroethene	70		U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)
Ethyl Benzene	700	700	370 (4)	250 (8)	67 (8)	450 (8)	15 (2)	410 H (8)
n-Hexane			---	---	---	---	---	---
Iodomethane			---	---	---	---	---	---
4-Methyl-2-pentanone			U (20)	U (40)	U (40)	U (40)	U (10)	HU (40)
Methylcyclohexane			11 J (4)	34 J (8)	53 J (8)	57 J (8)	9.4 J (2)	12 (8)
Methylene Chloride	5		U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)
Naphthalene	100	100	31 (4)	26 (8)	9.5 J (8)	35 (8)	31 (2)	77 H (8)
n-Propylbenzene			---	---	---	---	---	---
Styrene	100		U (4.1)	U (8.2)	U (8.2)	U (8.2)	U (2.1)	HU (8.2)
Toluene	1000	1000	82 (4)	12 (8)	11 (8)	270 (8)	44 (2)	180 H (8)
1,1,2-Trichloroethane	3		U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)
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)
ortho-xylene	10000		67 (4)	16 (8)	10 (8)	200 (8)	300 (2)	750 H (8)
Xylenes (total)	10000	10000	620 (4)	390 (8)	230 (8)	840 (8)	870 (2)	2700 H (8)
SVOC								
Acenaphthene	70	70	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)
Acenaphthylene			U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)
Benzo(a)anthracene	0.5	0.5	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)
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)
Benzo(b)fluoranthene	0.5	0.5	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)
Benzo(g,h,i)perylene			U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)
1,1-Biphenyl			---	---	---	---	---	---
bis(2-Ethylhexyl)phthalate	6		**11 BJ (5)**	U (5)	U (5)	U (5)	U (40)	U (100)
Chrysene	50	50	U (0.3)	U (0.3)	U (0.3)	U (0.15)	U (0.6)	U (1.5)
Dibenzofuran			U (5)	U (5)	U (5)	U (2.5)	U (10)	U (25)
Diethylphthalate	600		U (5)	U (5)	U (5)	U (2.5)	U (10)	U (25)
2,4-Dimethylphenol	100		84 (4.8)	U (4.8)	24 (4.8)	U (2.4)	**160 (9.6)**	36 J (24)
Di-n-butylphthalate	20		6.1 BJ (5)	U (5)	U (5)	U (2.5)	U (10)	U (25)
Fluoranthene	20	20	U (1)	U (1)	U (1)	U (0.5)	U (2)	U (5)
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)
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)
1-Methylnaphthalene		11	---	---	---	---	---	---
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)
2-Methylphenol			U (2.1)	U (2.1)	U (2.1)	U (1.1)	U (4.2)	U (11)
Naphthalene	100	100	24 B (0.5)	7.1 (0.5)	10 (0.5)	15 B (0.25)	18 (1)	60 (2.5)
Phenanthrene			U (0.6)	U (0.6)	U (0.6)	U (0.3)	U (1.2)	U (3)
Phenol	4000		53 (5)	61 (5)	34 (5)	5.6 (2.5)	15 J (10)	U (25)
Pyrene	20	20	U (1)	U (1)	U (1)	U (0.5)	U (2)	U (5)

Table 7
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
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
Lab Sample ID	Human Health	Tier 1	VF24007-001	VH28044-002	WB24062-035	WJ08015-001	XC21009-002	XF23073-001
Sample Method	Standards -	Groundwater	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
Comments								
MTDEQ VPH								
C5-C8 Aliphatics (Unadjusted)			---	---	---	---	---	---
C5-C8 Aliphatics		650	680 J (150)	2700 (300)	2200 (300)	1500 (150)	460 J (150)	990 (150)
C9-C12 Aliphatics (Unadjusted)			---	---	---	---	---	---
C9-C12 Aliphatics		1400	1700 (150)	740 J (300)	510 J (300)	370 J (150)	730 J (150)	710 J (150)
C9-C10 Aromatics (Unadjusted)			---	---	---	---	---	---
C9-C10 Aromatics		1100	1100 (50)	2400 (100)	730 (100)	990 (50)	810 (50)	3100 (50)
Gasoline Range Organics (C5-C12)			---	---	---	---	---	---
Volatile Petroleum Hydrocarbons			---	---	---	---	---	---
MTDEQ EPH								
C9-C18 Aliphatics		1400	U (320)	U (100)	U (110)	---	---	990 (100)
C19-C36 Aliphatics (Unadjusted)			---	---	---	---	---	---
C19-C36 Aliphatics		1000	U (320)	U (100)	U (110)	---	---	U (100)
C11 through C22 Aromatics (Unadjusted)			---	---	---	---	---	---
C11-C22 Aromatics		1100	U (320)	100 (100)	3200 (110)	---	---	4000 (100)
TPH (Unadjusted)			---	---	---	---	---	---
TPH			---	---	---	---	---	---
Petroleum Hydrocarbons (Extractable)			4300 (650)	3100 (210)	4700 (210)	---	---	5700 (2000)
Extractable Petroleum Hydrocarbons (Frac)			U (320)	120 J (100)	3300 (110)	---	---	5000 B (100)

Notes:

1 All concentrations are presented in ug/L (ppb).
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	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S
Field Sample ID	CMR-MW41S-220831	*N*-41S-221213-L1569525	CMR-MW-415-230321	CMR-MW-41S-270623	CMR-MW-41S-092023	CMR-MW-415-231207	CMR-MW-41S-240228
Lab Sample ID	XI01059-003	XL14017-003	YC22023-003	YF29005-005	YI21013-003	L1685777-03	L1710780-01
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	8/31/2022	12/13/2022	3/21/2023	6/27/2023	9/20/2023	12/7/2023	2/28/2024
Comments							
VOC							
Acetone	88 (4)	35 J (20)	U (20)	40 H (4)	U (200)	23.2 J (11.3)	UJ3 (11.3)
Benzene	**140 (0.4)**	**250 (2)**	**130 (0.4)**	**410 (2)**	**470 (20)**	**535 (1.88)**	**199 (0.0941)**
Bromoform	U (0.4)	U (2)	U (0.4)	U (2)	U (20)	U (0.129)	U (0.129)
2-Butanone	16 (2)	14 J (10)	U (2)	18 H (2)	U (100)	U (1.19)	U (1.19)
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	4.2 (0.4)	U (2)	U (0.4)	U (2)	U (20)	0.363 J (0.0962)	U (0.0962)
Chloroform	U (0.4)	U (2)	U (0.4)	U (2)	U (20)	U (0.111)	U (0.111)
Chloromethane	U (0.4)	U (2)	U (0.4)	U (2)	U (20)	U (0.96)	U (0.96)
Cumene	0.57 (0.4)	U (2)	0.55 (0.4)	5.6 (2)	U (20)	8.52 (0.105)	0.975 (0.105)
Cyclohexane	27 (0.4)	33 (2)	18 (2)	17 (2)	45 (20)	---	---
p-Cymene	---	---	---	---	---	6.35 (0.12)	2.96 (0.12)
cis-1,2-Dichloroethene	0.48 J (0.4)	U (2)	U (0.4)	U (2)	U (20)	U (0.126)	U (0.126)
Ethyl Benzene	21 (0.4)	50 (2)	16 (0.4)	150 (2)	170 (20)	191 (2.74)	21.9 (0.137)
n-Hexane	---	---	---	---	---	U (0.749)	U (0.749)
Iodomethane	---	---	---	---	---	2.19 B J (0.554)	U (0.554)
4-Methyl-2-pentanone	2.4 J (2)	U (10)	U (2)	U (10)	U (100)	2.78 J (0.478)	1.94 J (0.478)
Methylcyclohexane	18 (0.4)	34 (2)	12 (0.4)	15 J (2)	33 J (20)	---	---
Methylene Chloride	U (0.4)	U (2)	U (0.4)	U (2)	U (20)	U (0.43)	U (0.43)
Naphthalene	3.4 (0.4)	27 (2)	18 (0.4)	35 (2)	30 (20)	63.7 (0.174)	28.4 (0.174)
n-Propylbenzene	---	---	---	---	---	21.1 (0.0993)	2.81 (0.0993)
Styrene	U (0.41)	U (2.1)	U (0.41)	4.8 (2.1)	U (21)	U (0.118)	U (0.118)
Toluene	11 (0.4)	9.5 (2)	2.2 (0.4)	3.4 (2)	U (20)	6.45 (0.278)	1.5 (0.278)
1,1,2-Trichloroethane	U (0.4)	U (2)	U (0.4)	U (2)	U (20)	U (0.158)	U (0.158)
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	150 (0.4)	730 (2)	320 (2)	470 (2)	590 (20)	---	---
ortho-xylene	67 (0.4)	300 (2)	150 (2)	150 (2)	200 (20)	---	---
Xylenes (total)	220 (0.4)	1000 (2)	460 (2)	630 (2)	790 (20)	987 (3.48)	535 (0.174)
SVOC							
Acenaphthene	U (0.04)	U (0.8)	U (0.8)	0.34 J (0.2)	0.65 J (0.2)	0.788 J (0.0886)	0.347 J (0.0886)
Acenaphthylene	U (0.04)	U (0.8)	U (0.8)	U (0.2)	U (0.2)	U (0.0921)	U (0.0921)
Benzo(a)anthracene	U (0.04)	U (0.8)	U (0.8)	U (0.2)	U (0.2)	U (0.199)	U (0.199)
Benzo(a)pyrene	U (0.04)	U (0.8)	U (0.8)	U (0.2)	U (0.2)	U (0.0381)	U (0.0381)
Benzo(b)fluoranthene	U (0.04)	U (0.8)	U (0.8)	U (0.2)	U (0.2)	U (0.13)	U (0.13)
Benzo(g,h,i)perylene	U (0.04)	U (0.8)	U (0.8)	U (0.2)	U (0.2)	U (0.121)	U (0.121)
1,1-Biphenyl	U (0.21)	U (4.2)	U (4.2)	1.4 J (1.1)	U (1.1)	---	---
bis(2-Ethylhexyl)phthalate	3.8 BJ (1.5)	U (30)	U (30)	U (7.5)	U (7.5)	U (0.895)	U (0.895)
Chrysene	U (0.04)	U (0.8)	U (0.8)	U (0.2)	U (0.2)	U (0.13)	U (0.13)
Dibenzofuran	U (0.16)	U (3.2)	U (3.2)	U (0.8)	U (0.8)	0.55 J (0.097)	0.193 J (0.097)
Diethylphthalate	U (0.19)	U (3.8)	U (3.8)	U (0.95)	U (0.95)	U (0.287)	U (0.287)
2,4-Dimethylphenol	U (0.15)	**100 (3)**	60 (3)	8.3 (0.75)	75 (0.75)	15.8 (0.0636)	16 J3 (0.0636)
Di-n-butylphthalate	U (0.42)	U (8.4)	U (8.4)	U (2.1)	U (2.1)	U (0.453)	U (0.453)
Fluoranthene	U (0.04)	U (0.8)	U (0.8)	U (0.2)	U (0.2)	U (0.102)	U (0.102)
Fluorene	U (0.04)	U (0.8)	1.2 J (0.8)	0.67 J (0.2)	1.4 (0.2)	0.914 J (0.0844)	0.511 J (0.0844)
Indeno(1,2,3-cd)pyrene	U (0.04)	U (0.8)	U (0.8)	U (0.2)	U (0.2)	U (0.279)	U (0.279)
1-Methylnaphthalene	0.065 J (0.04)	12 (0.8)	14 (0.8)	10 (0.2)	7.3 (0.2)	31 (0.0687)	---
2-Methylnaphthalene	0.11 J (0.04)	6.7 (0.8)	11 (0.8)	12 (0.2)	0.74 J (0.2)	13.3 (0.117)	7.41 (0.117)
2-Methylphenol	U (0.21)	U (4.2)	U (4.2)	U (1.1)	U (1.1)	U (0.0929)	UJ3 (0.0929)
Naphthalene	U (0.04)	19 (0.8)	11 (0.8)	15 (0.2)	6.9 (0.2)	27.1 (0.159)	13 (0.159)
Phenanthrene	U (0.04)	U (0.8)	U (0.8)	0.42 J (0.2)	U (0.2)	0.555 J (0.112)	0.257 J (0.112)
Phenol	U (0.19)	9.1 J (3.8)	U (3.8)	U (0.95)	15 (0.95)	4.95 J (4.33)	U (4.33)
Pyrene	U (0.04)	U (0.8)	U (0.8)	U (0.2)	U (0.2)	U (0.107)	U (0.107)

Table 7
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**
Field Sample ID	**CMR-MW41S-220831**	***N*-41S-221213-L1569525**	**CMR-MW-415-230321**	**CMR-MW-41S-270623**	**CMR-MW-41S-092023**	**CMR-MW-415-231207**	**CMR-MW-41S-240228**
Lab Sample ID	**XI01059-003**	**XL14017-003**	**YC22023-003**	**YF29005-005**	**YI21013-003**	**L1685777-03**	**L1710780-01**
Sample Method	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**
Sample Date	**8/31/2022**	**12/13/2022**	**3/21/2023**	**6/27/2023**	**9/20/2023**	**12/7/2023**	**2/28/2024**
Comments							
MTDEQ VPH							
C5-C8 Aliphatics (Unadjusted)	1460 (33.3)	1050 (33.3)	516 (33.3)	850 (167)	1310 (33.3)	1410 (33.3)	782 (33.3)
C5-C8 Aliphatics	1140 (33.3)	1040 (33.3)	392 (33.3)	429 J (167)	842 (33.3)	869 (33.3)	582 (33.3)
C9-C12 Aliphatics (Unadjusted)	1200 (33.3)	2060 (33.3)	1330 (33.3)	3100 (167)	2510 (33.3)	3560 (33.3)	2240 (33.3)
C9-C12 Aliphatics	625 (33.3)	405 (33.3)	456 (33.3)	U (167)	844 (33.3)	2380 (33.3)	1680 (33.3)
C9-C10 Aromatics (Unadjusted)	530 (33.3)	1570 (33.3)	1240 (167)	1910 (167)	1750 (33.3)	1180 (33.3)	720 (33.3)
C9-C10 Aromatics	---	---	---	---	---	---	---
Gasoline Range Organics (C5-C12)	---	---	3360 (66.7)	6400 (333)	6010 (66.7)	---	---
Volatile Petroleum Hydrocarbons	---	---	3090 (333)	5860 (333)	5570 (66.7)	6150 (66.7)	3740 (66.7)
MTDEQ EPH							
C9-C18 Aliphatics	---	---	---	---	---	U (200)	U (200)
C19-C36 Aliphatics (Unadjusted)	---	UQ (200)	U (222)	U (200)	U (200)	U (200)	U (200)
C19-C36 Aliphatics	---	---	---	---	---	---	---
C11 through C22 Aromatics (Unadjusted)	---	375 JQ (200)	506 J (222)	425 JJ3 (200)	397 J (200)	813 (200)	569 J (200)
C11-C22 Aromatics	---	375 JQ (200)	506 J (222)	425 J (200)	397 J (200)	700 (200)	548 J (200)
TPH (Unadjusted)	---	375 JQ (200)	506 J (222)	425 J (200)	397 J (200)	813 (200)	569 J (200)
TPH	---	375 JQ (200)	506 J (222)	425 J (200)	397 J (200)	700 (200)	548 J (200)
Petroleum Hydrocarbons (Extractable)	5560 (500)	---	5640 (111)	5490 (100)	5660 (100)	6840 (100)	---
Extractable Petroleum Hydrocarbons (Frac)	---	4460 Q (100)	---	---	---	---	---

Notes:

1 All concentrations are presented in ug/L (ppb).

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 - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MW-041S	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105
Field Sample ID	CMR-MW-41S-240606	CMR-MW105-08052020	CMR-MW105-200827	CMR-MW105-210223	CMR-MW105S-211006	CMR-MW105-220317	MW105-GW-220622
Lab Sample ID	L1744765-01	VH07016-001	VH28044-018	WB25040-009	WJ08015-002	XC21009-003	XF23073-003
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	6/6/2024	8/5/2020	8/27/2020	2/23/2021	10/6/2021	3/17/2022	6/22/2022
Comments							
VOC							
Acetone	U (11.3)	110 (4)	43 J (40)	65 J (40)	58 H (20)	6.8 J (4)	U (4)
Benzene	**353 (2.35)**	**180 (0.4)**	**570 (4)**	**240 (4)**	**250 H (2)**	**25 (0.4)**	**110 (0.4)**
Bromoform	U (0.129)	U (0.4)	U (4)	U (4)	U (0.4)	U (0.4)	U (0.4)
2-Butanone	U (1.19)	15 (2)	U (20)	U (20)	17 (2)	U (2)	3 J (2)
n-Butylbenzene	U (0.157)	---	---	---	---	---	---
sec-Butylbenzene	8.79 (0.125)	---	---	---	---	---	---
tert-Butylbenzene	U (0.127)	---	---	---	---	---	---
Carbon Disulfide	0.171 J (0.0962)	0.56 (0.4)	U (4)	U (4)	HU (2)	U (0.4)	1.4 (0.4)
Chloroform	U (0.111)	U (0.4)	U (4)	U (4)	U (0.4)	U (0.4)	U (0.4)
Chloromethane	U (0.96)	29 (0.4)	U (4)	U (4)	U (0.4)	U (0.4)	U (0.4)
Cumene	8.31 (0.105)	4.6 (0.4)	5.4 (4)	5.5 (4)	2.4 (0.4)	U (0.4)	2.9 (0.4)
Cyclohexane	---	59 (0.4)	55 J (4)	70 (4)	59 (0.4)	3 (0.4)	50 (0.4)
p-Cymene	8.72 (0.12)	---	---	---	---	---	---
cis-1,2-Dichloroethene	U (0.126)	U (0.4)	U (4)	U (4)	U (0.4)	U (0.4)	U (0.4)
Ethyl Benzene	147 (3.43)	240 (2)	320 (4)	160 (4)	150 (0.4)	20 (0.4)	200 (0.4)
n-Hexane	11.5 (0.749)	---	---	---	---	---	---
Iodomethane	U (0.554)	---	---	---	---	---	---
4-Methyl-2-pentanone	2.6 J (0.478)	U (2)	U (20)	U (20)	U (2)	U (2)	U (2)
Methylcyclohexane	---	26 (0.4)	17 J (4)	37 J (4)	25 (0.4)	0.85 J (0.4)	14 (0.4)
Methylene Chloride	U (0.43)	U (0.4)	U (4)	U (4)	U (0.4)	U (0.4)	U (0.4)
Naphthalene	67.8 (0.174)	9.4 (0.4)	9.1 (4)	12 (4)	8.5 (0.4)	0.86 (0.4)	4.9 (0.4)
n-Propylbenzene	23.5 (0.0993)	---	---	---	---	---	---
Styrene	U (0.118)	U (0.41)	U (4.1)	U (4.1)	U (0.41)	U (0.41)	U (0.41)
Toluene	4.04 (0.278)	25 (0.4)	42 (4)	15 (4)	14 (0.4)	2 (0.4)	12 (0.4)
1,1,2-Trichloroethane	U (0.158)	U (0.4)	U (4)	U (4)	U (0.4)	U (0.4)	U (0.4)
1,2,3-Trimethylbenzene	261 (2.6)	---	---	---	---	---	---
1,2,4-Trimethylbenzene	656 (8.05)	---	---	---	---	---	---
1,3,5-Trimethylbenzene	91.5 (0.104)	---	---	---	---	---	---
m,p-xylene	---	250 (2)	260 (4)	55 (4)	41 (0.4)	6.7 (0.4)	28 (0.4)
ortho-xylene	---	16 (0.4)	20 (4)	5.7 (4)	3.8 (0.4)	2.3 (0.4)	3.9 (0.4)
Xylenes (total)	987 (4.35)	290 (0.4)	280 (4)	61 (4)	45 (0.4)	9 (0.4)	31 (0.4)
SVOC							
Acenaphthene	0.554 J (0.0886)	---	U (0.2)	0.065 J (0.04)	U (0.4)	U (0.04)	U (0.25)
Acenaphthylene	U (0.0921)	---	U (0.2)	U (0.04)	U (0.4)	U (0.04)	U (0.25)
Benzo(a)anthracene	U (0.199)	---	U (0.2)	U (0.04)	U (0.4)	U (0.04)	U (0.25)
Benzo(a)pyrene	U (0.0381)	---	U (0.35)	U (0.07)	U (0.7)	U (0.07)	U (0.44)
Benzo(b)fluoranthene	U (0.13)	---	U (0.2)	U (0.04)	U (0.4)	U (0.04)	U (0.25)
Benzo(g,h,i)perylene	U (0.121)	---	U (0.2)	U (0.04)	U (0.4)	U (0.04)	U (0.25)
1,1-Biphenyl	---	---	---	---	---	---	---
bis(2-Ethylhexyl)phthalate	U (0.895)	---	U (2.5)	U (0.5)	U (20)	U (2)	U (13)
Chrysene	U (0.13)	---	U (0.15)	U (0.03)	U (0.3)	U (0.03)	U (0.19)
Dibenzofuran	U (0.097)	---	U (2.5)	U (0.5)	U (5)	U (0.5)	U (3.1)
Diethylphthalate	U (0.287)	---	U (2.5)	U (0.5)	U (5)	U (0.5)	U (3.1)
2,4-Dimethylphenol	8.34 J (0.0636)	---	U (2.4)	1.1 (0.48)	U (4.8)	0.63 J (0.48)	U (3)
Di-n-butylphthalate	U (0.453)	---	U (2.5)	U (0.5)	U (5)	U (0.5)	U (3.1)
Fluoranthene	U (0.102)	---	U (0.5)	U (0.1)	U (1)	U (0.1)	U (0.63)
Fluorene	0.82 J (0.0844)	---	U (0.15)	0.15 J (0.03)	U (0.3)	U (0.03)	U (0.19)
Indeno(1,2,3-cd)pyrene	U (0.279)	---	U (0.2)	U (0.04)	U (0.4)	U (0.04)	U (0.25)
1-Methylnaphthalene	---	---	---	---	---	---	---
2-Methylnaphthalene	16.2 (0.117)	---	0.77 J (0.2)	2.4 (0.04)	U (0.4)	U (0.04)	U (0.25)
2-Methylphenol	U (0.0929)	---	U (1.1)	0.24 J (0.21)	U (2.1)	U (0.21)	U (1.3)
Naphthalene	24.4 (0.159)	---	6.6 (0.25)	6.1 (0.05)	3.1 (0.5)	0.42 (0.05)	2.1 (0.31)
Phenanthrene	0.582 J (0.112)	---	U (0.3)	0.088 J (0.06)	U (0.6)	U (0.06)	U (0.38)
Phenol	4.65 J (4.33)	---	U (2.5)	3.4 (0.5)	U (5)	U (0.5)	U (3.1)
Pyrene	U (0.107)	---	U (0.5)	U (0.1)	U (1)	U (0.1)	U (0.63)

Table 7
Summary of Groundwater Analytical Results - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location	**MW-041S**	**MW-105**	**MW-105**	**MW-105**	**MW-105**	**MW-105**	**MW-105**
Field Sample ID	**CMR-MW-41S-240606**	**CMR-MW105-08052020**	**CMR-MW105-200827**	**CMR-MW105-210223**	**CMR-MW105S-211006**	**CMR-MW105-220317**	**MW105-GW-220622**
Lab Sample ID	**L1744765-01**	**VH07016-001**	**VH28044-018**	**WB25040-009**	**WJ08015-002**	**XC21009-003**	**XF23073-003**
Sample Method	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**
Sample Date	**6/6/2024**	**8/5/2020**	**8/27/2020**	**2/23/2021**	**10/6/2021**	**3/17/2022**	**6/22/2022**
Comments							
MTDEQ VPH							
C5-C8 Aliphatics (Unadjusted)	1260 (33.3)	---	---	---	---	---	---
C5-C8 Aliphatics	903 (33.3)	1600 (15)	880 (75)	1800 (75)	1200 (75)	150 (15)	830 (15)
C9-C12 Aliphatics (Unadjusted)	4050 (33.3)	---	---	---	---	---	---
C9-C12 Aliphatics	2920 (33.3)	180 (15)	200 J (75)	210 J (75)	130 (15)	21 J (15)	37 J (15)
C9-C10 Aromatics (Unadjusted)	1380 (33.3)	---	---	---	---	---	---
C9-C10 Aromatics	---	530 (5)	650 (25)	350 (25)	300 (5)	52 (5)	150 (5)
Gasoline Range Organics (C5-C12)	---	---	---	---	---	---	---
Volatile Petroleum Hydrocarbons	6690 (66.7)	---	---	---	---	---	---
MTDEQ EPH							
C9-C18 Aliphatics	U (200)	---	U (480)	---	---	---	---
C19-C36 Aliphatics (Unadjusted)	U (200)	---	---	---	---	---	---
C19-C36 Aliphatics	---	---	740 (480)	---	---	---	---
C11 through C22 Aromatics (Unadjusted)	405 J (200)	---	---	---	---	---	---
C11-C22 Aromatics	363 J (200)	---	U (480)	---	---	---	---
TPH (Unadjusted)	405 J (200)	---	---	---	---	---	---
TPH	363 J (200)	---	---	---	---	---	---
Petroleum Hydrocarbons (Extractable)	---	---	1900 (950)	470 (240)	---	---	---
Extractable Petroleum Hydrocarbons (Frac)	---	---	880 J (480)	---	---	---	---

Notes:
1 All concentrations are presented in ug/L (ppb).
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 - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105
Field Sample ID	CMR-MW105-220831	*N*-105-221213-L1569525	CMR-MW-105-230321	CMR-MW-105-270623	CMR-MW-105-092023	CMR-MW-105-231207	CMR-MW-105-240228
Lab Sample ID	XI01059-001	XL14017-001	YC22023-001	YF29005-003	YI21013-001	L1685777-01	L1710780-02
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	8/31/2022	12/13/2022	3/21/2023	6/27/2023	9/20/2023	12/7/2023	2/28/2024
Comments							
VOC							
Acetone	77 (4)	8 J (4)	U (4)	21 H (4)	U (200)	U (11.3)	UJ3 (11.3)
Benzene	**85 (0.4)**	2.1 (0.4)	**12 (0.4)**	**48 (0.4)**	**85 (20)**	**11.7 (0.0941)**	3.91 (0.0941)
Bromoform	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (20)	U (0.129)	U (0.129)
2-Butanone	U (2)	U (2)	U (2)	3.2 J (2)	U (100)	U (1.19)	U (1.19)
n-Butylbenzene	---	---	---	---	---	0.247 J (0.157)	U (0.157)
sec-Butylbenzene	---	---	---	---	---	0.191 J (0.125)	U (0.125)
tert-Butylbenzene	---	---	---	---	---	U (0.127)	U (0.127)
Carbon Disulfide	0.55 (0.4)	5.8 (0.4)	U (0.4)	U (0.4)	U (20)	0.197 J (0.0962)	U (0.0962)
Chloroform	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (20)	U (0.111)	U (0.111)
Chloromethane	U (0.4)	U (0.4)	U (0.4)	1.5 (0.4)	U (20)	U (0.96)	U (0.96)
Cumene	0.67 (0.4)	U (0.4)	U (0.4)	0.72 (0.4)	U (20)	1.73 (0.105)	0.184 J (0.105)
Cyclohexane	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)	U (0.12)
cis-1,2-Dichloroethene	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (20)	U (0.126)	U (0.126)
Ethyl Benzene	120 (0.4)	7.9 (0.4)	21 (0.4)	15 (0.4)	570 (20)	75 (0.137)	2.41 (0.137)
n-Hexane	---	---	---	---	---	1.41 J (0.749)	U (0.749)
Iodomethane	---	---	---	---	---	U (0.554)	U (0.554)
4-Methyl-2-pentanone	U (2)	U (2)	U (2)	U (2)	U (100)	U (0.478)	U (0.478)
Methylcyclohexane	8.1 (0.4)	0.91 J (0.4)	1.7 J (0.4)	3.8 J (0.4)	28 J (20)	---	---
Methylene Chloride	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (20)	U (0.43)	U (0.43)
Naphthalene	4.9 (0.4)	U (0.4)	0.57 (0.4)	1.5 (0.4)	U (20)	0.374 J (0.174)	U (0.174)
n-Propylbenzene	---	---	---	---	---	5.33 (0.0993)	0.397 J (0.0993)
Styrene	U (0.41)	U (0.41)	U (0.41)	U (0.41)	U (21)	U (0.118)	U (0.118)
Toluene	9.9 (0.4)	U (0.4)	1.5 (0.4)	2.2 (0.4)	20 J (20)	1.78 (0.278)	0.431 J (0.278)
1,1,2-Trichloroethane	0.51 (0.4)	U (0.4)	U (0.4)	U (0.4)	U (20)	U (0.158)	U (0.158)
1,2,3-Trimethylbenzene	---	---	---	---	---	1.1 (0.104)	0.198 J (0.104)
1,2,4-Trimethylbenzene	---	---	---	---	---	2.33 (0.322)	0.351 J (0.322)
1,3,5-Trimethylbenzene	---	---	---	---	---	U (0.104)	0.117 J (0.104)
m,p-xylene	12 (0.4)	0.57 (0.4)	3.6 (0.4)	4.7 (0.4)	U (20)	---	---
ortho-xylene	3.9 (0.4)	0.44 J (0.4)	0.57 (0.4)	1.2 (0.4)	U (20)	---	---
Xylenes (total)	16 (0.4)	1 (0.4)	4.1 (0.4)	5.9 (0.4)	U (20)	2.43 (0.174)	0.59 J (0.174)
SVOC							
Acenaphthene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	0.102 J (0.0886)	U (0.0886)
Acenaphthylene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.0921)	U (0.0921)
Benzo(a)anthracene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.199)	U (0.199)
Benzo(a)pyrene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.0381)	U (0.0381)
Benzo(b)fluoranthene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.13)	U (0.13)
Benzo(g,h,i)perylene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.121)	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	U (30)	U (7.5)	U (7.5)	U (7.5)	U (7.5)	U (0.895)	1.87 B J (0.895)
Chrysene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.13)	U (0.13)
Dibenzofuran	U (3.2)	U (0.8)	U (0.8)	U (0.8)	U (0.8)	U (0.097)	U (0.097)
Diethylphthalate	U (3.8)	U (0.95)	U (0.95)	U (0.95)	U (0.95)	0.309 J (0.287)	U (0.287)
2,4-Dimethylphenol	37 (3)	U (0.75)	U (0.75)	U (0.75)	31 (0.75)	3.08 J (0.0636)	UJ3 (0.0636)
Di-n-butylphthalate	U (8.4)	U (2.1)	U (2.1)	U (2.1)	U (2.1)	U (0.453)	U (0.453)
Fluoranthene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.102)	U (0.102)
Fluorene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.0844)	U (0.0844)
Indeno(1,2,3-cd)pyrene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.279)	U (0.279)
1-Methylnaphthalene	1.3 J (0.8)	U (0.2)	U (0.2)	0.73 J (0.2)	4 (0.2)	---	---
2-Methylnaphthalene	1.9 J (0.8)	U (0.2)	U (0.2)	0.31 J (0.2)	0.29 J (0.2)	U (0.117)	U (0.117)
2-Methylphenol	U (4.2)	U (1.1)	U (1.1)	U (1.1)	U (1.1)	U (0.0929)	UJ3 (0.0929)
Naphthalene	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)	0.27 J (0.159)
Phenanthrene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.112)	U (0.112)
Phenol	U (3.8)	U (0.95)	U (0.95)	1.2 J (0.95)	3.3 J (0.95)	U (4.33)	U (4.33)
Pyrene	U (0.8)	U (0.2)	U (0.2)	U (0.2)	U (0.2)	U (0.107)	U (0.107)

Table 7
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**
Field Sample ID	**CMR-MW105-220831**	***N*-105-221213-L1569525**	**CMR-MW-105-230321**	**CMR-MW-105-270623**	**CMR-MW-105-092023**	**CMR-MW-105-231207**	**CMR-MW-105-240228**
Lab Sample ID	**XI01059-001**	**XL14017-001**	**YC22023-001**	**YF29005-003**	**YI21013-001**	**L1685777-01**	**L1710780-02**
Sample Method	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**
Sample Date	**8/31/2022**	**12/13/2022**	**3/21/2023**	**6/27/2023**	**9/20/2023**	**12/7/2023**	**2/28/2024**
Comments							
MTDEQ VPH							
C5-C8 Aliphatics (Unadjusted)	650 (33.3)	63.9 J (33.3)	178 (33.3)	1050 (33.3)	1580 (33.3)	523 (33.3)	U (33.3)
C5-C8 Aliphatics	517 (33.3)	63.9 J (33.3)	162 (33.3)	969 (33.3)	1490 (33.3)	510 (33.3)	U (33.3)
C9-C12 Aliphatics (Unadjusted)	240 B (33.3)	U (33.3)	106 (33.3)	377 (33.3)	955 (33.3)	231 (33.3)	U (33.3)
C9-C12 Aliphatics	140 B (33.3)	U (33.3)	67.5 J (33.3)	117 (33.3)	396 (33.3)	154 (33.3)	U (33.3)
C9-C10 Aromatics (Unadjusted)	158 (33.3)	51 J (33.3)	U (33.3)	185 (33.3)	375 (33.3)	70.6 J (33.3)	U (33.3)
C9-C10 Aromatics	---	---	---	---	---	---	---
Gasoline Range Organics (C5-C12)	---	---	280 (66.7)	1520 (66.7)	2880 (66.7)	---	---
Volatile Petroleum Hydrocarbons	---	---	284 (66.7)	1610 (66.7)	2910 (66.7)	825 (66.7)	U (66.7)
MTDEQ EPH							
C9-C18 Aliphatics	---	---	---	---	---	---	U (200)
C19-C36 Aliphatics (Unadjusted)	---	---	U (200)	U (200)	U (200)	---	411 J (200)
C19-C36 Aliphatics	---	---	---	---	---	---	---
C11 through C22 Aromatics (Unadjusted)	---	---	U (200)	UJ3 (200)	U (200)	---	U (200)
C11-C22 Aromatics	---	---	U (200)	U (200)	U (200)	---	U (200)
TPH (Unadjusted)	---	---	U (200)	U (200)	U (200)	---	411 J (200)
TPH	---	---	U (200)	U (200)	U (200)	---	411 J (200)
Petroleum Hydrocarbons (Extractable)	---	---	374 (100)	638 (100)	843 (100)	---	---
Extractable Petroleum Hydrocarbons (Frac)	---	---	---	---	---	---	---

Notes:
1 All concentrations are presented in ug/L (ppb).
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 - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MW-105	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106
Field Sample ID	CMR-MW-105-240606	CMR-MW106-211005	CMR-MW106-220316	MW106-GW-220622	CMR-MW106-220831	*N*-106-221213-L1569525	CMR-DS1-221213
Lab Sample ID	L1744765-03	WJ08009-001	XC21009-001	XF23073-002	XI01059-002	XL14017-002	XL14017-004
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	6/6/2024	10/5/2021	3/16/2022	6/22/2022	8/31/2022	12/13/2022	12/13/2022
Comments							Field Duplicate
VOC							
Acetone	U (11.3)	6.9 J (4)	U (4)	U (4)	U (4)	14 (4)	12 (4)
Benzene	**37.6 (0.0941)**	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Bromoform	U (0.129)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	0.96 (0.4)	U (0.4)
2-Butanone	U (1.19)	U (2)	U (2)	U (2)	U (2)	U (2)	U (2)
n-Butylbenzene	0.569 (0.157)	---	---	---	---	---	---
sec-Butylbenzene	0.439 J (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)
Chloroform	U (0.111)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Chloromethane	U (0.96)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Cumene	2.52 (0.105)	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)	7.2 (0.4)	2.8 (0.4)	2.6 (0.4)
p-Cymene	0.366 J (0.12)	---	---	---	---	---	---
cis-1,2-Dichloroethene	U (0.126)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Ethyl Benzene	84.8 (0.137)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
n-Hexane	10.4 (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)
Methylcyclohexane	---	U (0.4)	U (0.4)	U (0.4)	1.7 J (0.4)	1 J (0.4)	1.1 J (0.4)
Methylene Chloride	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)
Naphthalene	3.38 (0.174)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
n-Propylbenzene	10.7 (0.0993)	---	---	---	---	---	---
Styrene	U (0.118)	U (0.41)	U (0.41)	U (0.41)	U (0.41)	U (0.41)	U (0.41)
Toluene	3.83 (0.278)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
1,1,2-Trichloroethane	U (0.158)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
1,2,3-Trimethylbenzene	2.6 (0.104)	---	---	---	---	---	---
1,2,4-Trimethylbenzene	3.22 (0.322)	---	---	---	---	---	---
1,3,5-Trimethylbenzene	0.332 J (0.104)	---	---	---	---	---	---
m,p-xylene	---	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
ortho-xylene	---	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
Xylenes (total)	5.09 (0.174)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.4)
SVOC							
Acenaphthene	U (0.0886)	U (0.04)	U (0.04)	U (0.2)	U (0.04)	U (0.2)	---
Acenaphthylene	U (0.0921)	U (0.04)	U (0.04)	U (0.2)	U (0.04)	U (0.2)	---
Benzo(a)anthracene	U (0.199)	U (0.04)	0.084 J (0.04)	U (0.2)	U (0.04)	U (0.2)	---
Benzo(a)pyrene	U (0.0381)	U (0.07)	**0.17 J (0.07)**	U (0.35)	U (0.04)	U (0.2)	---
Benzo(b)fluoranthene	U (0.13)	U (0.04)	0.2 (0.04)	U (0.2)	U (0.04)	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)	---
1,1-Biphenyl	---	---	---	---	U (0.21)	U (1.1)	---
bis(2-Ethylhexyl)phthalate	U (0.895)	U (1)	U (2)	U (10)	2 BJ (1.5)	U (7.5)	---
Chrysene	U (0.13)	U (0.03)	0.042 J (0.03)	U (0.15)	U (0.04)	U (0.2)	---
Dibenzofuran	U (0.097)	U (0.5)	U (0.5)	U (2.5)	U (0.16)	U (0.8)	---
Diethylphthalate	U (0.287)	U (0.5)	U (0.5)	U (2.5)	0.21 J (0.19)	U (0.95)	---
2,4-Dimethylphenol	U (0.0636)	U (0.48)	U (0.48)	U (2.4)	U (0.15)	U (0.75)	---
Di-n-butylphthalate	U (0.453)	U (0.5)	U (0.5)	U (2.5)	U (0.42)	U (2.1)	---
Fluoranthene	U (0.102)	U (0.1)	0.16 J (0.1)	U (0.5)	U (0.04)	U (0.2)	---
Fluorene	U (0.0844)	U (0.03)	U (0.03)	U (0.15)	U (0.04)	U (0.2)	---
Indeno(1,2,3-cd)pyrene	U (0.279)	U (0.04)	0.15 J (0.04)	U (0.2)	U (0.04)	U (0.2)	---
1-Methylnaphthalene	---	---	---	---	0.061 J (0.04)	U (0.2)	---
2-Methylnaphthalene	0.299 J (0.117)	0.044 BJ (0.04)	U (0.04)	U (0.2)	0.1 J (0.04)	U (0.2)	---
2-Methylphenol	U (0.0929)	U (0.21)	U (0.21)	U (1.1)	U (0.21)	U (1.1)	---
Naphthalene	2.15 (0.159)	U (0.05)	U (0.05)	U (0.25)	0.045 J (0.04)	U (0.2)	---
Phenanthrene	U (0.112)	U (0.06)	U (0.06)	U (0.3)	U (0.04)	U (0.2)	---
Phenol	U (4.33)	U (0.5)	U (0.5)	U (2.5)	U (0.19)	U (0.95)	---
Pyrene	U (0.107)	U (0.1)	U (0.1)	U (0.5)	U (0.04)	U (0.2)	---

Table 7
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**
Field Sample ID	**CMR-MW-105-240606**	**CMR-MW106-211005**	**CMR-MW106-220316**	**MW106-GW-220622**	**CMR-MW106-220831**	***N*-106-221213-L1569525**	**CMR-DS1-221213**
Lab Sample ID	**L1744765-03**	**WJ08009-001**	**XC21009-001**	**XF23073-002**	**XI01059-002**	**XL14017-002**	**XL14017-004**
Sample Method	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**
Sample Date	**6/6/2024**	**10/5/2021**	**3/16/2022**	**6/22/2022**	**8/31/2022**	**12/13/2022**	**12/13/2022**
Comments							**Field Duplicate**
MTDEQ VPH							
C5-C8 Aliphatics (Unadjusted)	668 (33.3)	---	---	---	153 (33.3)	80 J (33.3)	---
C5-C8 Aliphatics	664 (33.3)	U (15)	U (15)	U (15)	153 (33.3)	80 J (33.3)	---
C9-C12 Aliphatics (Unadjusted)	211 (33.3)	---	---	---	36 B J (33.3)	U (33.3)	---
C9-C12 Aliphatics	205 (33.3)	U (15)	U (15)	U (15)	36 B J (33.3)	U (33.3)	---
C9-C10 Aromatics (Unadjusted)	56.5 J (33.3)	---	---	---	U (33.3)	U (33.3)	---
C9-C10 Aromatics	---	U (5)	U (5)	U (5)	---	---	---
Gasoline Range Organics (C5-C12)	---	---	---	---	---	---	---
Volatile Petroleum Hydrocarbons	936 (66.7)	---	---	---	---	---	---
MTDEQ EPH							
C9-C18 Aliphatics	U (200)	---	---	U (100)	---	---	---
C19-C36 Aliphatics (Unadjusted)	U (200)	---	---	---	---	UQ (200)	---
C19-C36 Aliphatics	---	---	---	U (100)	---	---	---
C11 through C22 Aromatics (Unadjusted)	U (200)	---	---	---	---	UQ (200)	---
C11-C22 Aromatics	U (200)	---	---	U (100)	---	UQ (200)	---
TPH (Unadjusted)	U (200)	---	---	---	---	UQ (200)	---
TPH	U (200)	---	---	---	---	UQ (200)	---
Petroleum Hydrocarbons (Extractable)	---	U (200)	U (200)	U (200)	U (100)	---	---
Extractable Petroleum Hydrocarbons (Frac)	---	---	---	U (100)	---	UQ (100)	---

Notes:
1 All concentrations are presented in ug/L (ppb).
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 - Petroleum COCs
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106
Field Sample ID	CMR-MW-106-230321	CMR-DUP-1-230321	CMR-MW-106-280623	CMR-MW-106-092023	CMR-MW-106-231207	CMR-MW-106-240228	CMR-MW-106-240606
Lab Sample ID	YC22023-002	YC22023-004	YF29005-001	YI21013-002	L1685777-02	L1710780-03	L1744765-04
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	3/21/2023	3/21/2023	6/28/2023	9/20/2023	12/7/2023	2/28/2024	6/6/2024
Comments		Field Duplicate					
VOC							
Acetone	U (4)	U (4)	U (4)	13 (4)	U (11.3)	UJ3 (11.3)	U (11.3)
Benzene	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.0941)	U (0.0941)	1.4 (0.0941)
Bromoform	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.129)	U (0.129)	U (0.129)
2-Butanone	U (2)	U (2)	U (2)	U (2)	U (1.19)	U (1.19)	U (1.19)
n-Butylbenzene	---	---	---	---	U (0.157)	U (0.157)	U (0.157)
sec-Butylbenzene	---	---	---	---	U (0.125)	U (0.125)	U (0.125)
tert-Butylbenzene	---	---	---	---	U (0.127)	U (0.127)	U (0.127)
Carbon Disulfide	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.0962)	U (0.0962)	U (0.0962)
Chloroform	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.111)	U (0.111)	U (0.111)
Chloromethane	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.96)	U (0.96)	U (0.96)
Cumene	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.105)	U (0.105)	U (0.105)
Cyclohexane	U (0.4)	U (0.4)	U (0.4)	1.7 (0.4)	---	---	---
p-Cymene	---	---	---	---	U (0.12)	U (0.12)	U (0.12)
cis-1,2-Dichloroethene	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.126)	U (0.126)	U (0.126)
Ethyl Benzene	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.137)	U (0.137)	U (0.137)
n-Hexane	---	---	---	---	U (0.749)	U (0.749)	U (0.749)
Iodomethane	---	---	---	---	2.23 B J (0.554)	U (0.554)	U (0.554)
4-Methyl-2-pentanone	U (2)	U (2)	U (2)	3.8 J (2)	3.21 J (0.478)	3.27 J (0.478)	1.79 J (0.478)
Methylcyclohexane	U (0.4)	U (0.4)	U (0.4)	0.5 J (0.4)	---	---	---
Methylene Chloride	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.43)	U (0.43)	U (0.43)
Naphthalene	U (0.4)	U (0.4)	U (0.4)	U (0.4)	UJ4 (0.174)	U (0.174)	0.354 J (0.174)
n-Propylbenzene	---	---	---	---	U (0.0993)	U (0.0993)	U (0.0993)
Styrene	U (0.41)	U (0.41)	U (0.41)	U (0.41)	U (0.118)	U (0.118)	U (0.118)
Toluene	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.278)	U (0.278)	U (0.278)
1,1,2-Trichloroethane	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.158)	U (0.158)	U (0.158)
1,2,3-Trimethylbenzene	---	---	---	---	U (0.104)	U (0.104)	U (0.104)
1,2,4-Trimethylbenzene	---	---	---	---	U (0.322)	U (0.322)	U (0.322)
1,3,5-Trimethylbenzene	---	---	---	---	U (0.104)	U (0.104)	U (0.104)
m,p-xylene	U (0.4)	U (0.4)	U (0.4)	U (0.4)	---	---	---
ortho-xylene	U (0.4)	U (0.4)	U (0.4)	U (0.4)	---	---	---
Xylenes (total)	U (0.4)	U (0.4)	U (0.4)	U (0.4)	U (0.174)	U (0.174)	U (0.174)
SVOC							
Acenaphthene	U (0.2)	---	U (0.2)	U (0.2)	U (0.0886)	U (0.0886)	U (0.0886)
Acenaphthylene	U (0.2)	---	U (0.2)	U (0.2)	U (0.0921)	U (0.0921)	U (0.0921)
Benzo(a)anthracene	U (0.2)	---	U (0.2)	U (0.2)	U (0.199)	U (0.199)	U (0.199)
Benzo(a)pyrene	U (0.2)	---	U (0.2)	U (0.2)	U (0.0381)	U (0.0381)	U (0.0381)
Benzo(b)fluoranthene	U (0.2)	---	U (0.2)	U (0.2)	U (0.13)	U (0.13)	U (0.13)
Benzo(g,h,i)perylene	U (0.2)	---	U (0.2)	U (0.2)	U (0.121)	U (0.121)	U (0.121)
1,1-Biphenyl	U (1.1)	---	U (1.1)	U (1.1)	---	---	---
bis(2-Ethylhexyl)phthalate	U (7.5)	---	U (7.5)	U (7.5)	U (0.895)	1.87 B J (0.895)	U (0.895)
Chrysene	U (0.2)	---	U (0.2)	U (0.2)	U (0.13)	U (0.13)	U (0.13)
Dibenzofuran	U (0.8)	---	U (0.8)	U (0.8)	U (0.097)	U (0.097)	U (0.097)
Diethylphthalate	U (0.95)	---	U (0.95)	U (0.95)	U (0.287)	U (0.287)	U (0.287)
2,4-Dimethylphenol	U (0.75)	---	U (0.75)	U (0.75)	U (0.0636)	UJ3 (0.0636)	U (0.0636)
Di-n-butylphthalate	U (2.1)	---	U (2.1)	U (2.1)	U (0.453)	U (0.453)	U (0.453)
Fluoranthene	U (0.2)	---	U (0.2)	U (0.2)	U (0.102)	U (0.102)	U (0.102)
Fluorene	U (0.2)	---	U (0.2)	U (0.2)	U (0.0844)	U (0.0844)	U (0.0844)
Indeno(1,2,3-cd)pyrene	U (0.2)	---	U (0.2)	U (0.2)	U (0.279)	U (0.279)	U (0.279)
1-Methylnaphthalene	U (0.2)	---	U (0.2)	U (0.2)	U (0.0687)	---	---
2-Methylnaphthalene	U (0.2)	---	U (0.2)	U (0.2)	U (0.117)	U (0.117)	U (0.117)
2-Methylphenol	U (1.1)	---	U (1.1)	U (1.1)	U (0.0929)	UJ3 (0.0929)	U (0.0929)
Naphthalene	U (0.2)	---	U (0.2)	U (0.2)	U (0.159)	U (0.159)	U (0.159)
Phenanthrene	U (0.2)	---	U (0.2)	U (0.2)	U (0.112)	U (0.112)	U (0.112)
Phenol	U (0.95)	---	U (0.95)	U (0.95)	U (4.33)	U (4.33)	7.72 J (4.33)
Pyrene	U (0.2)	---	U (0.2)	U (0.2)	U (0.107)	U (0.107)	U (0.107)

Table 7
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**	**MW-106**	**MW-106**
Field Sample ID	**CMR-MW-106-230321**	**CMR-DUP-1-230321**	**CMR-MW-106-280623**	**CMR-MW-106-092023**	**CMR-MW-106-231207**	**CMR-MW-106-240228**	**CMR-MW-106-240606**
Lab Sample ID	**YC22023-002**	**YC22023-004**	**YF29005-001**	**YI21013-002**	**L1685777-02**	**L1710780-03**	**L1744765-04**
Sample Method	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**	**Low Flow**
Sample Date	**3/21/2023**	**3/21/2023**	**6/28/2023**	**9/20/2023**	**12/7/2023**	**2/28/2024**	**6/6/2024**
Comments		**Field Duplicate**					
MTDEQ VPH							
C5-C8 Aliphatics (Unadjusted)	U (33.3)	---	85.9 J (33.3)	495 (33.3)	67.1 J (33.3)	U (333)	59.3 J (33.3)
C5-C8 Aliphatics	U (33.3)	---	85.9 J (33.3)	495 (33.3)	67.1 J (33.3)	U (333)	59.3 J (33.3)
C9-C12 Aliphatics (Unadjusted)	U (33.3)	---	U (33.3)	U (33.3)	U (33.3)	U (333)	U (33.3)
C9-C12 Aliphatics	U (33.3)	---	U (33.3)	U (33.3)	U (33.3)	U (333)	U (33.3)
C9-C10 Aromatics (Unadjusted)	U (33.3)	---	U (33.3)	38.4 J (33.3)	U (33.3)	U (333)	U (33.3)
C9-C10 Aromatics	---	---	---	---	---	---	---
Gasoline Range Organics (C5-C12)	U (66.7)	---	108 J (66.7)	533 (66.7)	---	---	---
Volatile Petroleum Hydrocarbons	U (66.7)	---	85.9 J (66.7)	533 (66.7)	67.1 J (66.7)	U (667)	U (66.7)
MTDEQ EPH							
C9-C18 Aliphatics	---	---	---	---	U (200)	U (200)	U (200)
C19-C36 Aliphatics (Unadjusted)	U (222)	---	U (200)	U (200)	U (200)	U (200)	U (200)
C19-C36 Aliphatics	---	---	---	---	---	---	---
C11 through C22 Aromatics (Unadjusted)	U (222)	---	UJ3 (200)	U (200)	U (200)	U (200)	U (200)
C11-C22 Aromatics	U (222)	---	U (200)	U (200)	U (200)	U (200)	U (200)
TPH (Unadjusted)	U (222)	---	U (200)	U (200)	U (200)	U (200)	U (200)
TPH	U (222)	---	U (200)	U (200)	U (200)	U (200)	U (200)
Petroleum Hydrocarbons (Extractable)	U (111)	---	1650 (100)	17000 (100)	5630 (100)	---	---
Extractable Petroleum Hydrocarbons (Frac)	---	---	---	---	---	---	---

Notes:
1 All concentrations are presented in ug/L (ppb).
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 8
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	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	CMR-MW-41S-240606
Sample Method	Low Flow	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	6/6/2024
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	1.18
Dissolved Oxygen	0.00	5.65	2.99	0.00	8.56	0.76	8.16	0.00	0.00	0.13	1.55
Oxidation Reduction Potential	-93	-40	-123	-127	-139	-149	-26	-147	-78	-93.2	152.2
pH (Field Analysis)	7.22	5.32	7	6.34	7.17	7.24	6.22	7.18	7.99	6.97	7.1
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	MW-105
Field Sample ID	CMR-MW105S-211006	CMR-MW105-220317	MW105-GW-220622	CMR-MW105-220831	CMR-MW-105-221213	CMR-MW-105-230321	CMR-MW-105-230627	CMR-MW-105-092023	CMR-MW-105-231207	CMR-MW-105-240228	CMR-MW-105-240606
Sample Method	Low Flow	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	6/6/2024
FIELD PARAMETERS											
Specific Conductivity (Field Analysis)	1.99	1.98	2.16	2.19	2.25	2.16	0.00	---	2.06	1.58	1.96
Dissolved Oxygen	0.00	0.00	1.81	0.00	0.00	4.20	8.25	6.31	0.00	2.84	0.6
Oxidation Reduction Potential	-107	-81	-113	-53	49	121	144	98	-44	96.7	-78.3
pH (Field Analysis)	7.57	7.36	7.31	6.10	7.14	7.32	6.30	7.12	7.91	6.93	7.19
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	MW-106
Field Sample ID	CMR-MW106-211005	CMR-MW106-220316	MW106-GW-220622	CMR-MW106-220831	CMR-MW-106-221213	CMR-MW-106-230321	CMR-MW-106-230628	CMR-MW-106-092023	CMR-MW-106-231207	CMR-MW-106-240228	CMR-MW-106-240606
Sample Method	Low Flow	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	6/6/2024
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	1.64
Dissolved Oxygen	0.00	0.02	0.85	0.00	8.16	2.90	9.03	0.00	0.00	0.41	1.00
Oxidation Reduction Potential	13	14	17	34	31	39	47	-127	-79	-96.2	-117.6
pH (Field Analysis)	8.07	7.50	7.27	6.57	7.54	7.23	6.74	7.35	7.82	6.92	7.2
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

Table 9
Summary of Groundwater Analytical Results - Attenuation Parameters
Calumet Montana Refining, LLC - Great Falls, Montana

Location	MW-041S	MW-105	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106
Field Sample ID	CMR-MW-41S-240606	CMR-MW-105-240606	CMR-MW106-211005	MW106-GW-220622	'-106-221213-L1569525	CMR-MW-106-280623	CMR-MW-106-231207	CMR-MW-106-240606
Lab Sample ID	L1744765-01	L1744765-03	WJ08009-001	XF23073-002	XL14017-002	YF29005-001	L1685777-02	L1744765-04
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	6/6/2024	6/6/2024	10/5/2021	6/22/2022	12/13/2022	6/28/2023	12/7/2023	6/6/2024
Comments								
Attenuation Parameter								
Carbon Dioxide	87900 T8 (6670)	81000 T8 (6670)	470000 (27000)	810000 (27000)	110000 (27000)	960000 (27000)	126000 BT8 (6670)	87000 T8 (6670)
Alkalinity [mg CaCO3/L]	---	---	500 (20)	830 (20)	120 (20)	1000 (20)	---	---
Biological Oxygen Demand	41100 (33300)	U (3330)	13000 (180)	26000 7 (180)	U (180)	2800 (180)	9610 (3330)	U (3330)
Iron	3670 (18)	135 B (18)	65 B (13)	15 J (13)	130 (13)	1300 B (130)	3030 (28.1)	4040 (18)
Iron (dissolved)	4110 (18)	99.4 J (18)	36 J (13)	130 J (130)	U (13)	1200 (130)	3180 (28.1)	4070 (18)
Manganese	1860 (0.934)	562 (0.934)	1400 (13)	880 (1.3)	1700 (13)	2700 (13)	2490 (0.704)	2210 (0.934)
Manganese (Dissolved)	2250 (0.934)	422 (0.934)	1400 (13)	890 (13)	1500 (13)	2800 (13)	2700 (0.704)	2290 (0.934)
Methane	5180 (2.91)	371 (2.91)	5.8 J (2.5)	62 B (2.5)	110 (2.5)	71 (2.5)	252 (2.91)	818 (2.91)
Nitrate	229 Q (48)	204 Q (48)	210000 (500)	4700 B (5)	750 H (50)	12000 H (25)	480 (48)	U (48)
Sulfate	19500 (594)	70800 J6 (594)	2900000 (25000)	210000 (13000)	140000 (250)	410000 (1300)	129000 (594)	62900 (594)

Notes:

1 All concentrations are presented in ug/L (ppb) except where otherwise noted.

Abbreviations:

U -- Not Detected.
J -- Estimated Concentration.
B-- Blank Contamination.
H -- Compound analyzed outside holding time
Q -- Sample prepared past holding time, concentrations should be considered minimum values.
T8 -- Samples received past holding time.
( ) -- Reporting Detection Limit.
--- -- Not Analyzed.

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 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:

L1742224, L1749212

ANALYTICAL REPORT

June 11, 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:	L1742224
Samples Received:	06/01/2024
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 National

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

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CMR-SP301-240531 L1742224-01 Air

Collected by	Collected date/time	Received date/time
Kyle A. Groves	05/31/24 11:43	06/01/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2297053	1	06/02/24 20:20	06/02/24 20:20	MNP	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2300868	10	06/07/24 23:59	06/07/24 23:59	DAH	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2301224	100	06/08/24 14:09	06/08/24 14:09	JAP	Mt. Juliet, TN

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	5.67	13.5		1	WG2297053
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND	J4	1	WG2297053
Benzene	71-43-2	78.10	2.00	6.39	289	923		10	WG2300868
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG2297053
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG2297053
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG2297053
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG2297053
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG2297053
Carbon disulfide	75-15-0	76.10	0.400	1.24	0.479	1.49		1	WG2297053
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG2297053
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG2297053
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG2297053
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG2297053
Chloromethane	74-87-3	50.50	0.200	0.413	0.318	0.657		1	WG2297053
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG2297053
Cyclohexane	110-82-7	84.20	2.00	6.89	352	1210		10	WG2300868
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG2297053
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG2297053
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG2297053
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG2297053
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG2297053
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG2297053
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG2297053
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG2297053
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG2297053
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG2297053
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG2297053
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG2297053
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG2297053
1,4-Dioxane	123-91-1	88.10	0.630	2.27	ND	ND		1	WG2297053
Ethanol	64-17-5	46.10	2.50	4.71	4.72	8.90		1	WG2297053
Ethylbenzene	100-41-4	106	0.200	0.867	35.4	153		1	WG2297053
4-Ethyltoluene	622-96-8	120	0.200	0.982	18.5	90.8		1	WG2297053
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	0.241	1.35		1	WG2297053
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.466	2.30		1	WG2297053
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG2297053
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG2297053
Heptane	142-82-5	100	2.00	8.18	137	560		10	WG2300868
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG2297053
n-Hexane	110-54-3	86.20	6.30	22.2	456	1610		10	WG2300868
Isopropylbenzene	98-82-8	120.20	0.200	0.983	ND	ND		1	WG2297053
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG2297053
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG2297053
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	1.72	5.07		1	WG2297053
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG2297053
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG2297053
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG2297053
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG2297053
2-Propanol	67-63-0	60.10	1.25	3.07	ND	ND		1	WG2297053
Propene	115-07-1	42.10	1.25	2.15	5.47	9.42		1	WG2297053
Styrene	100-42-5	104	0.400	1.70	ND	ND		1	WG2297053
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG2297053
Tetrachloroethylene	127-18-4	166	0.200	1.36	ND	ND		1	WG2297053
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG2297053
Toluene	108-88-3	92.10	0.500	1.88	8.74	32.9		1	WG2297053
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND		1	WG2297053

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	WG2297053
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG2297053
Trichloroethylene	79-01-6	131	0.200	1.07	ND	ND		1	WG2297053
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	66.3	325		1	WG2297053
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	64.7	318		1	WG2297053
2,2,4-Trimethylpentane	540-84-1	114.22	20.0	93.4	1960	9160		100	WG2301224
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG2297053
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG2297053
Vinyl acetate	108-05-4	86.10	0.630	2.22	ND	ND		1	WG2297053
Xylenes, Total	1330-20-7	106.16	6.00	26.1	322	1400		10	WG2300868
m&p-Xylene	179601-23-1	106	4.00	17.3	246	1070		10	WG2300868
o-Xylene	95-47-6	106	0.200	0.867	75.7	328		1	WG2297053
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*145*		J1		WG2297053
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*108*				WG2300868
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*97.7*				WG2301224

Sample Narrative:

L1742224-01 WG2297053: Surrogate failure due to matrix interference

Method Blank (MB)

(MB) R4076925-2 06/02/24 09:41

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	0.400
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
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

Method Blank (MB)

(MB) R4076925-2 06/02/24 09:41

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
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	0.400
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
o-Xylene	U		0.0828	0.200
(S) 1,4-Bromofluorobenzene	*100*			*60.0-140*

L1742214-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1742214-01 06/02/24 17:40 • (DUP) R4076925-4 06/02/24 18:21

Analyte	Original Result ppbv	DUP Result ppbv	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Acetone	74.9	72.0	1	3.95		25
Allyl chloride	ND	ND	1	0.000		25
Benzyl Chloride	ND	ND	1	0.000		25
Bromodichloromethane	ND	ND	1	0.000		25
Bromoform	ND	ND	1	0.000		25
Bromomethane	ND	ND	1	0.000		25
1,3-Butadiene	26.4	24.9	1	5.85		25
Carbon disulfide	1.14	1.09	1	4.48		25
Carbon tetrachloride	ND	ND	1	0.000		25
Chlorobenzene	ND	ND	1	0.000		25
Chloroethane	ND	ND	1	0.000		25

L1742214-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1742214-01 06/02/24 17:40 • (DUP) R4076925-4 06/02/24 18:21

Analyte	Original Result ppbv	DUP Result ppbv	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Chloroform	ND	ND	1	0.000		25
Chloromethane	2.75	2.64	1	4.08		25
2-Chlorotoluene	ND	ND	1	0.000		25
Dibromochloromethane	ND	ND	1	0.000		25
1,2-Dibromoethane	ND	ND	1	0.000		25
1,2-Dichlorobenzene	ND	ND	1	0.000		25
1,3-Dichlorobenzene	ND	ND	1	0.000		25
1,4-Dichlorobenzene	ND	ND	1	0.000		25
1,2-Dichloroethane	ND	ND	1	0.000		25
1,1-Dichloroethane	ND	ND	1	0.000		25
1,1-Dichloroethene	ND	ND	1	0.000		25
cis-1,2-Dichloroethene	ND	ND	1	0.000		25
trans-1,2-Dichloroethene	ND	ND	1	0.000		25
1,2-Dichloropropane	ND	ND	1	0.000		25
cis-1,3-Dichloropropene	ND	ND	1	0.000		25
trans-1,3-Dichloropropene	ND	ND	1	0.000		25
1,4-Dioxane	ND	ND	1	200	P1	25
Ethanol	13.8	13.2	1	4.44		25
Ethylbenzene	1.61	1.58	1	1.88		25
4-Ethyltoluene	0.374	0.373	1	0.268		25
Trichlorofluoromethane	0.217	0.209	1	3.76		25
Dichlorodifluoromethane	0.542	0.503	1	7.46		25
1,1,2-Trichlorotrifluoroethane	ND	ND	1	0.000		25
1,2-Dichlorotetrafluoroethane	ND	ND	1	0.000		25
Hexachloro-1,3-butadiene	ND	ND	1	0.000		25
Isopropylbenzene	ND	ND	1	0.000		25
Methylene Chloride	0.438	0.414	1	5.63		25
Methyl Butyl Ketone	ND	ND	1	0.000		25
2-Butanone (MEK)	5.70	5.58	1	2.13		25
4-Methyl-2-pentanone (MIBK)	ND	ND	1	1.48		25
Methyl methacrylate	ND	ND	1	0.000		25
MTBE	ND	ND	1	0.000		25
Naphthalene	ND	ND	1	0.000		25
2-Propanol	4.01	3.84	1	4.33		25
Propene	307	291	1	5.35	E	25
Styrene	ND	ND	1	0.000		25
1,1,2,2-Tetrachloroethane	ND	ND	1	0.000		25
Tetrachloroethylene	ND	ND	1	1.32		25
Tetrahydrofuran	ND	ND	1	0.000		25

L1742214-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1742214-01 06/02/24 17:40 • (DUP) R4076925-4 06/02/24 18:21

Analyte	Original Result ppbv	DUP Result ppbv	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Toluene	7.12	6.94	1	2.56		25
1,2,4-Trichlorobenzene	ND	ND	1	0.000		25
1,1,1-Trichloroethane	ND	ND	1	0.000		25
1,1,2-Trichloroethane	ND	ND	1	0.000		25
Trichloroethylene	ND	ND	1	200	P1	25
1,2,4-Trimethylbenzene	2.39	2.34	1	2.11		25
1,3,5-Trimethylbenzene	0.561	0.562	1	0.178		25
Vinyl chloride	ND	ND	1	0.000		25
Vinyl Bromide	ND	ND	1	0.000		25
Vinyl acetate	ND	ND	1	0.000		25
o-Xylene	2.22	2.15	1	3.20		25
(S) 1,4-Bromofluorobenzene		*103*				*60.0-140*

L1742214-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1742214-02 06/02/24 18:59 • (DUP) R4076925-5 06/02/24 19:40

Analyte	Original Result ppbv	DUP Result ppbv	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Acetone	50.0	44.3	1	12.1		25
Allyl chloride	ND	ND	1	0.000		25
Benzyl Chloride	ND	ND	1	0.000		25
Bromodichloromethane	ND	ND	1	0.000		25
Bromoform	ND	ND	1	0.000		25
Bromomethane	ND	ND	1	0.000		25
1,3-Butadiene	18.8	18.0	1	4.35		25
Carbon disulfide	1.03	1.01	1	1.96		25
Carbon tetrachloride	ND	ND	1	0.000		25
Chlorobenzene	ND	ND	1	0.000		25
Chloroethane	ND	ND	1	0.000		25
Chloroform	ND	ND	1	0.000		25
Chloromethane	0.799	0.767	1	4.09		25
2-Chlorotoluene	ND	ND	1	0.000		25
Dibromochloromethane	ND	ND	1	0.000		25
1,2-Dibromoethane	ND	ND	1	0.000		25
1,2-Dichlorobenzene	ND	ND	1	0.000		25
1,3-Dichlorobenzene	ND	ND	1	0.000		25
1,4-Dichlorobenzene	ND	ND	1	0.000		25
1,2-Dichloroethane	ND	ND	1	0.000		25

L1742214-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1742214-02 06/02/24 18:59 • (DUP) R4076925-5 06/02/24 19:40

Analyte	Original Result ppbv	DUP Result ppbv	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
1,1-Dichloroethane	ND	ND	1	0.000		25
1,1-Dichloroethene	ND	ND	1	0.000		25
cis-1,2-Dichloroethene	ND	ND	1	0.000		25
trans-1,2-Dichloroethene	ND	ND	1	0.000		25
1,2-Dichloropropane	ND	ND	1	0.000		25
cis-1,3-Dichloropropene	ND	ND	1	0.000		25
trans-1,3-Dichloropropene	ND	ND	1	0.000		25
1,4-Dioxane	ND	ND	1	200	P1	25
Ethanol	9.52	8.87	1	7.07		25
Ethylbenzene	1.90	1.85	1	2.67		25
4-Ethyltoluene	0.599	0.592	1	1.18		25
Trichlorofluoromethane	0.299	0.292	1	2.37		25
Dichlorodifluoromethane	0.512	0.513	1	0.195		25
1,1,2-Trichlorotrifluoroethane	ND	ND	1	2.47		25
1,2-Dichlorotetrafluoroethane	ND	ND	1	0.000		25
Hexachloro-1,3-butadiene	ND	ND	1	0.000		25
Isopropylbenzene	ND	ND	1	0.000		25
Methylene Chloride	0.318	0.319	1	0.314		25
Methyl Butyl Ketone	ND	ND	1	0.000		25
2-Butanone (MEK)	3.29	2.59	1	23.8		25
4-Methyl-2-pentanone (MIBK)	ND	ND	1	26.2	P1	25
Methyl methacrylate	ND	ND	1	0.000		25
MTBE	ND	ND	1	0.000		25
Naphthalene	ND	ND	1	0.000		25
2-Propanol	3.15	2.89	1	8.61		25
Propene	217	208	1	4.24	E	25
Styrene	ND	ND	1	0.000		25
1,1,2,2-Tetrachloroethane	ND	ND	1	0.000		25
Tetrachloroethylene	0.374	0.367	1	1.89		25
Tetrahydrofuran	ND	ND	1	0.000		25
Toluene	7.37	7.16	1	2.89		25
1,2,4-Trichlorobenzene	ND	ND	1	0.000		25
1,1,1-Trichloroethane	ND	ND	1	0.000		25
1,1,2-Trichloroethane	ND	ND	1	0.000		25
Trichloroethylene	ND	ND	1	1.95		25
1,2,4-Trimethylbenzene	3.85	3.74	1	2.90		25
1,3,5-Trimethylbenzene	0.765	0.753	1	1.58		25
Vinyl chloride	ND	ND	1	0.000		25
Vinyl Bromide	ND	ND	1	0.000		25

L1742214-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1742214-02 06/02/24 18:59 • (DUP) R4076925-5 06/02/24 19:40

Analyte	Original Result ppbv	DUP Result ppbv	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Vinyl acetate	ND	ND	1	0.000		25
o-Xylene	2.76	2.67	1	3.31		25
(S) 1,4-Bromofluorobenzene		*103*				*60.0-140*

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

(LCS) R4076925-1 06/02/24 09:03 • (LCSD) R4076925-3 06/02/24 11:25

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	4.56	4.48	122	119	70.0-130			1.77	25
Allyl chloride	3.75	4.49	5.16	120	138	70.0-130		J4	13.9	25
Benzyl Chloride	3.75	4.55	4.54	121	121	70.0-152			0.220	25
Bromodichloromethane	3.75	4.46	4.45	119	119	70.0-130			0.224	25
Bromoform	3.75	4.31	4.24	115	113	70.0-130			1.64	25
Bromomethane	3.75	4.36	4.34	116	116	70.0-130			0.460	25
1,3-Butadiene	3.75	4.67	4.54	125	121	70.0-130			2.82	25
Carbon disulfide	3.75	4.47	4.50	119	120	70.0-130			0.669	25
Carbon tetrachloride	3.75	4.41	4.37	118	117	70.0-130			0.911	25
Chlorobenzene	3.75	4.26	4.23	114	113	70.0-130			0.707	25
Chloroethane	3.75	4.58	4.55	122	121	70.0-130			0.657	25
Chloroform	3.75	4.42	4.43	118	118	70.0-130			0.226	25
Chloromethane	3.75	4.69	4.70	125	125	70.0-130			0.213	25
2-Chlorotoluene	3.75	4.42	4.40	118	117	70.0-130			0.454	25
Dibromochloromethane	3.75	4.31	4.29	115	114	70.0-130			0.465	25
1,2-Dibromoethane	3.75	4.34	4.31	116	115	70.0-130			0.694	25
1,2-Dichlorobenzene	3.75	4.38	4.37	117	117	70.0-130			0.229	25
1,3-Dichlorobenzene	3.75	4.36	4.35	116	116	70.0-130			0.230	25
1,4-Dichlorobenzene	3.75	4.37	4.35	117	116	70.0-130			0.459	25
1,2-Dichloroethane	3.75	4.49	4.51	120	120	70.0-130			0.444	25
1,1-Dichloroethane	3.75	4.52	4.52	121	121	70.0-130			0.000	25
1,1-Dichloroethene	3.75	4.55	4.52	121	121	70.0-130			0.662	25
cis-1,2-Dichloroethene	3.75	4.57	4.54	122	121	70.0-130			0.659	25
trans-1,2-Dichloroethene	3.75	4.55	4.58	121	122	70.0-130			0.657	25
1,2-Dichloropropane	3.75	4.36	4.39	116	117	70.0-130			0.686	25
cis-1,3-Dichloropropene	3.75	4.45	4.44	119	118	70.0-130			0.225	25
trans-1,3-Dichloropropene	3.75	4.46	4.45	119	119	70.0-130			0.224	25
1,4-Dioxane	3.75	4.31	4.25	115	113	70.0-140			1.40	25
Ethanol	3.75	4.48	4.41	119	118	55.0-148			1.57	25
Ethylbenzene	3.75	4.35	4.31	116	115	70.0-130			0.924	25

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

(LCS) R4076925-1 06/02/24 09:03 • (LCSD) R4076925-3 06/02/24 11:25

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
4-Ethyltoluene	3.75	4.41	4.37	118	117	70.0-130			0.911	25
Trichlorofluoromethane	3.75	4.41	4.42	118	118	70.0-130			0.227	25
Dichlorodifluoromethane	3.75	4.59	4.50	122	120	64.0-139			1.98	25
1,1,2-Trichlorotrifluoroethane	3.75	4.28	4.32	114	115	70.0-130			0.930	25
1,2-Dichlorotetrafluoroethane	3.75	4.47	4.44	119	118	70.0-130			0.673	25
Hexachloro-1,3-butadiene	3.75	4.27	4.22	114	113	70.0-151			1.18	25
Isopropylbenzene	3.75	4.33	4.34	115	116	70.0-130			0.231	25
Methylene Chloride	3.75	4.52	4.51	121	120	70.0-130			0.221	25
Methyl Butyl Ketone	3.75	4.76	4.74	127	126	70.0-149			0.421	25
2-Butanone (MEK)	3.75	4.53	4.48	121	119	70.0-130			1.11	25
4-Methyl-2-pentanone (MIBK)	3.75	4.78	4.75	127	127	70.0-139			0.630	25
Methyl methacrylate	3.75	4.21	4.19	112	112	70.0-130			0.476	25
MTBE	3.75	4.50	4.48	120	119	70.0-130			0.445	25
Naphthalene	3.75	4.49	4.51	120	120	70.0-159			0.444	25
2-Propanol	3.75	4.66	4.68	124	125	70.0-139			0.428	25
Propene	3.75	4.74	4.76	126	127	64.0-144			0.421	25
Styrene	3.75	4.43	4.39	118	117	70.0-130			0.907	25
1,1,2,2-Tetrachloroethane	3.75	4.45	4.45	119	119	70.0-130			0.000	25
Tetrachloroethylene	3.75	4.10	4.07	109	109	70.0-130			0.734	25
Tetrahydrofuran	3.75	4.73	4.76	126	127	70.0-137			0.632	25
Toluene	3.75	4.33	4.29	115	114	70.0-130			0.928	25
1,2,4-Trichlorobenzene	3.75	4.57	4.55	122	121	70.0-160			0.439	25
1,1,1-Trichloroethane	3.75	4.42	4.44	118	118	70.0-130			0.451	25
1,1,2-Trichloroethane	3.75	4.32	4.29	115	114	70.0-130			0.697	25
Trichloroethylene	3.75	4.29	4.24	114	113	70.0-130			1.17	25
1,2,4-Trimethylbenzene	3.75	4.41	4.43	118	118	70.0-130			0.452	25
1,3,5-Trimethylbenzene	3.75	4.50	4.51	120	120	70.0-130			0.222	25
Vinyl chloride	3.75	4.60	4.60	123	123	70.0-130			0.000	25
Vinyl Bromide	3.75	4.24	4.24	113	113	70.0-130			0.000	25
Vinyl acetate	3.75	4.82	4.85	129	129	70.0-130			0.620	25
o-Xylene	3.75	4.35	4.32	116	115	70.0-130			0.692	25
(S) 1,4-Bromofluorobenzene				*103*	*103*	*60.0-140*				

QUALITY CONTROL SUMMARY

L1742224-01

Method Blank (MB)

(MB) R4078941-3 06/07/24 12:45

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
Xylenes, Total	U		0.135	0.600
m&p-Xylene	U		0.135	0.400
(S) 1,4-Bromofluorobenzene	*94.7*			*60.0-140*

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

(LCS) R4078941-1 06/07/24 11:43 • (LCSD) R4078941-2 06/07/24 12:15

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	3.87	3.87	103	103	70.0-130			0.000	25
Cyclohexane	3.75	3.99	4.01	106	107	70.0-130			0.500	25
Heptane	3.75	4.04	4.07	108	109	70.0-130			0.740	25
n-Hexane	3.75	4.12	4.05	110	108	70.0-130			1.71	25
Xylenes, Total	11.3	12.6	12.8	112	113	70.0-130			1.57	25
m&p-Xylene	7.50	8.27	8.55	110	114	70.0-130			3.33	25
(S) 1,4-Bromofluorobenzene				*100*	*100*	*60.0-140*				

QUALITY CONTROL SUMMARY

L1742224-01

Method Blank (MB)

(MB) R4079182-2 06/08/24 08:46

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
2,2,4-Trimethylpentane	U		0.133	0.200
(S) 1,4-Bromofluorobenzene	*96.6*			*60.0-140*

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

(LCS) R4079182-1 06/08/24 08:01 • (LCSD) R4079182-3 06/08/24 09:35

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
2,2,4-Trimethylpentane	3.75	4.45	4.33	119	115	70.0-130			2.73	25
(S) 1,4-Bromofluorobenzene				*98.6*	*97.7*	*60.0-140*				

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.
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
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
J1	Surrogate recovery limits have been exceeded; values are outside upper control limits.
J4	The associated batch QC was outside the established quality control range for accuracy.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.

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	LAO000356
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.

Pace® Location Requested (City/State):

Air CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here

Scan QR code for instructions

L-159

Company Name: Ramboll US Consulting, Inc. - Denver

Street Address: 1999 Broadway Suite 2225
Denver, CO 80202

City, State Zip:

Customer Project #:

Project Name: CMR Great Falls - 2023 RFI Soil Sampling

Site Collection Info/Facility ID (as applicable): ENVIRONCO-CALUMET GREAT FALLS, MT

Time Zone Collected: [ ] AK [ ] PT [✓] MT [ ] CT [ ] ET

Contact/Report To: Kit Carson

Phone #: 303-382-5482

E-Mail: nmartin@ramboll.com;kcarson@ramboll.com;kheimstead@ramboll.com:twvss@ramboll.com:eleister@ram

Cc E-Mail:

Invoice to:

Invoice E-Mail:

Purchase Order # (if applicable):

Quote #:

State origin of sample(s): MT

Data Deliverables:
[ ] Level II [ ] Level III [ ] Level IV
[ ] EQUIS
[ ] Other_____

Regulatory Program (CAA, RCRA, etc.) as applicable:

Rush (Pre-approval required): 2 Day 3 day 5 day Other_____

Date Results Requested:

Permit # as applicable:

Units for Reporting: ug/m³ PPBV mg/m³ PPMV

* Matrix Codes (Insert in Matrix box below): Ambient (A), Indoor (I), Soil Vapor (SV), Other (O)

Field Information

Analyses Requested: TO-15 Summa

AN 5/22/24

Proj. Manager: 841 - Kelly Mercer

AcctNum / Client ID: ENVIRONCO

Table #:

Profile / Template: T249571

Prelog / Bottle Ord. ID: P1077523

Customer Sample ID	Matrix *	Summa Canister ID	Flow Controller ID	Begin Collection Date	Begin Collection Time	End Collection Date	End Collection Time	Canister Pressure / Vacuum: Start Pressure / Vacuum (in Hg)	Canister Pressure / Vacuum: End Pressure / Vacuum (in Hg)	PUF / FILTER: Duration (minutes)	PUF / FILTER: Flow Rate m³/min or L/min	PUF / FILTER: Total Volume Sampled m³ or L	TO-15 Summa				Sample Comment
CMR-SA301-240531	Air	0202880	28311	5/31/24	1140	05/31/24	1143	24.5	2	3			X				L1742224 -01

Sample Receipt Checklist
COC Seal Present/Intact: ✓Y__N
COC Signed/Accurate: ✓Y__N
Bottles arrive intact: ✓Y__N
Correct bottles used: ✓Y__N
Size: 1 Airs 1L ____ 6L ____ 1.4L
Tage Color: G__ W 1 P__ B__
Tubing ___ Shunt ___
Unused: [redacted]
T/P#: [redacted]

Customer Remarks / Special Conditions / Possible Hazards:

Collected By:
Printed Name: Kyle A. Graves
Signature: Kyle A. Graves

Additional Instructions from Pace®:

Coolers: Thermometer ID: Correction Factor (°C): Obs. Temp. (°C): Corrected Temp. (°C):

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Tracking Number:
Kyle A. Graves	5/31/24 1300			
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Delivered by: In- Person Courier
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature) Elijah Wilson	Date/Time: 6/1 0900	FedEX UPS Other
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:	Page: ____ of: ____

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace® Terms and Conditions found at https://www.pacelabs.com/resource-library/resource/pace-terms-and-conditions/

ANALYTICAL REPORT

June 27, 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:	L1749212
Samples Received:	06/21/2024
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 mydata.pacelabs.com

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CMR-SP301-240620 L1749212-01 Air

Collected by	Collected date/time	Received date/time
Kyle G	06/20/24 14:24	06/21/24 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2310201	1	06/22/24 18:10	06/22/24 18:10	DAH	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2311573	20	06/26/24 00:06	06/26/24 00:06	MNP	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2313344	100	06/27/24 13:25	06/27/24 13:25	MNP	Mt. Juliet, TN

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	9.51	22.6		1	WG2310201
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG2310201
Benzene	71-43-2	78.10	4.00	12.8	343	1100		20	WG2311573
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG2310201
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG2310201
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG2310201
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG2310201
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG2310201
Carbon disulfide	75-15-0	76.10	0.400	1.24	ND	ND		1	WG2310201
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG2310201
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG2310201
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG2310201
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG2310201
Chloromethane	74-87-3	50.50	0.200	0.413	ND	ND		1	WG2310201
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG2310201
Cyclohexane	110-82-7	84.20	4.00	13.8	358	1230		20	WG2311573
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG2310201
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG2310201
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG2310201
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG2310201
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG2310201
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG2310201
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG2310201
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG2310201
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG2310201
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG2310201
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG2310201
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG2310201
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG2310201
1,4-Dioxane	123-91-1	88.10	0.630	2.27	ND	ND		1	WG2310201
Ethanol	64-17-5	46.10	2.50	4.71	ND	ND		1	WG2310201
Ethylbenzene	100-41-4	106	0.200	0.867	49.3	214		1	WG2310201
4-Ethyltoluene	622-96-8	120	0.200	0.982	39.8	195		1	WG2310201
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	ND	ND		1	WG2310201
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.557	2.75		1	WG2310201
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG2310201
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG2310201
Heptane	142-82-5	100	4.00	16.4	220	900		20	WG2311573
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG2310201
n-Hexane	110-54-3	86.20	12.6	44.4	649	2290		20	WG2311573
Isopropylbenzene	98-82-8	120.20	0.200	0.983	ND	ND		1	WG2310201
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG2310201
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG2310201
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	ND	ND		1	WG2310201
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG2310201
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG2310201
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG2310201
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG2310201
2-Propanol	67-63-0	60.10	1.25	3.07	ND	ND		1	WG2310201
Propene	115-07-1	42.10	1.25	2.15	ND	ND		1	WG2310201
Styrene	100-42-5	104	0.400	1.70	ND	ND		1	WG2310201
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG2310201
Tetrachloroethylene	127-18-4	166	0.200	1.36	ND	ND		1	WG2310201
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG2310201
Toluene	108-88-3	92.10	0.500	1.88	11.8	44.4		1	WG2310201
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND		1	WG2310201

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	WG2310201
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG2310201
Trichloroethylene	79-01-6	131	0.200	1.07	ND	ND		1	WG2310201
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	31.9	157		1	WG2310201
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	40.8	200		1	WG2310201
2,2,4-Trimethylpentane	540-84-1	114.22	20.0	93.4	2220	10400		100	WG2313344
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG2310201
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG2310201
Vinyl acetate	108-05-4	86.10	0.630	2.22	ND	ND		1	WG2310201
Xylenes, Total	1330-20-7	106.16	12.0	52.1	422	1830		20	WG2311573
m&p-Xylene	179601-23-1	106	8.00	34.7	346	1500		20	WG2311573
o-Xylene	95-47-6	106	0.200	0.867	75.6	328		1	WG2310201
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*188*		J1		WG2310201
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*104*				WG2311573
(S) 1,4-Bromofluorobenzene	*460-00-4*	*175*	*60.0-140*		*104*				WG2313344

Sample Narrative:

L1749212-01 WG2310201: Surrogate failure due to matrix interference

Method Blank (MB)

(MB) R4085989-3 06/22/24 10:02

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	0.400
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
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

Method Blank (MB)

(MB) R4085989-3 06/22/24 10:02

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
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	0.400
1,1,2,2-Tetrachloroethane	U		0.0743	0.200
Tetrachloroethylene	U		0.0814	0.200
Tetrahydrofuran	U		0.0734	0.200
Toluene	0.409	J	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
o-Xylene	U		0.0828	0.200
(S) 1,4-Bromofluorobenzene	*91.2*			*60.0-140*

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

(LCS) R4085989-1 06/22/24 08:14 • (LCSD) R4085989-2 06/22/24 09:08

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	3.67	3.78	97.9	101	70.0-130			2.95	25
Allyl chloride	3.75	2.78	3.02	74.1	80.5	70.0-130			8.28	25
Benzyl Chloride	3.75	3.49	3.76	93.1	100	70.0-152			7.45	25
Bromodichloromethane	3.75	3.80	3.99	101	106	70.0-130			4.88	25
Bromoform	3.75	3.88	4.01	103	107	70.0-130			3.30	25
Bromomethane	3.75	3.67	3.90	97.9	104	70.0-130			6.08	25
1,3-Butadiene	3.75	3.66	3.72	97.6	99.2	70.0-130			1.63	25
Carbon disulfide	7.50	7.80	7.93	104	106	70.0-130			1.65	25
Carbon tetrachloride	3.75	3.91	3.91	104	104	70.0-130			0.000	25
Chlorobenzene	3.75	3.94	4.01	105	107	70.0-130			1.76	25
Chloroethane	3.75	3.89	3.91	104	104	70.0-130			0.513	25

QUALITY CONTROL SUMMARY

L1749212-01

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

(LCS) R4085989-1 06/22/24 08:14 • (LCSD) R4085989-2 06/22/24 09:08

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Chloroform	3.75	3.84	4.02	102	107	70.0-130			4.58	25
Chloromethane	3.75	3.73	3.91	99.5	104	70.0-130			4.71	25
2-Chlorotoluene	3.75	3.95	4.08	105	109	70.0-130			3.24	25
Dibromochloromethane	3.75	3.77	3.89	101	104	70.0-130			3.13	25
1,2-Dibromoethane	3.75	3.84	3.96	102	106	70.0-130			3.08	25
1,2-Dichlorobenzene	3.75	3.83	4.16	102	111	70.0-130			8.26	25
1,3-Dichlorobenzene	3.75	3.98	4.24	106	113	70.0-130			6.33	25
1,4-Dichlorobenzene	3.75	3.92	4.32	105	115	70.0-130			9.71	25
1,2-Dichloroethane	3.75	3.98	4.17	106	111	70.0-130			4.66	25
1,1-Dichloroethane	3.75	3.83	3.98	102	106	70.0-130			3.84	25
1,1-Dichloroethene	3.75	3.88	4.04	103	108	70.0-130			4.04	25
cis-1,2-Dichloroethene	3.75	3.86	3.86	103	103	70.0-130			0.000	25
trans-1,2-Dichloroethene	3.75	3.89	4.04	104	108	70.0-130			3.78	25
1,2-Dichloropropane	3.75	3.75	3.88	100	103	70.0-130			3.41	25
cis-1,3-Dichloropropene	3.75	3.80	3.84	101	102	70.0-130			1.05	25
trans-1,3-Dichloropropene	3.75	3.90	4.19	104	112	70.0-130			7.17	25
1,4-Dioxane	3.75	4.10	3.94	109	105	70.0-140			3.98	25
Ethanol	3.75	3.63	3.55	96.8	94.7	55.0-148			2.23	25
Ethylbenzene	3.75	3.74	3.98	99.7	106	70.0-130			6.22	25
4-Ethyltoluene	3.75	3.75	3.99	100	106	70.0-130			6.20	25
Trichlorofluoromethane	3.75	3.88	3.89	103	104	70.0-130			0.257	25
Dichlorodifluoromethane	3.75	3.90	4.03	104	107	64.0-139			3.28	25
1,1,2-Trichlorotrifluoroethane	3.75	3.96	4.08	106	109	70.0-130			2.99	25
1,2-Dichlorotetrafluoroethane	3.75	3.81	3.90	102	104	70.0-130			2.33	25
Hexachloro-1,3-butadiene	3.75	3.83	4.04	102	108	70.0-151			5.34	25
Isopropylbenzene	3.75	3.68	3.98	98.1	106	70.0-130			7.83	25
Methylene Chloride	3.75	3.81	3.76	102	100	70.0-130			1.32	25
Methyl Butyl Ketone	3.75	3.58	3.70	95.5	98.7	70.0-149			3.30	25
2-Butanone (MEK)	3.75	4.14	4.43	110	118	70.0-130			6.77	25
4-Methyl-2-pentanone (MIBK)	3.75	3.82	3.65	102	97.3	70.0-139			4.55	25
Methyl methacrylate	3.75	3.65	3.52	97.3	93.9	70.0-130			3.63	25
MTBE	3.75	3.78	3.98	101	106	70.0-130			5.15	25
Naphthalene	3.75	3.78	4.01	101	107	70.0-159			5.91	25
2-Propanol	3.75	3.35	3.62	89.3	96.5	70.0-139			7.75	25
Propene	3.75	3.69	3.62	98.4	96.5	64.0-144			1.92	25
Styrene	7.50	7.76	8.16	103	109	70.0-130			5.03	25
1,1,2,2-Tetrachloroethane	3.75	3.72	4.06	99.2	108	70.0-130			8.74	25
Tetrachloroethylene	3.75	3.93	3.90	105	104	70.0-130			0.766	25
Tetrahydrofuran	3.75	3.89	4.10	104	109	70.0-137			5.26	25
Toluene	3.75	3.39	3.56	90.4	94.9	70.0-130			4.89	25

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

(LCS) R4085989-1 06/22/24 08:14 • (LCSD) R4085989-2 06/22/24 09:08

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
1,2,4-Trichlorobenzene	3.75	3.55	3.86	94.7	103	70.0-160			8.37	25
1,1,1-Trichloroethane	3.75	3.95	4.00	105	107	70.0-130			1.26	25
1,1,2-Trichloroethane	3.75	3.72	3.97	99.2	106	70.0-130			6.50	25
Trichloroethylene	3.75	3.79	3.94	101	105	70.0-130			3.88	25
1,2,4-Trimethylbenzene	3.75	3.73	3.96	99.5	106	70.0-130			5.98	25
1,3,5-Trimethylbenzene	3.75	3.81	4.08	102	109	70.0-130			6.84	25
Vinyl chloride	3.75	3.86	3.91	103	104	70.0-130			1.29	25
Vinyl Bromide	3.75	3.91	4.10	104	109	70.0-130			4.74	25
Vinyl acetate	3.75	3.96	3.88	106	103	70.0-130			2.04	25
o-Xylene	3.75	3.73	3.96	99.5	106	70.0-130			5.98	25
(S) 1,4-Bromofluorobenzene				*99.9*	*100*	*60.0-140*				

Method Blank (MB)

(MB) R4086484-3 06/25/24 10:10

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
Xylenes, Total	U		0.135	0.600
m&p-Xylene	U		0.135	0.400
(S) 1,4-Bromofluorobenzene	*99.5*			*60.0-140*

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

(LCS) R4086484-1 06/25/24 08:43 • (LCSD) R4086484-2 06/25/24 09:27

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	3.29	3.17	87.7	84.5	70.0-130			3.72	25
Cyclohexane	3.75	2.99	2.91	79.7	77.6	70.0-130			2.71	25
Heptane	3.75	3.08	2.94	82.1	78.4	70.0-130			4.65	25
n-Hexane	3.75	2.88	2.91	76.8	77.6	70.0-130			1.04	25
Xylenes, Total	11.3	9.60	9.44	85.0	83.5	70.0-130			1.68	25
m&p-Xylene	7.50	6.40	6.29	85.3	83.9	70.0-130			1.73	25
(S) 1,4-Bromofluorobenzene				*99.0*	*104*	*60.0-140*				

Method Blank (MB)

(MB) R4087368-3 06/27/24 09:41

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
2,2,4-Trimethylpentane	U		0.133	0.200
(S) 1,4-Bromofluorobenzene	*101*			*60.0-140*

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

(LCS) R4087368-1 06/27/24 08:43 • (LCSD) R4087368-2 06/27/24 09:13

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
2,2,4-Trimethylpentane	3.75	3.91	3.91	104	104	70.0-130			0.000	25
(S) 1,4-Bromofluorobenzene				*104*	*105*	*60.0-140*				

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

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	LAO000356
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.

Pace® Location Requested (City/State):

Air CHAIN-OF-CUSTODY Analytical Request Document

Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields

LAB USE ONLY- Affix Workorder/Login Label Here

Scan QR code for instructions

M160

AN 5/28/24

Company Name: **Ramboll US Consulting, Inc. - Denver**

Street Address: **1999 Broadway Suite 2225 Denver, CO 80202**

City, State Zip:

Customer Project #:

Project Name: **Monthyl GW Calumet - Great Falls, MT**

Site Collection Info/Facility ID (as applicable): **ENVIRONCO-CALU MONTH**

Time Zone Collected: [ ] AK [ ] PT [✓] MT [ ] CT [ ] ET

Contact/Report To: **Abby Small**

Phone #: **303-382-5474**

E-Mail: **asmall@ramboll.com;rdeshpande@ramboll.com;eleister@ramboll.com:twvss@ramboll.com**

Cc E-Mail:

Invoice to:

Invoice E-Mail:

Purchase Order # (if applicable):

Quote #:

State origin of sample(s): MT

Data Deliverables:

[ ] Level II [ ] Level III [ ] Level IV

[ ] EQUIS

[ ] Other_____

Regulatory Program (CAA, RCRA, etc.) as applicable:

Rush (Pre-approval required): 2 Day 3 day 5 day Other_____

Date Results Requested:

Permit # as applicable:

Units for Reporting: ug/m³ PPBV mg/m³ PPMV

Proj. Manager: **841 - Kelly Mercer**

AcctNum / Client ID: **ENVIRONCO**

Table #:

Profile / Template: **T245957**

Prelog / Bottle Ord. ID: **P1077525**

Lab Use Only

* Matrix Codes (Insert in Matrix box below): Ambient (A), Indoor (I), Soil Vapor (SV), Other (O)

Customer Sample ID	Matrix *	Summa Canister ID	Flow Controller ID	Begin Collection Date	Begin Collection Time	End Collection Date	End Collection Time	Canister Pressure / Vacuum: Start Pressure / Vacuum (in Hg)	Canister Pressure / Vacuum: End Pressure / Vacuum (in Hg)	PUF / FILTER: Duration (minutes)	PUF / FILTER: Flow Rate m³/min or L/min	PUF / FILTER: Total Volume Sampled m³ or L	Analyses Requested: TO-15 Summa				Sample Comment
CMR-SP301-240620	Air	020657	020901	062024	1420	062024	1424	26	02	4:45	.21	1	✓				L1749212-01

Sample Receipt Checklist

COC Seal Present/Intact: Y__N
COC Signed/Accurate: Y__N
Bottles arrive intact: Y__N
Correct bottles used: Y__N

Size: 1 Airs 1L ____ 6L ____ 1.4L
Tage Color: G__ W 1 P__ B__
Tubing ___ Shunt ___

T/B#: ____

Unused: ____

Customer Remarks / Special Conditions / Possible Hazards:

Collected By: Kyle Groves
Printed Name:
Signature: Kyle A. Groves

Additional Instructions from Pace®:

Coolers: Thermometer ID: Correction Factor (°C): Obs. Temp. (°C): Corrected Temp. (°C):

Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Kyle A. Groves	062024 1600		
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature) Elijah Wilson	Date/Time: 6/21 0915
Relinquished by/Company: (Signature)	Date/Time:	Received by/Company: (Signature)	Date/Time:

Tracking Number:

Delivered by: In- Person Courier FedEX UPS Other

Page: ____ of: ____

Submitting a sample via this chain of custody constitutes acknowledgment and acceptance of the Pace® Terms and Conditions found at https://www.pacelabs.com/resource-library/resource/pace-terms-and-conditions/

APPENDIX A2

DUAL-PHASE EXTRACTION EFFLUENT LIQUID ANALYTICAL RESULTS

Pace Project Numbers:

L1731636, L1739782, L1749453

ANALYTICAL REPORT

May 16, 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:	L1731636
Samples Received:	05/01/2024
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 National

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

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CMR-SP200-240430 L1731636-01 GW

Collected by: Kyle A. Groves
Collected date/time: 04/30/24 13:30
Received date/time: 05/01/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2279318	10	05/03/24 06:42	05/03/24 06:42	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2281252	10	05/07/24 14:12	05/07/24 14:12	DYW	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2279412	20	05/02/24 18:08	05/09/24 15:49	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2279412	50	05/02/24 18:08	05/10/24 11:57	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2280689	100	05/06/24 06:51	05/15/24 00:16	AGW	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2280689	20	05/06/24 06:51	05/11/24 00:53	AGW	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2280689	20	05/06/24 06:51	05/13/24 18:24	AGW	Mt. Juliet, TN

TRIP BLANK L1731636-02 GW

Collected by: Kyle A. Groves
Collected date/time: 04/30/24 00:00
Received date/time: 05/01/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2281252	1	05/07/24 07:57	05/07/24 07:57	DYW	Mt. Juliet, TN

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	1260		333	1000	10	05/03/2024 06:42	WG2279318
Unadjusted C9-C12 Aliphatics	11600		333	1000	10	05/03/2024 06:42	WG2279318
Unadjusted C9-C10 Aromatics	3230		333	1000	10	05/03/2024 06:42	WG2279318
Adjusted C5-C8 Aliphatics	1010		333	1000	10	05/03/2024 06:42	WG2279318
Adjusted C9-C12 Aliphatics	11400		333	1000	10	05/03/2024 06:42	WG2279318
Total VPH	16100		667	2000	10	05/03/2024 06:42	WG2279318
(S) 2,5-Dibromotoluene(FID)	*34.4*	J2		*70.0-130*		*05/03/2024 06:42*	WG2279318
(S) 2,5-Dibromotoluene(PID)	*34.2*	J2		*70.0-130*		*05/03/2024 06:42*	WG2279318

Sample Narrative:

L1731636-01 WG2279318: 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	1820		113	250	10	05/07/2024 14:12	WG2281252
Acrylonitrile	U		6.71	50.0	10	05/07/2024 14:12	WG2281252
Benzene	250		0.941	5.00	10	05/07/2024 14:12	WG2281252
Bromobenzene	U		1.18	5.00	10	05/07/2024 14:12	WG2281252
Bromodichloromethane	U		1.36	5.00	10	05/07/2024 14:12	WG2281252
Bromochloromethane	U		1.28	5.00	10	05/07/2024 14:12	WG2281252
Bromoform	U		1.29	5.00	10	05/07/2024 14:12	WG2281252
Bromomethane	U		6.05	25.0	10	05/07/2024 14:12	WG2281252
n-Butylbenzene	U		1.57	5.00	10	05/07/2024 14:12	WG2281252
sec-Butylbenzene	10.8		1.25	5.00	10	05/07/2024 14:12	WG2281252
tert-Butylbenzene	U		1.27	5.00	10	05/07/2024 14:12	WG2281252
Carbon disulfide	U		0.962	5.00	10	05/07/2024 14:12	WG2281252
Carbon tetrachloride	U		1.28	5.00	10	05/07/2024 14:12	WG2281252
Chlorobenzene	U		1.17	5.00	10	05/07/2024 14:12	WG2281252
Chlorodibromomethane	U		1.40	5.00	10	05/07/2024 14:12	WG2281252
Chloroethane	U		1.92	25.0	10	05/07/2024 14:12	WG2281252
2-Chloroethyl vinyl ether	U		5.75	500	10	05/07/2024 14:12	WG2281252
Chloroform	U		1.11	5.00	10	05/07/2024 14:12	WG2281252
Chloromethane	U		9.60	12.5	10	05/07/2024 14:12	WG2281252
2-Chlorotoluene	U		1.06	5.00	10	05/07/2024 14:12	WG2281252
4-Chlorotoluene	U		1.14	5.00	10	05/07/2024 14:12	WG2281252
1,2-Dibromo-3-Chloropropane	U		2.76	25.0	10	05/07/2024 14:12	WG2281252
1,2-Dibromoethane	U		1.26	5.00	10	05/07/2024 14:12	WG2281252
Dibromomethane	U		1.22	5.00	10	05/07/2024 14:12	WG2281252
1,2-Dichlorobenzene	U		1.07	5.00	10	05/07/2024 14:12	WG2281252
1,3-Dichlorobenzene	U		2.99	5.00	10	05/07/2024 14:12	WG2281252
1,4-Dichlorobenzene	U		1.20	5.00	10	05/07/2024 14:12	WG2281252
Dichlorodifluoromethane	U		3.74	25.0	10	05/07/2024 14:12	WG2281252
1,1-Dichloroethane	U		1.00	5.00	10	05/07/2024 14:12	WG2281252
1,2-Dichloroethane	U		0.819	5.00	10	05/07/2024 14:12	WG2281252
1,1-Dichloroethene	U		1.88	5.00	10	05/07/2024 14:12	WG2281252
cis-1,2-Dichloroethene	U		1.26	5.00	10	05/07/2024 14:12	WG2281252
trans-1,2-Dichloroethene	U		1.49	5.00	10	05/07/2024 14:12	WG2281252
1,2-Dichloropropane	U		1.49	5.00	10	05/07/2024 14:12	WG2281252
1,1-Dichloropropene	U		1.42	5.00	10	05/07/2024 14:12	WG2281252
1,3-Dichloropropane	U		1.09	10.0	10	05/07/2024 14:12	WG2281252
cis-1,3-Dichloropropene	U		1.11	5.00	10	05/07/2024 14:12	WG2281252
trans-1,3-Dichloropropene	U		1.18	5.00	10	05/07/2024 14:12	WG2281252
trans-1,4-Dichloro-2-butene	U	J3	4.67	50.0	10	05/07/2024 14:12	WG2281252
2,2-Dichloropropane	U		1.61	5.00	10	05/07/2024 14:12	WG2281252

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	05/07/2024 14:12	WG2281252
Ethylbenzene	25.9		1.37	5.00	10	05/07/2024 14:12	WG2281252
Hexachloro-1,3-butadiene	U		3.37	10.0	10	05/07/2024 14:12	WG2281252
2-Hexanone	U		7.87	50.0	10	05/07/2024 14:12	WG2281252
n-Hexane	U		7.49	50.0	10	05/07/2024 14:12	WG2281252
Iodomethane	U		5.54	50.0	10	05/07/2024 14:12	WG2281252
Isopropylbenzene	3.76	J	1.05	5.00	10	05/07/2024 14:12	WG2281252
p-Isopropyltoluene	16.1		1.20	5.00	10	05/07/2024 14:12	WG2281252
2-Butanone (MEK)	258		11.9	50.0	10	05/07/2024 14:12	WG2281252
Methylene Chloride	U		4.30	25.0	10	05/07/2024 14:12	WG2281252
4-Methyl-2-pentanone (MIBK)	9.64	J	4.78	50.0	10	05/07/2024 14:12	WG2281252
Methyl tert-butyl ether	U		1.01	5.00	10	05/07/2024 14:12	WG2281252
Naphthalene	U		1.74	25.0	10	05/07/2024 14:12	WG2281252
n-Propylbenzene	8.79		0.993	5.00	10	05/07/2024 14:12	WG2281252
Styrene	U		1.18	5.00	10	05/07/2024 14:12	WG2281252
1,1,1,2-Tetrachloroethane	U		1.47	5.00	10	05/07/2024 14:12	WG2281252
1,1,2,2-Tetrachloroethane	U		1.33	5.00	10	05/07/2024 14:12	WG2281252
1,1,2-Trichlorotrifluoroethane	U		1.80	5.00	10	05/07/2024 14:12	WG2281252
Tetrachloroethene	U		3.00	5.00	10	05/07/2024 14:12	WG2281252
Toluene	3.29	J	2.78	5.00	10	05/07/2024 14:12	WG2281252
1,2,3-Trichlorobenzene	U		1.64	5.00	10	05/07/2024 14:12	WG2281252
1,2,4-Trichlorobenzene	U		4.81	10.0	10	05/07/2024 14:12	WG2281252
1,1,1-Trichloroethane	U		1.49	5.00	10	05/07/2024 14:12	WG2281252
1,1,2-Trichloroethane	U		1.58	5.00	10	05/07/2024 14:12	WG2281252
Trichloroethene	U		1.90	5.00	10	05/07/2024 14:12	WG2281252
Trichlorofluoromethane	U		1.60	25.0	10	05/07/2024 14:12	WG2281252
1,2,3-Trichloropropane	U		2.37	25.0	10	05/07/2024 14:12	WG2281252
1,2,4-Trimethylbenzene	329		3.22	5.00	10	05/07/2024 14:12	WG2281252
1,2,3-Trimethylbenzene	230		1.04	5.00	10	05/07/2024 14:12	WG2281252
1,3,5-Trimethylbenzene	38.2		1.04	5.00	10	05/07/2024 14:12	WG2281252
Vinyl acetate	U		6.92	50.0	10	05/07/2024 14:12	WG2281252
Vinyl chloride	U		2.34	5.00	10	05/07/2024 14:12	WG2281252
Xylenes, Total	103		1.74	15.0	10	05/07/2024 14:12	WG2281252
(S) Toluene-d8	*110*			*80.0-120*		*05/07/2024 14:12*	WG2281252
(S) 4-Bromofluorobenzene	*106*			*77.0-126*		*05/07/2024 14:12*	WG2281252
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*		*05/07/2024 14:12*	WG2281252

Sample Narrative:

L1731636-01 WG2281252: Target compounds too high to run at a lower dilution.

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	205000		10000	30000	50	05/10/2024 11:57	WG2279412
Unadjusted C19-C36 Aliphatics	62000		10000	30000	50	05/10/2024 11:57	WG2279412
Unadjusted C11-C22 Aromatics	75800		4000	12000	20	05/09/2024 15:49	WG2279412
Unadjusted Total Petroleum Hydrocarbons	343000		10000	30000	50	05/10/2024 11:57	WG2279412
Adjusted C11-C22 Aromatics	75800		4000	12000	20	05/09/2024 15:49	WG2279412
Adjusted Total Petroleum Hydrocarbons	343000		10000	30000	50	05/10/2024 11:57	WG2279412
(S) o-Terphenyl	*0.000*	J7		*40.0-140*		*05/09/2024 15:49*	WG2279412
(S) 1-Chloro-octadecane	*0.000*	J7		*40.0-140*		*05/10/2024 11:57*	WG2279412
(S) 2-Fluorobiphenyl	*0.000*	J7		*40.0-140*		*05/09/2024 15:49*	WG2279412
(S) 2-Bromonaphthalene	*0.000*	J7		*40.0-140*		*05/09/2024 15:49*	WG2279412

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		1.77	20.0	20	05/11/2024 00:53	WG2280689
Acenaphthylene	U		1.84	20.0	20	05/11/2024 00:53	WG2280689
Anthracene	U		1.61	20.0	20	05/11/2024 00:53	WG2280689
Benzidine	U		74.8	200	20	05/11/2024 00:53	WG2280689
Benzo(a)anthracene	U		3.98	20.0	20	05/11/2024 00:53	WG2280689
Benzo(b)fluoranthene	U		2.60	20.0	20	05/11/2024 00:53	WG2280689
Benzo(k)fluoranthene	U		2.40	20.0	20	05/11/2024 00:53	WG2280689
Benzo(g,h,i)perylene	U		2.42	20.0	20	05/11/2024 00:53	WG2280689
Benzo(a)pyrene	U		0.762	20.0	20	05/11/2024 00:53	WG2280689
Bis(2-chlorethoxy)methane	U		2.32	200	20	05/11/2024 00:53	WG2280689
Bis(2-chloroethyl)ether	U		2.74	200	20	05/11/2024 00:53	WG2280689
2,2-Oxybis(1-Chloropropane)	U		4.20	200	20	05/11/2024 00:53	WG2280689
4-Bromophenyl-phenylether	U		1.75	200	20	05/11/2024 00:53	WG2280689
2-Chloronaphthalene	U		1.30	20.0	20	05/11/2024 00:53	WG2280689
4-Chlorophenyl-phenylether	U		1.85	200	20	05/11/2024 00:53	WG2280689
Chrysene	U		2.60	20.0	20	05/11/2024 00:53	WG2280689
Dibenz(a,h)anthracene	U		1.29	20.0	20	05/11/2024 00:53	WG2280689
3,3-Dichlorobenzidine	U		4.24	200	20	05/11/2024 00:53	WG2280689
2,4-Dinitrotoluene	U		1.97	200	20	05/11/2024 00:53	WG2280689
2,6-Dinitrotoluene	U		5.00	200	20	05/11/2024 00:53	WG2280689
Fluoranthene	U		2.04	20.0	20	05/11/2024 00:53	WG2280689
Fluorene	U		1.69	20.0	20	05/11/2024 00:53	WG2280689
Hexachlorobenzene	U		1.51	20.0	20	05/11/2024 00:53	WG2280689
Hexachloro-1,3-butadiene	U		1.94	200	20	05/11/2024 00:53	WG2280689
Hexachlorocyclopentadiene	U		1.20	200	20	05/11/2024 00:53	WG2280689
Hexachloroethane	U		2.54	200	20	05/11/2024 00:53	WG2280689
Indeno(1,2,3-cd)pyrene	U		5.58	20.0	20	05/11/2024 00:53	WG2280689
Isophorone	U		2.86	200	20	05/11/2024 00:53	WG2280689
Naphthalene	23.1	B	3.18	20.0	20	05/11/2024 00:53	WG2280689
Nitrobenzene	U		5.94	200	20	05/11/2024 00:53	WG2280689
n-Nitrosodimethylamine	U		20.0	200	20	05/11/2024 00:53	WG2280689
n-Nitrosodiphenylamine	U		47.4	200	20	05/11/2024 00:53	WG2280689
n-Nitrosodi-n-propylamine	U		5.22	200	20	05/11/2024 00:53	WG2280689
Phenanthrene	8.03	J	2.24	20.0	20	05/11/2024 00:53	WG2280689
Benzylbutyl phthalate	U		15.3	60.0	20	05/11/2024 00:53	WG2280689
Bis(2-Ethylhexyl)phthalate	U		17.9	60.0	20	05/11/2024 00:53	WG2280689
Di-n-butyl phthalate	U		9.06	60.0	20	05/11/2024 00:53	WG2280689
Diethyl phthalate	U		5.74	60.0	20	05/11/2024 00:53	WG2280689
Dimethyl phthalate	U		5.20	60.0	20	05/11/2024 00:53	WG2280689
Di-n-octyl phthalate	U		18.6	60.0	20	05/11/2024 00:53	WG2280689
Pyrene	5.71	J	2.14	20.0	20	05/11/2024 00:53	WG2280689
1,2,4-Trichlorobenzene	U		1.40	200	20	05/11/2024 00:53	WG2280689
Aniline	U		33.0	200	20	05/11/2024 00:53	WG2280689
1,2-Diphenylhydrazine	U	N2	2.10	200	20	05/11/2024 00:53	WG2280689
Benzyl alcohol	U		11.3	200	20	05/11/2024 00:53	WG2280689
4-Chloroaniline	U		4.68	200	20	05/11/2024 00:53	WG2280689
4-Chloro-3-methylphenol	U		2.62	200	20	05/11/2024 00:53	WG2280689
2-Chlorophenol	U		2.66	200	20	05/11/2024 00:53	WG2280689
Dibenzofuran	U		1.94	200	20	05/11/2024 00:53	WG2280689
2,4-Dichlorophenol	U		2.04	200	20	05/11/2024 00:53	WG2280689
2,4-Dimethylphenol	U		1.27	200	20	05/11/2024 00:53	WG2280689
4,6-Dinitro-2-methylphenol	U		22.4	200	20	05/11/2024 00:53	WG2280689
2,4-Dinitrophenol	U		119	200	20	05/11/2024 00:53	WG2280689
2-Methylnaphthalene	61.8		2.34	20.0	20	05/11/2024 00:53	WG2280689
2-Methylphenol	U		1.86	200	20	05/11/2024 00:53	WG2280689
3&4-Methyl Phenol	U		3.36	200	20	05/11/2024 00:53	WG2280689

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		2.04	200	20	05/11/2024 00:53	WG2280689
3-Nitroaniline	U		1.74	200	20	05/11/2024 00:53	WG2280689
4-Nitroaniline	U		1.82	200	20	05/11/2024 00:53	WG2280689
2-Nitrophenol	U		2.34	200	20	05/11/2024 00:53	WG2280689
4-Nitrophenol	U		2.86	200	20	05/11/2024 00:53	WG2280689
Pentachlorophenol	U		6.26	200	20	05/11/2024 00:53	WG2280689
Phenol	U		86.6	200	20	05/11/2024 00:53	WG2280689
Pyridine	U		12.5	200	20	05/11/2024 00:53	WG2280689
2,4,6-Trichlorophenol	U		2.00	200	20	05/11/2024 00:53	WG2280689
Acetophenone	U		4.16	200	20	05/11/2024 00:53	WG2280689
2-Acetylaminofluorene	U		5.06	200	20	05/13/2024 18:24	WG2280689
4-Aminobiphenyl	U		46.1	1000	100	05/15/2024 00:16	WG2280689
Chlorobenzilate	U		76.8	1000	20	05/13/2024 18:24	WG2280689
Diallate	U		52.4	1000	100	05/15/2024 00:16	WG2280689
2,6-Dichlorophenol	U		10.2	1000	100	05/15/2024 00:16	WG2280689
Dimethoate	U		505	5000	100	05/15/2024 00:16	WG2280689
P-(Dimethylamino) Azobenzene	U		73.8	200	20	05/13/2024 18:24	WG2280689
Dimethylbenz (A) Anthracene	U		34.2	200	20	05/13/2024 18:24	WG2280689
3,3-Dimethylbenzidine	U	J4	67.8	200	20	05/13/2024 18:24	WG2280689
a,a-Dimethylphenethylamine	U	J4	313	5000	100	05/15/2024 00:16	WG2280689
1,3-Dinitrobenzene	U		35.9	1000	100	05/15/2024 00:16	WG2280689
Diphenylamine	U		47.4	200	20	05/11/2024 00:53	WG2280689
Dinoseb	U		801	5000	100	05/15/2024 00:16	WG2280689
Disulfoton	U		26.7	1000	100	05/15/2024 00:16	WG2280689
Ethyl methanesulfonate	U		6.52	200	20	05/13/2024 18:24	WG2280689
Ethyl Parathion	U		37.9	1000	100	05/15/2024 00:16	WG2280689
Famphur	U	C6	78.4	400	20	05/13/2024 18:24	WG2280689
Hexachloropropene	U		14.9	5000	100	05/15/2024 00:16	WG2280689
Hexachlorophene	U		28.8	1000	20	05/13/2024 18:24	WG2280689
Isodrin	U		411	1000	100	05/15/2024 00:16	WG2280689
Isosafrole	U		388	1000	100	05/15/2024 00:16	WG2280689
Kepone	U	C6 J4	53.2	400	20	05/13/2024 18:24	WG2280689
Methapyrilene	U	J4	1000	5000	100	05/15/2024 00:16	WG2280689
3-Methylcholanthrene	U		3.28	200	20	05/13/2024 18:24	WG2280689
Methyl methanesulfonate	U		68.0	1000	20	05/13/2024 18:24	WG2280689
Methyl parathion	U		21.3	1000	100	05/15/2024 00:16	WG2280689
1,4-Naphthoquinone	U	J4	556	5000	100	05/15/2024 00:16	WG2280689
1-Naphthylamine	U		28.9	1000	100	05/15/2024 00:16	WG2280689
2-Naphthylamine	U		448	1000	100	05/15/2024 00:16	WG2280689
5-Nitro-o-toluidine	U		199	1000	100	05/15/2024 00:16	WG2280689
4-Nitroquinoline 1-oxide	U		203	1000	100	05/15/2024 00:16	WG2280689
n-Nitrosodiethylamine	U		71.4	200	20	05/13/2024 18:24	WG2280689
n-Nitrosodi-n-butylamine	U		391	1000	100	05/15/2024 00:16	WG2280689
n-Nitrosomethylethylamine	U		65.0	200	20	05/13/2024 18:24	WG2280689
n-Nitrosomorpholine	U		65.0	200	20	05/13/2024 18:24	WG2280689
n-Nitrosopiperidine	U		372	1000	100	05/15/2024 00:16	WG2280689
n-Nitrosopyrrolidine	U		67.8	200	20	05/13/2024 18:24	WG2280689
Pentachlorobenzene	U		415	1000	100	05/15/2024 00:16	WG2280689
Pentachloroethane	U		56.6	1000	20	05/13/2024 18:24	WG2280689
Pentachloronitrobenzene	U		415	1000	100	05/15/2024 00:16	WG2280689
Phenacetin	U		466	1000	100	05/15/2024 00:16	WG2280689
p-Phenylenediamine	U	J4	38700	690000	100	05/15/2024 00:16	WG2280689
Phorate	U		486	5000	100	05/15/2024 00:16	WG2280689
2-Picoline	U	J4	137	1000	20	05/13/2024 18:24	WG2280689
Pronamide	U		421	1000	100	05/15/2024 00:16	WG2280689
Safrole	U		368	1000	100	05/15/2024 00:16	WG2280689

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		399	5000	100	05/15/2024 00:16	WG2280689
1,2,4,5-Tetrachlorobenzene	U		1.29	200	20	05/11/2024 00:53	WG2280689
2,3,4,6-Tetrachlorophenol	U		4.62	200	20	05/11/2024 00:53	WG2280689
Thionazin	U		407	1000	100	05/15/2024 00:16	WG2280689
o-Toluidine	U		70.6	200	20	05/13/2024 18:24	WG2280689
2,4,5-Trichlorophenol	U		2.18	200	20	05/11/2024 00:53	WG2280689
O,O,O-Triethyl Phosphorothioate	U		293	1000	100	05/15/2024 00:16	WG2280689
1,3,5-Trinitrobenzene	U		132	1000	100	05/15/2024 00:16	WG2280689
(S) 2-Fluorophenol	*11.8*	J7		*10.0-120*		*05/11/2024 00:53*	WG2280689
(S) Phenol-d5	*0.000*	J7		*10.0-120*		*05/11/2024 00:53*	WG2280689
(S) Nitrobenzene-d5	*0.000*	J7		*10.0-127*		*05/11/2024 00:53*	WG2280689
(S) 2-Fluorobiphenyl	*39.7*	J7		*10.0-130*		*05/11/2024 00:53*	WG2280689
(S) 2,4,6-Tribromophenol	*26.5*	J7		*10.0-155*		*05/11/2024 00:53*	WG2280689
(S) p-Terphenyl-d14	*43.4*	J7		*10.0-128*		*05/11/2024 00:53*	WG2280689

Sample Narrative:

L1731636-01 WG2280689: Dilution and surrogate failure due to matrix interference.

L1731636-01 WG2280689: Dilution due to matrix.

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	05/07/2024 07:57	WG2281252
Acrylonitrile	U		0.671	5.00	1	05/07/2024 07:57	WG2281252
Benzene	U		0.0941	0.500	1	05/07/2024 07:57	WG2281252
Bromobenzene	U		0.118	0.500	1	05/07/2024 07:57	WG2281252
Bromodichloromethane	U		0.136	0.500	1	05/07/2024 07:57	WG2281252
Bromochloromethane	U		0.128	0.500	1	05/07/2024 07:57	WG2281252
Bromoform	U		0.129	0.500	1	05/07/2024 07:57	WG2281252
Bromomethane	U		0.605	2.50	1	05/07/2024 07:57	WG2281252
n-Butylbenzene	U		0.157	0.500	1	05/07/2024 07:57	WG2281252
sec-Butylbenzene	U		0.125	0.500	1	05/07/2024 07:57	WG2281252
tert-Butylbenzene	U		0.127	0.500	1	05/07/2024 07:57	WG2281252
Carbon disulfide	U		0.0962	0.500	1	05/07/2024 07:57	WG2281252
Carbon tetrachloride	U		0.128	0.500	1	05/07/2024 07:57	WG2281252
Chlorobenzene	U		0.117	0.500	1	05/07/2024 07:57	WG2281252
Chlorodibromomethane	U		0.140	0.500	1	05/07/2024 07:57	WG2281252
Chloroethane	U		0.192	2.50	1	05/07/2024 07:57	WG2281252
2-Chloroethyl vinyl ether	U		0.575	50.0	1	05/07/2024 07:57	WG2281252
Chloroform	U		0.111	0.500	1	05/07/2024 07:57	WG2281252
Chloromethane	U		0.960	1.25	1	05/07/2024 07:57	WG2281252
2-Chlorotoluene	U		0.106	0.500	1	05/07/2024 07:57	WG2281252
4-Chlorotoluene	U		0.114	0.500	1	05/07/2024 07:57	WG2281252
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	05/07/2024 07:57	WG2281252
1,2-Dibromoethane	U		0.126	0.500	1	05/07/2024 07:57	WG2281252
Dibromomethane	U		0.122	0.500	1	05/07/2024 07:57	WG2281252
1,2-Dichlorobenzene	U		0.107	0.500	1	05/07/2024 07:57	WG2281252
1,3-Dichlorobenzene	U		0.299	0.500	1	05/07/2024 07:57	WG2281252
1,4-Dichlorobenzene	U		0.120	0.500	1	05/07/2024 07:57	WG2281252
Dichlorodifluoromethane	U		0.374	2.50	1	05/07/2024 07:57	WG2281252
1,1-Dichloroethane	U		0.100	0.500	1	05/07/2024 07:57	WG2281252
1,2-Dichloroethane	U		0.0819	0.500	1	05/07/2024 07:57	WG2281252
1,1-Dichloroethene	U		0.188	0.500	1	05/07/2024 07:57	WG2281252
cis-1,2-Dichloroethene	U		0.126	0.500	1	05/07/2024 07:57	WG2281252
trans-1,2-Dichloroethene	U		0.149	0.500	1	05/07/2024 07:57	WG2281252
1,2-Dichloropropane	U		0.149	0.500	1	05/07/2024 07:57	WG2281252
1,1-Dichloropropene	U		0.142	0.500	1	05/07/2024 07:57	WG2281252
1,3-Dichloropropane	U		0.109	1.00	1	05/07/2024 07:57	WG2281252
cis-1,3-Dichloropropene	U		0.111	0.500	1	05/07/2024 07:57	WG2281252
trans-1,3-Dichloropropene	U		0.118	0.500	1	05/07/2024 07:57	WG2281252
trans-1,4-Dichloro-2-butene	U	J3	0.467	5.00	1	05/07/2024 07:57	WG2281252
2,2-Dichloropropane	U		0.161	0.500	1	05/07/2024 07:57	WG2281252
Di-isopropyl ether	U		0.105	0.500	1	05/07/2024 07:57	WG2281252
Ethylbenzene	U		0.137	0.500	1	05/07/2024 07:57	WG2281252
Hexachloro-1,3-butadiene	U		0.337	1.00	1	05/07/2024 07:57	WG2281252
2-Hexanone	U		0.787	5.00	1	05/07/2024 07:57	WG2281252
n-Hexane	U		0.749	5.00	1	05/07/2024 07:57	WG2281252
Iodomethane	U		0.554	5.00	1	05/07/2024 07:57	WG2281252
Isopropylbenzene	U		0.105	0.500	1	05/07/2024 07:57	WG2281252
p-Isopropyltoluene	U		0.120	0.500	1	05/07/2024 07:57	WG2281252
2-Butanone (MEK)	U		1.19	5.00	1	05/07/2024 07:57	WG2281252
Methylene Chloride	U		0.430	2.50	1	05/07/2024 07:57	WG2281252
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	05/07/2024 07:57	WG2281252
Methyl tert-butyl ether	U		0.101	0.500	1	05/07/2024 07:57	WG2281252
Naphthalene	U		0.174	2.50	1	05/07/2024 07:57	WG2281252
n-Propylbenzene	U		0.0993	0.500	1	05/07/2024 07:57	WG2281252
Styrene	U		0.118	0.500	1	05/07/2024 07:57	WG2281252
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	05/07/2024 07:57	WG2281252

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	05/07/2024 07:57	WG2281252
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	05/07/2024 07:57	WG2281252
Tetrachloroethene	U		0.300	0.500	1	05/07/2024 07:57	WG2281252
Toluene	U		0.278	0.500	1	05/07/2024 07:57	WG2281252
1,2,3-Trichlorobenzene	U		0.164	0.500	1	05/07/2024 07:57	WG2281252
1,2,4-Trichlorobenzene	U		0.481	1.00	1	05/07/2024 07:57	WG2281252
1,1,1-Trichloroethane	U		0.149	0.500	1	05/07/2024 07:57	WG2281252
1,1,2-Trichloroethane	U		0.158	0.500	1	05/07/2024 07:57	WG2281252
Trichloroethene	U		0.190	0.500	1	05/07/2024 07:57	WG2281252
Trichlorofluoromethane	U		0.160	2.50	1	05/07/2024 07:57	WG2281252
1,2,3-Trichloropropane	U		0.237	2.50	1	05/07/2024 07:57	WG2281252
1,2,4-Trimethylbenzene	U		0.322	0.500	1	05/07/2024 07:57	WG2281252
1,2,3-Trimethylbenzene	U		0.104	0.500	1	05/07/2024 07:57	WG2281252
1,3,5-Trimethylbenzene	U		0.104	0.500	1	05/07/2024 07:57	WG2281252
Vinyl acetate	U		0.692	5.00	1	05/07/2024 07:57	WG2281252
Vinyl chloride	U		0.234	0.500	1	05/07/2024 07:57	WG2281252
Xylenes, Total	U		0.174	1.50	1	05/07/2024 07:57	WG2281252
(S) Toluene-d8	*115*			*80.0-120*		*05/07/2024 07:57*	WG2281252
(S) 4-Bromofluorobenzene	*110*			*77.0-126*		*05/07/2024 07:57*	WG2281252
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*		*05/07/2024 07:57*	WG2281252

Method Blank (MB)

(MB) R4066626-3 05/02/24 19:14

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)	*94.7*			*70.0-130*
(S) 2,5-Dibromotoluene(PID)	*87.2*			*70.0-130*

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

(LCS) R4066626-1 05/02/24 09:32 • (LCSD) R4066626-2 05/02/24 10:07

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	1040	1040	86.7	86.7	70.0-130			0.000	50
Unadjusted C9-C12 Aliphatics	1400	1270	1260	90.7	90.0	70.0-130			0.791	50
Unadjusted C9-C10 Aromatics	200	167	166	83.5	83.0	70.0-130			0.601	50
Total VPH	2800	2480	2470	88.6	88.2	70.0-130			0.404	50
(S) 2,5-Dibromotoluene(FID)				*94.9*	*96.2*	*70.0-130*				
(S) 2,5-Dibromotoluene(PID)				*84.5*	*85.5*	*70.0-130*				

L1730713-15 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1730713-15 05/02/24 21:25 • (MS) R4066626-4 05/03/24 07:17 • (MSD) R4066626-5 05/03/24 07:52

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	1010	1040	84.2	86.7	1	70.0-130			2.93	50
Unadjusted C9-C12 Aliphatics	1400	U	1300	1350	92.9	96.4	1	70.0-130			3.77	50
Unadjusted C9-C10 Aromatics	200	U	171	174	85.5	87.0	1	70.0-130			1.74	50
Total VPH	2800	U	2480	2560	88.6	91.4	1	70.0-130			3.17	50
(S) 2,5-Dibromotoluene(FID)					*94.5*	*96.9*		*70.0-130*				
(S) 2,5-Dibromotoluene(PID)					*83.6*	*85.8*		*70.0-130*				

Method Blank (MB)

(MB) R4067077-3 05/07/24 07:15

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

Method Blank (MB)

(MB) R4067077-3 05/07/24 07:15

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	*115*			*80.0-120*
(S) 4-Bromofluorobenzene	*105*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*

QUALITY CONTROL SUMMARY

L1731636-01,02

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

(LCS) R4067077-1 05/07/24 06:13 • (LCSD) R4067077-2 05/07/24 06:34

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 %
Acetone	25.0	24.1	24.3	96.4	97.2	19.0-160			0.826	27
Acrylonitrile	25.0	24.1	24.7	96.4	98.8	55.0-149			2.46	20
Benzene	5.00	4.77	5.08	95.4	102	70.0-123			6.29	20
Bromobenzene	5.00	4.46	4.31	89.2	86.2	73.0-121			3.42	20
Bromodichloromethane	5.00	4.80	5.03	96.0	101	75.0-120			4.68	20
Bromochloromethane	5.00	4.77	5.61	95.4	112	76.0-122			16.2	20
Bromoform	5.00	4.61	4.53	92.2	90.6	68.0-132			1.75	20
Bromomethane	5.00	4.02	4.34	80.4	86.8	10.0-160			7.66	25
n-Butylbenzene	5.00	4.27	4.36	85.4	87.2	73.0-125			2.09	20
sec-Butylbenzene	5.00	4.60	4.81	92.0	96.2	75.0-125			4.46	20
tert-Butylbenzene	5.00	4.57	4.76	91.4	95.2	76.0-124			4.07	20
Carbon disulfide	5.00	4.51	4.88	90.2	97.6	61.0-128			7.88	20
Carbon tetrachloride	5.00	4.72	4.80	94.4	96.0	68.0-126			1.68	20
Chlorobenzene	5.00	4.90	5.21	98.0	104	80.0-121			6.13	20
Chlorodibromomethane	5.00	4.79	4.40	95.8	88.0	77.0-125			8.49	20
Chloroethane	5.00	5.60	6.17	112	123	47.0-150			9.69	20
2-Chloroethyl vinyl ether	25.0	22.0	23.6	88.0	94.4	51.0-160			7.02	20
Chloroform	5.00	4.64	5.00	92.8	100	73.0-120			7.47	20
Chloromethane	5.00	4.56	4.66	91.2	93.2	41.0-142			2.17	20
2-Chlorotoluene	5.00	4.53	4.86	90.6	97.2	76.0-123			7.03	20
4-Chlorotoluene	5.00	4.49	4.64	89.8	92.8	75.0-122			3.29	20
1,2-Dibromo-3-Chloropropane	5.00	4.58	4.35	91.6	87.0	58.0-134			5.15	20
1,2-Dibromoethane	5.00	5.12	5.30	102	106	80.0-122			3.45	20
Dibromomethane	5.00	5.05	4.98	101	99.6	80.0-120			1.40	20
1,2-Dichlorobenzene	5.00	4.73	5.13	94.6	103	79.0-121			8.11	20
1,3-Dichlorobenzene	5.00	4.39	4.48	87.8	89.6	79.0-120			2.03	20
1,4-Dichlorobenzene	5.00	4.28	4.71	85.6	94.2	79.0-120			9.57	20
Dichlorodifluoromethane	5.00	5.20	5.67	104	113	51.0-149			8.65	20
1,1-Dichloroethane	5.00	4.60	4.98	92.0	99.6	70.0-126			7.93	20
1,2-Dichloroethane	5.00	4.65	4.93	93.0	98.6	70.0-128			5.85	20
1,1-Dichloroethene	5.00	4.71	5.00	94.2	100	71.0-124			5.97	20
cis-1,2-Dichloroethene	5.00	4.48	5.04	89.6	101	73.0-120			11.8	20
trans-1,2-Dichloroethene	5.00	4.68	5.06	93.6	101	73.0-120			7.80	20
1,2-Dichloropropane	5.00	4.64	4.95	92.8	99.0	77.0-125			6.47	20
1,1-Dichloropropene	5.00	4.74	5.16	94.8	103	74.0-126			8.48	20
1,3-Dichloropropane	5.00	4.87	5.16	97.4	103	80.0-120			5.78	20
cis-1,3-Dichloropropene	5.00	4.74	5.02	94.8	100	80.0-123			5.74	20
trans-1,3-Dichloropropene	5.00	4.59	4.64	91.8	92.8	78.0-124			1.08	20
trans-1,4-Dichloro-2-butene	5.00	4.93	3.67	98.6	73.4	33.0-144		J3	29.3	20
2,2-Dichloropropane	5.00	4.04	4.33	80.8	86.6	58.0-130			6.93	20

QUALITY CONTROL SUMMARY

L1731636-01,02

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

(LCS) R4067077-1 05/07/24 06:13 • (LCSD) R4067077-2 05/07/24 06:34

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 %
Di-isopropyl ether	5.00	4.64	4.79	92.8	95.8	58.0-138			3.18	20
Ethylbenzene	5.00	4.87	5.25	97.4	105	79.0-123			7.51	20
Hexachloro-1,3-butadiene	5.00	4.60	4.88	92.0	97.6	54.0-138			5.91	20
2-Hexanone	25.0	23.8	24.3	95.2	97.2	67.0-149			2.08	20
n-Hexane	5.00	4.59	4.91	91.8	98.2	57.0-133			6.74	20
Iodomethane	25.0	15.7	19.3	62.8	77.2	33.0-147			20.6	26
Isopropylbenzene	5.00	4.84	5.01	96.8	100	76.0-127			3.45	20
p-Isopropyltoluene	5.00	4.72	4.98	94.4	99.6	76.0-125			5.36	20
2-Butanone (MEK)	25.0	23.1	24.3	92.4	97.2	44.0-160			5.06	20
Methylene Chloride	5.00	4.68	4.69	93.6	93.8	67.0-120			0.213	20
4-Methyl-2-pentanone (MIBK)	25.0	26.0	25.7	104	103	68.0-142			1.16	20
Methyl tert-butyl ether	5.00	4.77	4.94	95.4	98.8	68.0-125			3.50	20
Naphthalene	5.00	3.90	4.48	78.0	89.6	54.0-135			13.8	20
n-Propylbenzene	5.00	4.39	5.04	87.8	101	77.0-124			13.8	20
Styrene	5.00	4.41	4.79	88.2	95.8	73.0-130			8.26	20
1,1,1,2-Tetrachloroethane	5.00	4.81	4.88	96.2	97.6	75.0-125			1.44	20
1,1,2,2-Tetrachloroethane	5.00	4.57	4.74	91.4	94.8	65.0-130			3.65	20
1,1,2-Trichlorotrifluoroethane	5.00	5.01	5.10	100	102	69.0-132			1.78	20
Tetrachloroethene	5.00	5.54	5.87	111	117	72.0-132			5.78	20
Toluene	5.00	4.82	5.03	96.4	101	79.0-120			4.26	20
1,2,3-Trichlorobenzene	5.00	4.75	4.82	95.0	96.4	50.0-138			1.46	20
1,2,4-Trichlorobenzene	5.00	4.47	4.61	89.4	92.2	57.0-137			3.08	20
1,1,1-Trichloroethane	5.00	4.66	5.01	93.2	100	73.0-124			7.24	20
1,1,2-Trichloroethane	5.00	5.14	5.13	103	103	80.0-120			0.195	20
Trichloroethene	5.00	4.88	5.20	97.6	104	78.0-124			6.35	20
Trichlorofluoromethane	5.00	5.04	5.56	101	111	59.0-147			9.81	20
1,2,3-Trichloropropane	5.00	4.65	4.53	93.0	90.6	73.0-130			2.61	20
1,2,4-Trimethylbenzene	5.00	4.52	5.08	90.4	102	76.0-121			11.7	20
1,2,3-Trimethylbenzene	5.00	4.49	5.00	89.8	100	77.0-120			10.7	20
1,3,5-Trimethylbenzene	5.00	4.70	5.01	94.0	100	76.0-122			6.39	20
Vinyl acetate	25.0	20.5	25.0	82.0	100	11.0-160			19.8	20
Vinyl chloride	5.00	5.26	5.90	105	118	67.0-131			11.5	20
Xylenes, Total	15.0	14.2	14.9	94.7	99.3	79.0-123			4.81	20
(S) Toluene-d8				*112*	*111*	*80.0-120*				
(S) 4-Bromofluorobenzene				*105*	*104*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*102*	*96.6*	*70.0-130*				

Method Blank (MB)

(MB) R4066450-1 05/06/24 13:53

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
Unadjusted Total Petroleum Hydrocarbons	U	J	200	600
(S) 1-Chloro-octadecane	*90.4*			*40.0-140*

Method Blank (MB)

(MB) R4066450-4 05/06/24 15:00

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C11-C22 Aromatics	U	U	200	600
Unadjusted Total Petroleum Hydrocarbons	U	J	200	600
(S) o-Terphenyl	*79.1*			*40.0-140*
(S) 2-Fluorobiphenyl	*86.1*			*40.0-140*
(S) 2-Bromonaphthalene	*91.9*			*40.0-140*

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

(LCS) R4066450-2 05/06/24 14:16 • (LCSD) R4066450-3 05/06/24 14:38

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	400	391	66.7	65.2	40.0-140			2.28	25
Unadjusted C19-C36 Aliphatics	800	788	765	98.5	95.6	40.0-140			2.96	25
(S) 1-Chloro-octadecane				*99.8*	*0.000*	*40.0-140*		J2		

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

(LCS) R4066450-5 05/06/24 15:22 • (LCSD) R4066450-6 05/06/24 15:44

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	1410	1420	82.9	83.5	40.0-140			0.707	25
(S) o-Terphenyl				*79.6*	*0.000*	*40.0-140*		J2		
(S) 2-Fluorobiphenyl				*85.9*	*85.5*	*40.0-140*				
(S) 2-Bromonaphthalene				*92.1*	*92.1*	*40.0-140*				

Method Blank (MB)

(MB) R4067343-2 05/07/24 23:34

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	0.179	J	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

Method Blank (MB)

(MB) R4067343-2 05/07/24 23:34

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	*40.2*			*10.0-120*
(S) Phenol-d5	*26.1*			*10.0-120*
(S) Nitrobenzene-d5	*63.1*			*10.0-127*
(S) 2-Fluorobiphenyl	*75.0*			*10.0-130*
(S) 2,4,6-Tribromophenol	*75.5*			*10.0-155*
(S) p-Terphenyl-d14	*97.6*			*10.0-128*

Method Blank (MB)

(MB) R4068610-2 05/11/24 20:33

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

Method Blank (MB)

(MB) R4068610-2 05/11/24 20:33

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) R4067343-1 05/07/24 23:12

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	50.0	38.7	77.4	41.0-120	
Acenaphthylene	50.0	40.8	81.6	43.0-120	
Anthracene	50.0	40.6	81.2	45.0-120	
Benzidine	100	58.4	58.4	10.0-120	
Benzo(a)anthracene	50.0	41.7	83.4	47.0-120	
Benzo(b)fluoranthene	50.0	43.7	87.4	46.0-120	
Benzo(k)fluoranthene	50.0	43.6	87.2	46.0-120	
Benzo(g,h,i)perylene	50.0	41.5	83.0	48.0-121	
Benzo(a)pyrene	50.0	43.1	86.2	47.0-120	
Bis(2-chlorethoxy)methane	50.0	32.0	64.0	33.0-120	
Bis(2-chloroethyl)ether	50.0	36.2	72.4	23.0-120	
2,2-Oxybis(1-Chloropropane)	50.0	34.3	68.6	28.0-120	
4-Bromophenyl-phenylether	50.0	41.8	83.6	45.0-120	
2-Chloronaphthalene	50.0	37.7	75.4	37.0-120	
4-Chlorophenyl-phenylether	50.0	39.4	78.8	44.0-120	
Chrysene	50.0	45.0	90.0	48.0-120	
Dibenz(a,h)anthracene	50.0	44.5	89.0	47.0-120	
3,3-Dichlorobenzidine	100	99.2	99.2	44.0-120	
2,4-Dinitrotoluene	50.0	43.0	86.0	49.0-124	
2,6-Dinitrotoluene	50.0	40.9	81.8	46.0-120	
Fluoranthene	50.0	42.7	85.4	51.0-120	
Fluorene	50.0	40.8	81.6	47.0-120	

Laboratory Control Sample (LCS)

(LCS) R4067343-1 05/07/24 23:12

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexachlorobenzene	50.0	40.6	81.2	44.0-120	
Hexachloro-1,3-butadiene	50.0	29.5	59.0	19.0-120	
Hexachlorocyclopentadiene	50.0	19.7	39.4	15.0-120	
Hexachloroethane	50.0	34.2	68.4	15.0-120	
Indeno(1,2,3-cd)pyrene	50.0	41.3	82.6	49.0-122	
Isophorone	50.0	29.2	58.4	36.0-120	
Naphthalene	50.0	30.9	61.8	27.0-120	
Nitrobenzene	50.0	31.6	63.2	27.0-120	
n-Nitrosodimethylamine	50.0	23.5	47.0	10.0-120	
n-Nitrosodiphenylamine	50.0	42.4	84.8	47.0-120	
n-Nitrosodi-n-propylamine	50.0	32.8	65.6	31.0-120	
Phenanthrene	50.0	40.3	80.6	46.0-120	
Benzylbutyl phthalate	50.0	49.8	99.6	43.0-121	
Bis(2-Ethylhexyl)phthalate	50.0	48.9	97.8	43.0-122	
Di-n-butyl phthalate	50.0	47.2	94.4	49.0-121	
Diethyl phthalate	50.0	42.6	85.2	48.0-122	
Dimethyl phthalate	50.0	41.2	82.4	48.0-120	
Di-n-octyl phthalate	50.0	47.8	95.6	42.0-125	
Pyrene	50.0	44.0	88.0	47.0-120	
1,2,4-Trichlorobenzene	50.0	31.5	63.0	24.0-120	
Aniline	50.0	20.1	40.2	13.0-120	
1,2-Diphenylhydrazine	50.0	41.3	82.6	41.0-126	N2
Benzyl alcohol	50.0	23.4	46.8	25.0-120	
4-Chloroaniline	50.0	21.4	42.8	25.0-120	
4-Chloro-3-methylphenol	50.0	30.4	60.8	40.0-120	
2-Chlorophenol	50.0	32.0	64.0	25.0-120	
Dibenzofuran	50.0	39.7	79.4	44.0-120	
2,4-Dichlorophenol	50.0	30.7	61.4	36.0-120	
2,4-Dimethylphenol	50.0	33.5	67.0	33.0-120	
4,6-Dinitro-2-methylphenol	50.0	46.8	93.6	38.0-138	
2,4-Dinitrophenol	50.0	45.4	90.8	10.0-120	
2-Methylnaphthalene	50.0	30.2	60.4	33.0-120	
2-Methylphenol	50.0	28.2	56.4	28.0-120	
3&4-Methyl Phenol	50.0	29.3	58.6	31.0-120	
2-Nitroaniline	50.0	41.3	82.6	43.0-120	
3-Nitroaniline	50.0	36.0	72.0	38.0-120	
4-Nitroaniline	50.0	40.0	80.0	18.0-160	
2-Nitrophenol	50.0	33.2	66.4	31.0-120	
4-Nitrophenol	50.0	18.9	37.8	10.0-120	
Pentachlorophenol	50.0	40.4	80.8	23.0-120	

Laboratory Control Sample (LCS)

(LCS) R4067343-1 05/07/24 23:12

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Phenol	50.0	13.9	27.8	10.0-120	
Pyridine	50.0	12.0	24.0	10.0-120	
2,4,6-Trichlorophenol	50.0	39.0	78.0	42.0-120	
Acetophenone	50.0	34.6	69.2	29.0-120	
Diphenylamine	50.0	42.4	84.8	35.0-120	
1,2,4,5-Tetrachlorobenzene	50.0	34.8	69.6	31.0-121	
2,3,4,6-Tetrachlorophenol	50.0	45.5	91.0	42.0-132	
2,4,5-Trichlorophenol	50.0	40.9	81.8	44.0-120	
(S) 2-Fluorophenol			*41.7*	*10.0-120*	
(S) Phenol-d5			*26.8*	*10.0-120*	
(S) Nitrobenzene-d5			*59.1*	*10.0-127*	
(S) 2-Fluorobiphenyl			*77.5*	*10.0-130*	
(S) 2,4,6-Tribromophenol			*86.5*	*10.0-155*	
(S) p-Terphenyl-d14			*85.8*	*10.0-128*	

Laboratory Control Sample (LCS)

(LCS) R4068610-1 05/11/24 20:16

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Acetylaminofluorene	50.0	52.6	105	32.0-120	
4-Aminobiphenyl	50.0	38.5	77.0	20.0-120	
Chlorobenzilate	50.0	40.7	81.4	29.0-128	J
Diallate	50.0	35.1	70.2	30.0-120	
2,6-Dichlorophenol	50.0	29.4	58.8	19.0-136	
Dimethoate	50.0	40.3	80.6	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	41.2	82.4	27.0-120	
Dimethylbenz (A) Anthracene	50.0	17.3	34.6	14.0-124	
3,3-Dimethylbenzidine	50.0	4.64	9.28	13.0-120	J J4
a,a-Dimethylphenethylamine	50.0	0.000	0.000	10.0-129	J4
1,3-Dinitrobenzene	50.0	36.5	73.0	34.0-120	
Diphenylamine	50.0	36.3	72.6	35.0-120	
Dinoseb	50.0	51.9	104	39.0-120	
Disulfoton	50.0	34.9	69.8	32.0-120	
Ethyl methanesulfonate	50.0	24.4	48.8	10.0-120	
Ethyl Parathion	50.0	62.0	124	46.0-130	
Famphur	50.0	42.4	84.8	32.0-120	
Hexachloropropene	50.0	31.5	63.0	10.0-120	J
Hexachlorophene	100	37.9	37.9	10.0-120	J

Laboratory Control Sample (LCS)

(LCS) R4068610-1 05/11/24 20:16

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Isodrin	50.0	36.7	73.4	22.0-157	
Isosafrole	50.0	29.2	58.4	25.0-133	
Kepone	50.0	96.1	192	10.0-120	J4
Methapyrilene	50.0	4.30	8.60	10.0-120	J J4
3-Methylcholanthrene	50.0	36.4	72.8	30.0-160	
Methyl methanesulfonate	50.0	23.8	47.6	10.0-120	J
Methyl parathion	50.0	55.3	111	42.0-120	
1,4-Naphthoquinone	50.0	5.50	11.0	50.0-150	J J4
1-Naphthylamine	50.0	27.9	55.8	19.0-120	
2-Naphthylamine	50.0	15.9	31.8	10.0-120	
5-Nitro-o-toluidine	50.0	43.7	87.4	34.0-120	
4-Nitroquinoline 1-oxide	50.0	39.8	79.6	10.0-159	
n-Nitrosodiethylamine	50.0	28.6	57.2	10.0-120	
n-Nitrosodi-n-butylamine	50.0	43.9	87.8	13.0-143	
n-Nitrosomethylethylamine	50.0	24.3	48.6	10.0-120	
n-Nitrosomorpholine	50.0	34.6	69.2	10.0-120	
n-Nitrosopiperidine	50.0	37.1	74.2	10.0-160	
n-Nitrosopyrrolidine	50.0	30.9	61.8	10.0-124	
Pentachlorobenzene	50.0	33.9	67.8	25.0-120	
Pentachloroethane	50.0	29.3	58.6	10.0-120	J
Pentachloronitrobenzene	50.0	58.9	118	34.0-132	
Phenacetin	50.0	53.2	106	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	37.1	74.2	13.0-160	J
2-Picoline	50.0	0.519	1.04	10.0-120	J J4
Pronamide	50.0	45.8	91.6	38.0-130	
Safrole	50.0	28.5	57.0	21.0-120	
Sulfotep	50.0	49.3	98.6	52.0-120	J
Thionazin	50.0	51.6	103	38.0-121	
o-Toluidine	50.0	19.7	39.4	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	31.4	62.8	11.0-135	
1,3,5-Trinitrobenzene	50.0	59.5	119	37.0-147	

L1731832-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1731832-02 05/10/24 02:01 • (MS) R4068266-1 05/10/24 02:23 • (MSD) R4068266-2 05/10/24 02:44

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	50.0	0.375	34.2	30.9	67.7	61.0	1	28.0-120			10.1	25
Acenaphthylene	50.0	U	37.0	32.0	74.0	64.0	1	31.0-121			14.5	25
Anthracene	50.0	U	39.5	35.6	79.0	71.2	1	36.0-120			10.4	23
Benzidine	100	U	21.6	34.8	21.6	34.8	1	10.0-120		J3	46.8	37
Benzo(a)anthracene	50.0	U	41.9	40.2	83.8	80.4	1	39.0-120			4.14	23
Benzo(b)fluoranthene	50.0	U	43.4	41.4	86.8	82.8	1	37.0-120			4.72	23
Benzo(k)fluoranthene	50.0	U	42.3	39.4	84.6	78.8	1	37.0-120			7.10	26
Benzo(g,h,i)perylene	50.0	U	38.0	35.4	76.0	70.8	1	37.0-123			7.08	25
Benzo(a)pyrene	50.0	U	38.7	37.0	77.4	74.0	1	37.0-120			4.49	24
Bis(2-chlorethoxy)methane	50.0	U	33.9	29.6	67.8	59.2	1	17.0-120			13.5	31
Bis(2-chloroethyl)ether	50.0	U	31.5	27.5	63.0	55.0	1	14.0-120			13.6	33
2,2-Oxybis(1-Chloropropane)	50.0	U	25.6	23.8	51.2	47.6	1	18.0-120			7.29	34
4-Bromophenyl-phenylether	50.0	U	39.6	33.9	79.2	67.8	1	37.0-120			15.5	24
2-Chloronaphthalene	50.0	U	33.9	29.7	67.8	59.4	1	29.0-120			13.2	28
4-Chlorophenyl-phenylether	50.0	U	38.7	33.9	77.4	67.8	1	36.0-120			13.2	23
Chrysene	50.0	U	41.2	38.0	82.4	76.0	1	38.0-120			8.08	23
Dibenz(a,h)anthracene	50.0	U	37.5	35.3	75.0	70.6	1	36.0-121			6.04	24
3,3-Dichlorobenzidine	100	U	78.0	75.7	78.0	75.7	1	10.0-134			2.99	30
2,4-Dinitrotoluene	50.0	U	37.8	33.3	75.6	66.6	1	39.0-125			12.7	25
2,6-Dinitrotoluene	50.0	U	36.6	33.5	73.2	67.0	1	36.0-120			8.84	27
Fluoranthene	50.0	U	39.7	37.8	79.4	75.6	1	41.0-121			4.90	22
Fluorene	50.0	0.225	37.0	32.3	73.5	64.2	1	37.0-120			13.6	24
Hexachlorobenzene	50.0	U	34.7	30.1	69.4	60.2	1	35.0-122			14.2	24
Hexachloro-1,3-butadiene	50.0	U	35.5	30.0	71.0	60.0	1	12.0-120			16.8	34
Hexachlorocyclopentadiene	50.0	U	17.1	14.4	34.2	28.8	1	10.0-120			17.1	33
Hexachloroethane	50.0	U	31.9	28.3	63.8	56.6	1	10.0-120			12.0	40
Indeno(1,2,3-cd)pyrene	50.0	U	37.9	36.3	75.8	72.6	1	38.0-125			4.31	24
Isophorone	50.0	U	39.3	34.0	78.6	68.0	1	21.0-120			14.5	27
Naphthalene	50.0	372	471	426	198	108	1	10.0-120	E V	E	10.0	31
Nitrobenzene	50.0	U	40.8	34.4	81.6	68.8	1	12.0-120			17.0	30
n-Nitrosodimethylamine	50.0	U	37.7	29.8	75.4	59.6	1	10.0-120			23.4	40
n-Nitrosodiphenylamine	50.0	U	37.2	33.1	74.4	66.2	1	37.0-120			11.7	24
n-Nitrosodi-n-propylamine	50.0	U	37.1	33.4	74.2	66.8	1	16.0-120			10.5	30
Phenanthrene	50.0	0.280	36.9	34.0	73.2	67.4	1	33.0-120			8.18	22
Benzylbutyl phthalate	50.0	U	44.1	40.7	88.2	81.4	1	34.0-126			8.02	24
Bis(2-Ethylhexyl)phthalate	50.0	U	39.0	37.8	78.0	75.6	1	33.0-126			3.13	25
Di-n-butyl phthalate	50.0	1.57	44.4	42.3	85.7	81.5	1	35.0-128			4.84	23
Diethyl phthalate	50.0	U	40.1	36.0	80.2	72.0	1	39.0-125			10.8	24
Dimethyl phthalate	50.0	U	37.7	34.0	75.4	68.0	1	37.0-120			10.3	24
Di-n-octyl phthalate	50.0	U	43.5	41.2	87.0	82.4	1	25.0-135			5.43	26

L1731832-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1731832-02 05/10/24 02:01 • (MS) R4068266-1 05/10/24 02:23 • (MSD) R4068266-2 05/10/24 02:44

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	50.0	U	46.7	43.7	93.4	87.4	1	39.0-120			6.64	22
1,2,4-Trichlorobenzene	50.0	U	35.8	31.4	71.6	62.8	1	15.0-120			13.1	31
Aniline	50.0	U	21.7	19.0	43.4	38.0	1	10.0-120			13.3	39
1,2-Diphenylhydrazine	50.0	U	44.4	34.5	88.8	69.0	1	28.0-129	N2	J3 N2	25.1	25
Benzyl alcohol	50.0	U	28.4	25.6	56.8	51.2	1	14.0-120			10.4	38
4-Chloroaniline	50.0	U	32.5	28.2	65.0	56.4	1	10.0-120			14.2	31
4-Chloro-3-methylphenol	50.0	U	37.2	32.3	74.4	64.6	1	26.0-120			14.1	27
2-Chlorophenol	50.0	U	23.4	20.9	46.8	41.8	1	18.0-120			11.3	34
Dibenzofuran	50.0	U	35.9	31.8	71.8	63.6	1	32.0-120			12.1	26
2,4-Dichlorophenol	50.0	U	38.2	31.7	76.4	63.4	1	19.0-120			18.6	27
2,4-Dimethylphenol	50.0	3.83	37.1	31.7	66.5	55.7	1	15.0-120			15.7	28
4,6-Dinitro-2-methylphenol	50.0	U	40.3	34.8	80.6	69.6	1	10.0-144			14.6	39
2,4-Dinitrophenol	50.0	U	32.2	31.8	64.4	63.6	1	10.0-120			1.25	40
2-Methylnaphthalene	50.0	2.36	36.6	31.0	68.5	57.3	1	17.0-120			16.6	28
2-Methylphenol	50.0	U	22.6	19.8	45.2	39.6	1	10.0-120			13.2	30
3&4-Methyl Phenol	50.0	U	25.1	21.1	50.2	42.2	1	10.0-120			17.3	36
2-Nitroaniline	50.0	U	32.9	30.3	65.8	60.6	1	33.0-120			8.23	27
3-Nitroaniline	50.0	U	28.6	28.1	57.2	56.2	1	20.0-120			1.76	27
4-Nitroaniline	50.0	U	30.4	30.1	60.8	60.2	1	10.0-160			0.992	26
2-Nitrophenol	50.0	U	33.5	28.5	67.0	57.0	1	20.0-120			16.1	30
4-Nitrophenol	50.0	U	12.5	12.1	25.0	24.2	1	10.0-120			3.25	40
Pentachlorophenol	50.0	U	29.8	26.5	59.6	53.0	1	10.0-128			11.7	37
Phenol	50.0	U	13.5	11.5	27.0	23.0	1	10.0-120			16.0	40
Pyridine	50.0	U	13.1	15.5	26.2	31.0	1	10.0-120			16.8	37
2,4,6-Trichlorophenol	50.0	U	38.6	33.6	77.2	67.2	1	26.0-120			13.9	31
Acetophenone	50.0	0.346	28.6	25.7	56.5	50.7	1	20.0-120			10.7	35
Diphenylamine	50.0	U	37.2	33.1	74.4	66.2	1	35.0-120			11.7	30
1,2,4,5-Tetrachlorobenzene	50.0	U	45.3	39.4	90.6	78.8	1	19.0-122			13.9	32
2,3,4,6-Tetrachlorophenol	50.0	U	41.9	37.5	83.8	75.0	1	17.0-142			11.1	34
2,4,5-Trichlorophenol	50.0	U	42.5	37.3	85.0	74.6	1	33.0-120			13.0	31
(S) 2-Fluorophenol					*36.9*	*30.1*		*10.0-120*				
(S) Phenol-d5					*26.1*	*20.9*		*10.0-120*				
(S) Nitrobenzene-d5					*77.2*	*68.0*		*10.0-127*				
(S) 2-Fluorobiphenyl					*69.1*	*59.3*		*10.0-130*				
(S) 2,4,6-Tribromophenol					*69.0*	*64.5*		*10.0-155*				
(S) p-Terphenyl-d14					*79.3*	*75.9*		*10.0-128*				

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

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.
C6	The initial calibration verification standard (SSCV) associated with this data responded low.
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL).
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.
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.
U	Below Detectable Limits: Indicates that the analyte was not detected.
V	The sample concentration is too high to evaluate accurate spike recoveries.

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	LAO000356
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.

Company Name/Address:
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:

Please Circle: PT MT CT ET

Phone: 303-382-5474

Client Project #

Lab Project # ENVIRONCO-CALU MONTH

Collected by (print): Kyle A. Groves

Site/Facility ID # GREAT FALLS, MT

P.O. #

Collected by (signature): Kyle A. [illegible]

Immediately Packed on Ice N ___ Y X

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

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/hubfs/pas-standard-terms.pdf

SDG # T731636

H038

Acctnum: ENVIRONCO
Template: T245953
Prelogin: P1065773
PM: 841 - Kelly Mercer
PB: NG 4/17/24
Shipped Via: FedEX Ground

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	8270AP9 100ml Amb NoPres	SVEPHMT 1L-Amb-Add HCl	V8260LL 40mlAmb-HCl	V8260LL 40mlAmb-HCl-Blk	VPHMT 40mlAmb HCl	VPHMT 40mlAmb-HCl-Blk	Remarks	Sample # (lab only)
CMR-SP200-240430	grab	GW	–	04 30 24	1330	9	X	X	X	X	X	X		-01
TRIP BLANK		GW												-02

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

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: __ UPS __ FedEx __ Courier _____

Tracking # 6727 1916 9064

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

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCl / MeoH TBR
[illegible]	04 30 24	1530		2
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 0.1-6°C Bottles Received:
				5.1+0.1=5.2 9
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: Time:
			[illegible] (14)	5/1/24 900

If preservation required by Login: Date/Time

Hold:

Condition: NCF / OK

05/01-NCF-L1731636-ENVIRONCO PM

R5

Time estimate: oh **Time spent:** oh

Members

Paul Minnich (responsible) KM Kelly Mercer

Due on *4 May 2024 5:00 PM* for target *Done*

- [ ] Login Clarification needed
- [x] Chain of custody is incomplete
- [ ] Please specify Metals requested
- [ ] Please specify TCLP requested
- [ ] Received additional samples not listed on COC
- [ ] Sample IDs on containers do not match IDs on COC
- [x] Client did not "X" analysis
- [ ] Chain of Custody is missing
- [ ] If no COC: Received by:_____
- [ ] If no COC: Date/Time:_____
- [ ] If no COC: Temp./Cont.Rec./pH:_____
- [ ] If no COC: Carrier:_____
- [ ] If no COC: Tracking #:_____
- [ ] Client informed by call
- [ ] Client informed by Email
- [ ] Client informed by Voicemail
- [ ] Date/Time:_____
- [ ] PM initials:_____
- [ ] Client Contact:_____

Comments

Paul Minnich *2 May 2024 3:07 AM*

Trip blanks not marked for tests. Logged per P#

Kelly Mercer *2 May 2024 10:33 AM*

PLease analyze for V8260LL

Troy Dunlap *2 May 2024 10:45 AM*

Done.

ANALYTICAL REPORT

June 04, 2024

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

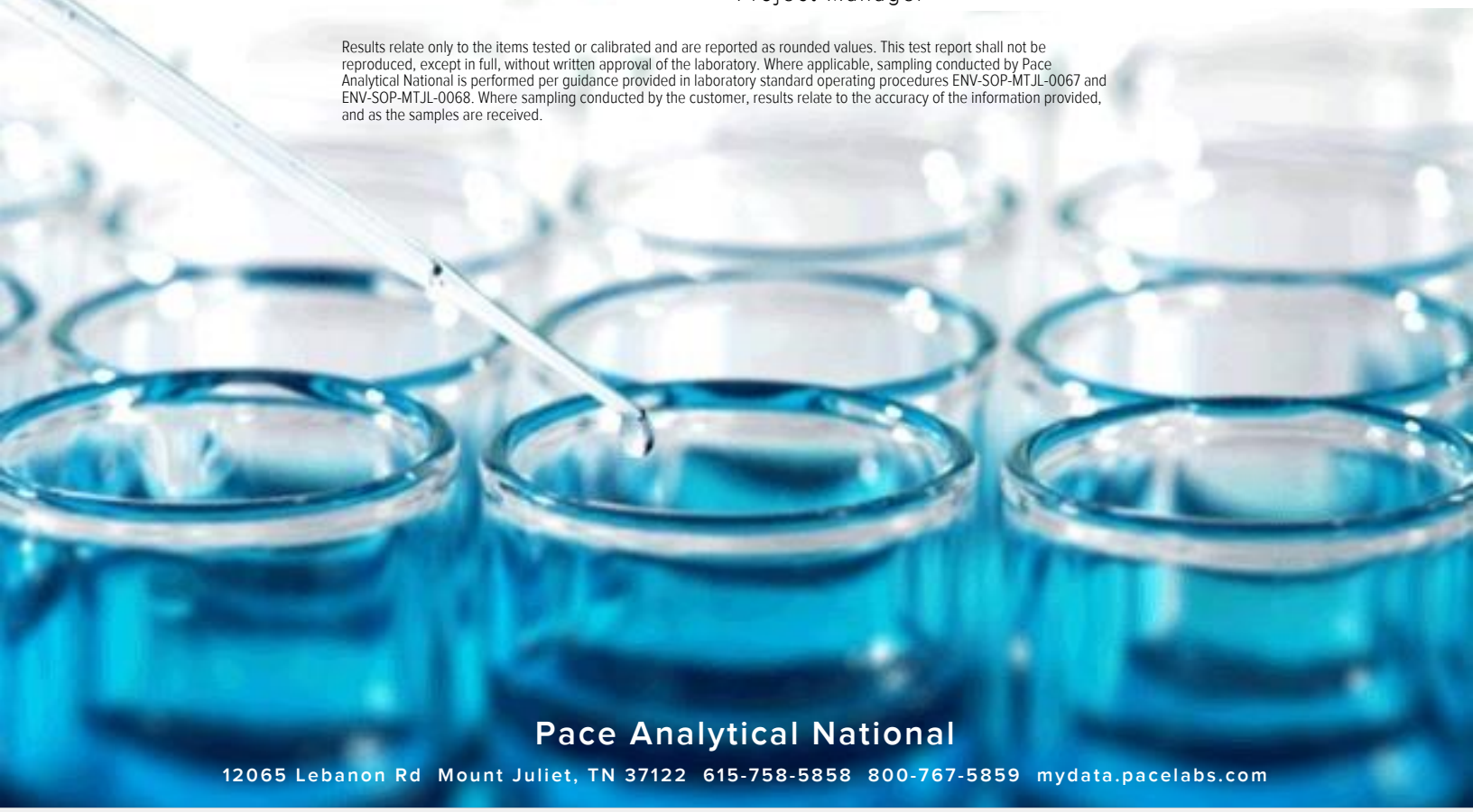
Ramboll US Consulting, Inc. - Denver

Sample Delivery Group:	L1739782
Samples Received:	05/23/2024
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 National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 mydata.pacelabs.com

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CMR-SP200-240522 L1739782-01 GW

Collected by: Kyle A. Groves
Collected date/time: 05/22/24 15:00
Received date/time: 05/23/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2295667	50	05/30/24 17:11	05/30/24 17:11	JHH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2296427	50	05/31/24 23:16	05/31/24 23:16	KSD	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2294683	30	05/28/24 06:04	05/31/24 07:29	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2294683	60	05/28/24 06:04	05/31/24 07:06	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2294514	20	05/29/24 06:42	05/31/24 00:26	AGW	Mt. Juliet, TN

TRIP BLANK L1739782-02 GW

Collected by: Kyle A. Groves
Collected date/time: 05/22/24 00:00
Received date/time: 05/23/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2293772	1	05/28/24 04:28	05/28/24 04:28	ADM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2296427	1	05/31/24 17:53	05/31/24 17:53	KSD	Mt. Juliet, TN

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

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

pH outside of method requirement.

Lab Sample ID	Project Sample ID	Method
L1739782-01	CMR-SP200-240522	8260B

Analyzed from headspace vial.

Lab Sample ID	Project Sample ID	Method
L1739782-02	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	1820	J	1670	5000	50	05/30/2024 17:11	WG2295667
Unadjusted C9-C12 Aliphatics	21000		1670	5000	50	05/30/2024 17:11	WG2295667
Unadjusted C9-C10 Aromatics	7670		1670	5000	50	05/30/2024 17:11	WG2295667
Adjusted C5-C8 Aliphatics	1750	J	1670	5000	50	05/30/2024 17:11	WG2295667
Adjusted C9-C12 Aliphatics	20600		1670	5000	50	05/30/2024 17:11	WG2295667
Total VPH	30500		3340	10000	50	05/30/2024 17:11	WG2295667
(S) 2,5-Dibromotoluene(FID)	*79.8*			*70.0-130*		*05/30/2024 17:11*	WG2295667
(S) 2,5-Dibromotoluene(PID)	*89.2*			*70.0-130*		*05/30/2024 17:11*	WG2295667

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	J4	565	1250	50	05/31/2024 23:16	WG2296427
Acrylonitrile	U	J4	33.6	250	50	05/31/2024 23:16	WG2296427
Benzene	68.5		4.71	25.0	50	05/31/2024 23:16	WG2296427
Bromobenzene	U		5.90	25.0	50	05/31/2024 23:16	WG2296427
Bromodichloromethane	U		6.80	25.0	50	05/31/2024 23:16	WG2296427
Bromochloromethane	U		6.40	25.0	50	05/31/2024 23:16	WG2296427
Bromoform	U		6.45	25.0	50	05/31/2024 23:16	WG2296427
Bromomethane	U		30.3	125	50	05/31/2024 23:16	WG2296427
n-Butylbenzene	U		7.85	25.0	50	05/31/2024 23:16	WG2296427
sec-Butylbenzene	11.9	J	6.25	25.0	50	05/31/2024 23:16	WG2296427
tert-Butylbenzene	U		6.35	25.0	50	05/31/2024 23:16	WG2296427
Carbon disulfide	U		4.81	25.0	50	05/31/2024 23:16	WG2296427
Carbon tetrachloride	U		6.40	25.0	50	05/31/2024 23:16	WG2296427
Chlorobenzene	U		5.85	25.0	50	05/31/2024 23:16	WG2296427
Chlorodibromomethane	U		7.00	25.0	50	05/31/2024 23:16	WG2296427
Chloroethane	U		9.60	125	50	05/31/2024 23:16	WG2296427
2-Chloroethyl vinyl ether	U		28.8	2500	50	05/31/2024 23:16	WG2296427
Chloroform	U		5.55	25.0	50	05/31/2024 23:16	WG2296427
Chloromethane	U		48.0	62.5	50	05/31/2024 23:16	WG2296427
2-Chlorotoluene	U		5.30	25.0	50	05/31/2024 23:16	WG2296427
4-Chlorotoluene	U		5.70	25.0	50	05/31/2024 23:16	WG2296427
1,2-Dibromo-3-Chloropropane	U		13.8	125	50	05/31/2024 23:16	WG2296427
1,2-Dibromoethane	U		6.30	25.0	50	05/31/2024 23:16	WG2296427
Dibromomethane	U		6.10	25.0	50	05/31/2024 23:16	WG2296427
1,2-Dichlorobenzene	U		5.35	25.0	50	05/31/2024 23:16	WG2296427
1,3-Dichlorobenzene	U		14.9	25.0	50	05/31/2024 23:16	WG2296427
1,4-Dichlorobenzene	U		6.00	25.0	50	05/31/2024 23:16	WG2296427
Dichlorodifluoromethane	U		18.7	125	50	05/31/2024 23:16	WG2296427
1,1-Dichloroethane	U		5.00	25.0	50	05/31/2024 23:16	WG2296427
1,2-Dichloroethane	U		4.09	25.0	50	05/31/2024 23:16	WG2296427
1,1-Dichloroethene	U		9.40	25.0	50	05/31/2024 23:16	WG2296427
cis-1,2-Dichloroethene	U		6.30	25.0	50	05/31/2024 23:16	WG2296427
trans-1,2-Dichloroethene	U		7.45	25.0	50	05/31/2024 23:16	WG2296427
1,2-Dichloropropane	U		7.45	25.0	50	05/31/2024 23:16	WG2296427
1,1-Dichloropropene	U		7.10	25.0	50	05/31/2024 23:16	WG2296427
1,3-Dichloropropane	U		5.45	50.0	50	05/31/2024 23:16	WG2296427
cis-1,3-Dichloropropene	U		5.55	25.0	50	05/31/2024 23:16	WG2296427
trans-1,3-Dichloropropene	U		5.90	25.0	50	05/31/2024 23:16	WG2296427
trans-1,4-Dichloro-2-butene	U		23.4	250	50	05/31/2024 23:16	WG2296427
2,2-Dichloropropane	U		8.05	25.0	50	05/31/2024 23:16	WG2296427
Di-isopropyl ether	U		5.25	25.0	50	05/31/2024 23:16	WG2296427
Ethylbenzene	16.8	J	6.85	25.0	50	05/31/2024 23:16	WG2296427
Hexachloro-1,3-butadiene	U		16.9	50.0	50	05/31/2024 23:16	WG2296427

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		39.4	250	50	05/31/2024 23:16	WG2296427
n-Hexane	U		37.4	250	50	05/31/2024 23:16	WG2296427
Iodomethane	U		27.7	250	50	05/31/2024 23:16	WG2296427
Isopropylbenzene	U		5.25	25.0	50	05/31/2024 23:16	WG2296427
p-Isopropyltoluene	63.1		6.00	25.0	50	05/31/2024 23:16	WG2296427
2-Butanone (MEK)	U	J4	59.5	250	50	05/31/2024 23:16	WG2296427
Methylene Chloride	U		21.5	125	50	05/31/2024 23:16	WG2296427
4-Methyl-2-pentanone (MIBK)	U		23.9	250	50	05/31/2024 23:16	WG2296427
Methyl tert-butyl ether	U		5.05	25.0	50	05/31/2024 23:16	WG2296427
Naphthalene	33.9	J J3	8.70	125	50	05/31/2024 23:16	WG2296427
n-Propylbenzene	U		4.97	25.0	50	05/31/2024 23:16	WG2296427
Styrene	U		5.90	25.0	50	05/31/2024 23:16	WG2296427
1,1,1,2-Tetrachloroethane	U		7.35	25.0	50	05/31/2024 23:16	WG2296427
1,1,2,2-Tetrachloroethane	U		6.65	25.0	50	05/31/2024 23:16	WG2296427
1,1,2-Trichlorotrifluoroethane	U		9.00	25.0	50	05/31/2024 23:16	WG2296427
Tetrachloroethene	U		15.0	25.0	50	05/31/2024 23:16	WG2296427
Toluene	U		13.9	25.0	50	05/31/2024 23:16	WG2296427
1,2,3-Trichlorobenzene	U	J3	8.20	25.0	50	05/31/2024 23:16	WG2296427
1,2,4-Trichlorobenzene	U		24.1	50.0	50	05/31/2024 23:16	WG2296427
1,1,1-Trichloroethane	U		7.45	25.0	50	05/31/2024 23:16	WG2296427
1,1,2-Trichloroethane	U		7.90	25.0	50	05/31/2024 23:16	WG2296427
Trichloroethene	U		9.50	25.0	50	05/31/2024 23:16	WG2296427
Trichlorofluoromethane	U	J4	8.00	125	50	05/31/2024 23:16	WG2296427
1,2,3-Trichloropropane	U		11.9	125	50	05/31/2024 23:16	WG2296427
1,2,4-Trimethylbenzene	250		16.1	25.0	50	05/31/2024 23:16	WG2296427
1,2,3-Trimethylbenzene	353		5.20	25.0	50	05/31/2024 23:16	WG2296427
1,3,5-Trimethylbenzene	273		5.20	25.0	50	05/31/2024 23:16	WG2296427
Vinyl acetate	U		34.6	250	50	05/31/2024 23:16	WG2296427
Vinyl chloride	U		11.7	25.0	50	05/31/2024 23:16	WG2296427
Xylenes, Total	369		8.70	75.0	50	05/31/2024 23:16	WG2296427
(S) Toluene-d8	*95.4*			*80.0-120*		*05/31/2024 23:16*	WG2296427
(S) 4-Bromofluorobenzene	*106*			*77.0-126*		*05/31/2024 23:16*	WG2296427
(S) 1,2-Dichloroethane-d4	*108*			*70.0-130*		*05/31/2024 23:16*	WG2296427

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	224000		12000	36000	60	05/31/2024 07:06	WG2294683
Unadjusted C19-C36 Aliphatics	44800		12000	36000	60	05/31/2024 07:06	WG2294683
Unadjusted C11-C22 Aromatics	79600		6000	18000	30	05/31/2024 07:29	WG2294683
Unadjusted Total Petroleum Hydrocarbons	348000		6000	18000	30	05/31/2024 07:29	WG2294683
Adjusted C11-C22 Aromatics	79600		6000	18000	30	05/31/2024 07:29	WG2294683
Adjusted Total Petroleum Hydrocarbons	348000		6000	18000	30	05/31/2024 07:29	WG2294683
(S) o-Terphenyl	*0.000*	J7		*40.0-140*		*05/31/2024 07:29*	WG2294683
(S) 1-Chloro-octadecane	*0.000*	J7		*40.0-140*		*05/31/2024 07:06*	WG2294683
(S) 2-Fluorobiphenyl	*0.000*	J7		*40.0-140*		*05/31/2024 07:29*	WG2294683
(S) 2-Bromonaphthalene	*0.000*	J7		*40.0-140*		*05/31/2024 07:29*	WG2294683

Sample Narrative:

L1739782-01 WG2294683: Dilution due to matrix impact during extraction procedure. Surrogate failure due to matrix.

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	17.1	J	1.77	20.0	20	05/31/2024 00:26	WG2294514
Acenaphthylene	U		1.84	20.0	20	05/31/2024 00:26	WG2294514
Anthracene	U		1.61	20.0	20	05/31/2024 00:26	WG2294514
Benzidine	U	J4	74.8	200	20	05/31/2024 00:26	WG2294514
Benzo(a)anthracene	U		3.98	20.0	20	05/31/2024 00:26	WG2294514
Benzo(b)fluoranthene	U		2.60	20.0	20	05/31/2024 00:26	WG2294514
Benzo(k)fluoranthene	U		2.40	20.0	20	05/31/2024 00:26	WG2294514
Benzo(g,h,i)perylene	U		2.42	20.0	20	05/31/2024 00:26	WG2294514
Benzo(a)pyrene	U		0.762	20.0	20	05/31/2024 00:26	WG2294514
Bis(2-chlorethoxy)methane	U		2.32	200	20	05/31/2024 00:26	WG2294514
Bis(2-chloroethyl)ether	U		2.74	200	20	05/31/2024 00:26	WG2294514
2,2-Oxybis(1-Chloropropane)	U		4.20	200	20	05/31/2024 00:26	WG2294514
4-Bromophenyl-phenylether	U		1.75	200	20	05/31/2024 00:26	WG2294514
2-Chloronaphthalene	U		1.30	20.0	20	05/31/2024 00:26	WG2294514
4-Chlorophenyl-phenylether	U		1.85	200	20	05/31/2024 00:26	WG2294514
Chrysene	U		2.60	20.0	20	05/31/2024 00:26	WG2294514
Dibenz(a,h)anthracene	U		1.29	20.0	20	05/31/2024 00:26	WG2294514
3,3-Dichlorobenzidine	U		4.24	200	20	05/31/2024 00:26	WG2294514
2,4-Dinitrotoluene	U		1.97	200	20	05/31/2024 00:26	WG2294514
2,6-Dinitrotoluene	U		5.00	200	20	05/31/2024 00:26	WG2294514
Fluoranthene	U		2.04	20.0	20	05/31/2024 00:26	WG2294514
Fluorene	U		1.69	20.0	20	05/31/2024 00:26	WG2294514
Hexachlorobenzene	U		1.51	20.0	20	05/31/2024 00:26	WG2294514
Hexachloro-1,3-butadiene	U		1.94	200	20	05/31/2024 00:26	WG2294514
Hexachlorocyclopentadiene	U		1.20	200	20	05/31/2024 00:26	WG2294514
Hexachloroethane	U		2.54	200	20	05/31/2024 00:26	WG2294514
Indeno(1,2,3-cd)pyrene	U		5.58	20.0	20	05/31/2024 00:26	WG2294514
Isophorone	U		2.86	200	20	05/31/2024 00:26	WG2294514
Naphthalene	119		3.18	20.0	20	05/31/2024 00:26	WG2294514
Nitrobenzene	U		5.94	200	20	05/31/2024 00:26	WG2294514
n-Nitrosodimethylamine	U		20.0	200	20	05/31/2024 00:26	WG2294514
n-Nitrosodiphenylamine	U	J4	47.4	200	20	05/31/2024 00:26	WG2294514
n-Nitrosodi-n-propylamine	U		5.22	200	20	05/31/2024 00:26	WG2294514
Phenanthrene	21.2		2.24	20.0	20	05/31/2024 00:26	WG2294514
Benzylbutyl phthalate	U		15.3	60.0	20	05/31/2024 00:26	WG2294514
Bis(2-Ethylhexyl)phthalate	U		17.9	60.0	20	05/31/2024 00:26	WG2294514
Di-n-butyl phthalate	U		9.06	60.0	20	05/31/2024 00:26	WG2294514
Diethyl phthalate	U		5.74	60.0	20	05/31/2024 00:26	WG2294514
Dimethyl phthalate	U		5.20	60.0	20	05/31/2024 00:26	WG2294514
Di-n-octyl phthalate	U		18.6	60.0	20	05/31/2024 00:26	WG2294514
Pyrene	5.11	J	2.14	20.0	20	05/31/2024 00:26	WG2294514
1,2,4-Trichlorobenzene	U		1.40	200	20	05/31/2024 00:26	WG2294514
Aniline	U		33.0	200	20	05/31/2024 00:26	WG2294514
1,2-Diphenylhydrazine	U	N2	2.10	200	20	05/31/2024 00:26	WG2294514
Benzyl alcohol	U		11.3	200	20	05/31/2024 00:26	WG2294514
4-Chloroaniline	U		4.68	200	20	05/31/2024 00:26	WG2294514
4-Chloro-3-methylphenol	U		2.62	200	20	05/31/2024 00:26	WG2294514
2-Chlorophenol	U		2.66	200	20	05/31/2024 00:26	WG2294514
Dibenzofuran	U	J4	1.94	200	20	05/31/2024 00:26	WG2294514
2,4-Dichlorophenol	U		2.04	200	20	05/31/2024 00:26	WG2294514
2,4-Dimethylphenol	U		1.27	200	20	05/31/2024 00:26	WG2294514
4,6-Dinitro-2-methylphenol	U		22.4	200	20	05/31/2024 00:26	WG2294514
2,4-Dinitrophenol	U		119	200	20	05/31/2024 00:26	WG2294514
2-Methylnaphthalene	280		2.34	20.0	20	05/31/2024 00:26	WG2294514
2-Methylphenol	U		1.86	200	20	05/31/2024 00:26	WG2294514
3&4-Methyl Phenol	U		3.36	200	20	05/31/2024 00:26	WG2294514

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		2.04	200	20	05/31/2024 00:26	WG2294514
3-Nitroaniline	U		1.74	200	20	05/31/2024 00:26	WG2294514
4-Nitroaniline	U		1.82	200	20	05/31/2024 00:26	WG2294514
2-Nitrophenol	U		2.34	200	20	05/31/2024 00:26	WG2294514
4-Nitrophenol	U		2.86	200	20	05/31/2024 00:26	WG2294514
Pentachlorophenol	U		6.26	200	20	05/31/2024 00:26	WG2294514
Phenol	U		86.6	200	20	05/31/2024 00:26	WG2294514
Pyridine	U	J4	12.5	200	20	05/31/2024 00:26	WG2294514
2,4,6-Trichlorophenol	U		2.00	200	20	05/31/2024 00:26	WG2294514
Acetophenone	U		4.16	200	20	05/31/2024 00:26	WG2294514
2-Acetylaminofluorene	U		5.06	200	20	05/31/2024 00:26	WG2294514
4-Aminobiphenyl	U		9.22	200	20	05/31/2024 00:26	WG2294514
Chlorobenzilate	U		76.8	1000	20	05/31/2024 00:26	WG2294514
Diallate	U		10.5	200	20	05/31/2024 00:26	WG2294514
2,6-Dichlorophenol	U		2.04	200	20	05/31/2024 00:26	WG2294514
Dimethoate	U		101	1000	20	05/31/2024 00:26	WG2294514
P-(Dimethylamino) Azobenzene	U		73.8	200	20	05/31/2024 00:26	WG2294514
Dimethylbenz (A) Anthracene	U		34.2	200	20	05/31/2024 00:26	WG2294514
3,3-Dimethylbenzidine	U	J4	67.8	200	20	05/31/2024 00:26	WG2294514
a,a-Dimethylphenethylamine	U	J4	62.6	1000	20	05/31/2024 00:26	WG2294514
1,3-Dinitrobenzene	U		7.18	200	20	05/31/2024 00:26	WG2294514
Diphenylamine	U		47.4	200	20	05/31/2024 00:26	WG2294514
Dinoseb	U		160	1000	20	05/31/2024 00:26	WG2294514
Disulfoton	U		5.34	200	20	05/31/2024 00:26	WG2294514
Ethyl methanesulfonate	U		6.52	200	20	05/31/2024 00:26	WG2294514
Ethyl Parathion	U		7.58	200	20	05/31/2024 00:26	WG2294514
Famphur	U	C6	78.4	400	20	05/31/2024 00:26	WG2294514
Hexachloropropene	U		2.98	1000	20	05/31/2024 00:26	WG2294514
Hexachlorophene	U		28.8	1000	20	05/31/2024 00:26	WG2294514
Isodrin	U		82.2	200	20	05/31/2024 00:26	WG2294514
Isosafrole	U		77.6	200	20	05/31/2024 00:26	WG2294514
Kepone	U	C6	53.2	400	20	05/31/2024 00:26	WG2294514
Methapyrilene	U	J4	200	1000	20	05/31/2024 00:26	WG2294514
3-Methylcholanthrene	U		3.28	200	20	05/31/2024 00:26	WG2294514
Methyl methanesulfonate	U		68.0	1000	20	05/31/2024 00:26	WG2294514
Methyl parathion	U		4.26	200	20	05/31/2024 00:26	WG2294514
1,4-Naphthoquinone	U	J4	111	1000	20	05/31/2024 00:26	WG2294514
1-Naphthylamine	U		5.78	200	20	05/31/2024 00:26	WG2294514
2-Naphthylamine	U		89.6	200	20	05/31/2024 00:26	WG2294514
5-Nitro-o-toluidine	U		39.8	200	20	05/31/2024 00:26	WG2294514
4-Nitroquinoline 1-oxide	U		40.6	200	20	05/31/2024 00:26	WG2294514
n-Nitrosodiethylamine	U		71.4	200	20	05/31/2024 00:26	WG2294514
n-Nitrosodi-n-butylamine	U		78.2	200	20	05/31/2024 00:26	WG2294514
n-Nitrosomethylethylamine	U		65.0	200	20	05/31/2024 00:26	WG2294514
n-Nitrosomorpholine	U		65.0	200	20	05/31/2024 00:26	WG2294514
n-Nitrosopiperidine	U		74.4	200	20	05/31/2024 00:26	WG2294514
n-Nitrosopyrrolidine	U		67.8	200	20	05/31/2024 00:26	WG2294514
Pentachlorobenzene	U		83.0	200	20	05/31/2024 00:26	WG2294514
Pentachloroethane	U		56.6	1000	20	05/31/2024 00:26	WG2294514
Pentachloronitrobenzene	U		83.0	200	20	05/31/2024 00:26	WG2294514
Phenacetin	U		93.2	200	20	05/31/2024 00:26	WG2294514
p-Phenylenediamine	U	J4	7740	138000	20	05/31/2024 00:26	WG2294514
Phorate	U		97.2	1000	20	05/31/2024 00:26	WG2294514
2-Picoline	U	J4	137	1000	20	05/31/2024 00:26	WG2294514
Pronamide	U		84.2	200	20	05/31/2024 00:26	WG2294514
Safrole	U		73.6	200	20	05/31/2024 00:26	WG2294514

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		79.8	1000	20	05/31/2024 00:26	WG2294514
1,2,4,5-Tetrachlorobenzene	U		1.29	200	20	05/31/2024 00:26	WG2294514
2,3,4,6-Tetrachlorophenol	U		4.62	200	20	05/31/2024 00:26	WG2294514
Thionazin	U		81.4	200	20	05/31/2024 00:26	WG2294514
o-Toluidine	U		70.6	200	20	05/31/2024 00:26	WG2294514
2,4,5-Trichlorophenol	U		2.18	200	20	05/31/2024 00:26	WG2294514
O,O,O-Triethyl Phosphorothioate	U		58.6	200	20	05/31/2024 00:26	WG2294514
1,3,5-Trinitrobenzene	U		26.4	200	20	05/31/2024 00:26	WG2294514
(S) 2-Fluorophenol	*0.000*	J7		*10.0-120*		*05/31/2024 00:26*	WG2294514
(S) Phenol-d5	*0.000*	J7		*10.0-120*		*05/31/2024 00:26*	WG2294514
(S) Nitrobenzene-d5	*0.000*	J7		*10.0-127*		*05/31/2024 00:26*	WG2294514
(S) 2-Fluorobiphenyl	*49.9*	J7		*10.0-130*		*05/31/2024 00:26*	WG2294514
(S) 2,4,6-Tribromophenol	*64.3*	J7		*10.0-155*		*05/31/2024 00:26*	WG2294514
(S) p-Terphenyl-d14	*65.3*	J7		*10.0-128*		*05/31/2024 00:26*	WG2294514

Sample Narrative:

L1739782-01 WG2294514: Dilution and surrogate failure due to matrix interference.

L1739782-01 WG2294514: Dilution due to matrix.

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	05/28/2024 04:28	WG2293772
Unadjusted C9-C12 Aliphatics	U		33.3	100	1	05/28/2024 04:28	WG2293772
Unadjusted C9-C10 Aromatics	U		33.3	100	1	05/28/2024 04:28	WG2293772
Adjusted C5-C8 Aliphatics	U		33.3	100	1	05/28/2024 04:28	WG2293772
Adjusted C9-C12 Aliphatics	U		33.3	100	1	05/28/2024 04:28	WG2293772
Total VPH	U		66.7	200	1	05/28/2024 04:28	WG2293772
(S) 2,5-Dibromotoluene(FID)	*96.7*			*70.0-130*		*05/28/2024 04:28*	WG2293772
(S) 2,5-Dibromotoluene(PID)	*86.6*			*70.0-130*		*05/28/2024 04:28*	WG2293772

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	J4	11.3	25.0	1	05/31/2024 17:53	WG2296427
Acrylonitrile	U	J4	0.671	5.00	1	05/31/2024 17:53	WG2296427
Benzene	U		0.0941	0.500	1	05/31/2024 17:53	WG2296427
Bromobenzene	U		0.118	0.500	1	05/31/2024 17:53	WG2296427
Bromodichloromethane	U		0.136	0.500	1	05/31/2024 17:53	WG2296427
Bromochloromethane	U		0.128	0.500	1	05/31/2024 17:53	WG2296427
Bromoform	U		0.129	0.500	1	05/31/2024 17:53	WG2296427
Bromomethane	U		0.605	2.50	1	05/31/2024 17:53	WG2296427
n-Butylbenzene	U		0.157	0.500	1	05/31/2024 17:53	WG2296427
sec-Butylbenzene	U		0.125	0.500	1	05/31/2024 17:53	WG2296427
tert-Butylbenzene	U		0.127	0.500	1	05/31/2024 17:53	WG2296427
Carbon disulfide	U		0.0962	0.500	1	05/31/2024 17:53	WG2296427
Carbon tetrachloride	U		0.128	0.500	1	05/31/2024 17:53	WG2296427
Chlorobenzene	U		0.117	0.500	1	05/31/2024 17:53	WG2296427
Chlorodibromomethane	U		0.140	0.500	1	05/31/2024 17:53	WG2296427
Chloroethane	U		0.192	2.50	1	05/31/2024 17:53	WG2296427
2-Chloroethyl vinyl ether	U		0.575	50.0	1	05/31/2024 17:53	WG2296427
Chloroform	U		0.111	0.500	1	05/31/2024 17:53	WG2296427
Chloromethane	U		0.960	1.25	1	05/31/2024 17:53	WG2296427
2-Chlorotoluene	U		0.106	0.500	1	05/31/2024 17:53	WG2296427
4-Chlorotoluene	U		0.114	0.500	1	05/31/2024 17:53	WG2296427
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	05/31/2024 17:53	WG2296427
1,2-Dibromoethane	U		0.126	0.500	1	05/31/2024 17:53	WG2296427
Dibromomethane	U		0.122	0.500	1	05/31/2024 17:53	WG2296427
1,2-Dichlorobenzene	U		0.107	0.500	1	05/31/2024 17:53	WG2296427
1,3-Dichlorobenzene	U		0.299	0.500	1	05/31/2024 17:53	WG2296427
1,4-Dichlorobenzene	U		0.120	0.500	1	05/31/2024 17:53	WG2296427
Dichlorodifluoromethane	U		0.374	2.50	1	05/31/2024 17:53	WG2296427
1,1-Dichloroethane	U		0.100	0.500	1	05/31/2024 17:53	WG2296427
1,2-Dichloroethane	U		0.0819	0.500	1	05/31/2024 17:53	WG2296427
1,1-Dichloroethene	U		0.188	0.500	1	05/31/2024 17:53	WG2296427
cis-1,2-Dichloroethene	U		0.126	0.500	1	05/31/2024 17:53	WG2296427
trans-1,2-Dichloroethene	U		0.149	0.500	1	05/31/2024 17:53	WG2296427
1,2-Dichloropropane	U		0.149	0.500	1	05/31/2024 17:53	WG2296427
1,1-Dichloropropene	U		0.142	0.500	1	05/31/2024 17:53	WG2296427
1,3-Dichloropropane	U		0.109	1.00	1	05/31/2024 17:53	WG2296427
cis-1,3-Dichloropropene	U		0.111	0.500	1	05/31/2024 17:53	WG2296427
trans-1,3-Dichloropropene	U		0.118	0.500	1	05/31/2024 17:53	WG2296427
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	05/31/2024 17:53	WG2296427
2,2-Dichloropropane	U		0.161	0.500	1	05/31/2024 17:53	WG2296427
Di-isopropyl ether	U		0.105	0.500	1	05/31/2024 17:53	WG2296427
Ethylbenzene	U		0.137	0.500	1	05/31/2024 17:53	WG2296427
Hexachloro-1,3-butadiene	U		0.337	1.00	1	05/31/2024 17:53	WG2296427

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	05/31/2024 17:53	WG2296427
n-Hexane	U		0.749	5.00	1	05/31/2024 17:53	WG2296427
Iodomethane	U		0.554	5.00	1	05/31/2024 17:53	WG2296427
Isopropylbenzene	U		0.105	0.500	1	05/31/2024 17:53	WG2296427
p-Isopropyltoluene	U		0.120	0.500	1	05/31/2024 17:53	WG2296427
2-Butanone (MEK)	U	J4	1.19	5.00	1	05/31/2024 17:53	WG2296427
Methylene Chloride	U		0.430	2.50	1	05/31/2024 17:53	WG2296427
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	05/31/2024 17:53	WG2296427
Methyl tert-butyl ether	U		0.101	0.500	1	05/31/2024 17:53	WG2296427
Naphthalene	U	J3	0.174	2.50	1	05/31/2024 17:53	WG2296427
n-Propylbenzene	U		0.0993	0.500	1	05/31/2024 17:53	WG2296427
Styrene	U		0.118	0.500	1	05/31/2024 17:53	WG2296427
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	05/31/2024 17:53	WG2296427
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	05/31/2024 17:53	WG2296427
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	05/31/2024 17:53	WG2296427
Tetrachloroethene	U		0.300	0.500	1	05/31/2024 17:53	WG2296427
Toluene	U		0.278	0.500	1	05/31/2024 17:53	WG2296427
1,2,3-Trichlorobenzene	U	J3	0.164	0.500	1	05/31/2024 17:53	WG2296427
1,2,4-Trichlorobenzene	U		0.481	1.00	1	05/31/2024 17:53	WG2296427
1,1,1-Trichloroethane	U		0.149	0.500	1	05/31/2024 17:53	WG2296427
1,1,2-Trichloroethane	U		0.158	0.500	1	05/31/2024 17:53	WG2296427
Trichloroethene	U		0.190	0.500	1	05/31/2024 17:53	WG2296427
Trichlorofluoromethane	U	J4	0.160	2.50	1	05/31/2024 17:53	WG2296427
1,2,3-Trichloropropane	U		0.237	2.50	1	05/31/2024 17:53	WG2296427
1,2,4-Trimethylbenzene	U		0.322	0.500	1	05/31/2024 17:53	WG2296427
1,2,3-Trimethylbenzene	U		0.104	0.500	1	05/31/2024 17:53	WG2296427
1,3,5-Trimethylbenzene	U		0.104	0.500	1	05/31/2024 17:53	WG2296427
Vinyl acetate	U		0.692	5.00	1	05/31/2024 17:53	WG2296427
Vinyl chloride	U		0.234	0.500	1	05/31/2024 17:53	WG2296427
Xylenes, Total	U		0.174	1.50	1	05/31/2024 17:53	WG2296427
(S) Toluene-d8	*98.9*			*80.0-120*		*05/31/2024 17:53*	WG2296427
(S) 4-Bromofluorobenzene	*102*			*77.0-126*		*05/31/2024 17:53*	WG2296427
(S) 1,2-Dichloroethane-d4	*102*			*70.0-130*		*05/31/2024 17:53*	WG2296427

Method Blank (MB)

(MB) R4076205-3 05/27/24 20:04

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)	*96.2*			*70.0-130*
(S) 2,5-Dibromotoluene(PID)	*85.2*			*70.0-130*

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

(LCS) R4076205-1 05/27/24 17:46 • (LCSD) R4076205-2 05/27/24 18:20

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	1150	1140	95.8	95.0	70.0-130			0.873	50
Unadjusted C9-C12 Aliphatics	1400	1330	1330	95.0	95.0	70.0-130			0.000	50
Unadjusted C9-C10 Aromatics	200	166	165	83.0	82.5	70.0-130			0.604	50
Total VPH	2800	2650	2640	94.6	94.3	70.0-130			0.378	50
(S) 2,5-Dibromotoluene(FID)				*87.3*	*87.8*	*70.0-130*				
(S) 2,5-Dibromotoluene(PID)				*74.3*	*75.1*	*70.0-130*				

Method Blank (MB)

(MB) R4076747-2 05/30/24 14:19

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)	*92.5*			*70.0-130*
(S) 2,5-Dibromotoluene(PID)	*101*			*70.0-130*

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

(LCS) R4076747-1 05/30/24 11:56 • (LCSD) R4076747-3 05/30/24 14:52

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	1040	1150	86.7	95.8	70.0-130			10.0	50
Unadjusted C9-C12 Aliphatics	1400	1210	1330	86.4	95.0	70.0-130			9.45	50
Unadjusted C9-C10 Aromatics	200	195	211	97.5	105	70.0-130			7.88	50
Total VPH	2800	2450	2690	87.5	96.1	70.0-130			9.34	50
(S) 2,5-Dibromotoluene(FID)				*86.3*	*86.4*	*70.0-130*				
(S) 2,5-Dibromotoluene(PID)				*91.6*	*91.3*	*70.0-130*				

Method Blank (MB)

(MB) R4076111-3 05/31/24 14:06

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

Method Blank (MB)

(MB) R4076111-3 05/31/24 14:06

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	*98.6*			*80.0-120*
(S) 4-Bromofluorobenzene	*104*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*101*			*70.0-130*

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

(LCS) R4076111-1 05/31/24 12:50 • (LCSD) R4076111-2 05/31/24 13:09

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	52.8	45.6	211	182	19.0-160	J4	J4	14.6	27
Acrylonitrile	25.0	40.6	41.9	162	168	55.0-149	J4	J4	3.15	20
Benzene	5.00	5.00	5.15	100	103	70.0-123			2.96	20
Bromobenzene	5.00	4.82	4.89	96.4	97.8	73.0-121			1.44	20
Bromodichloromethane	5.00	5.50	5.54	110	111	75.0-120			0.725	20
Bromochloromethane	5.00	5.35	5.43	107	109	76.0-122			1.48	20
Bromoform	5.00	5.01	5.28	100	106	68.0-132			5.25	20
Bromomethane	5.00	4.93	5.46	98.6	109	10.0-160			10.2	25
n-Butylbenzene	5.00	4.09	4.91	81.8	98.2	73.0-125			18.2	20
sec-Butylbenzene	5.00	5.17	5.43	103	109	75.0-125			4.91	20
tert-Butylbenzene	5.00	5.13	5.43	103	109	76.0-124			5.68	20
Carbon disulfide	5.00	5.25	5.43	105	109	61.0-128			3.37	20
Carbon tetrachloride	5.00	5.95	6.06	119	121	68.0-126			1.83	20
Chlorobenzene	5.00	4.97	5.06	99.4	101	80.0-121			1.79	20
Chlorodibromomethane	5.00	5.08	5.16	102	103	77.0-125			1.56	20
Chloroethane	5.00	5.70	5.84	114	117	47.0-150			2.43	20
2-Chloroethyl vinyl ether	25.0	30.7	32.0	123	128	51.0-160	J	J	4.15	20
Chloroform	5.00	5.02	5.07	100	101	73.0-120			0.991	20
Chloromethane	5.00	5.43	5.63	109	113	41.0-142			3.62	20
2-Chlorotoluene	5.00	5.34	5.30	107	106	76.0-123			0.752	20
4-Chlorotoluene	5.00	4.96	4.24	99.2	84.8	75.0-122			15.7	20
1,2-Dibromo-3-Chloropropane	5.00	4.83	5.49	96.6	110	58.0-134			12.8	20
1,2-Dibromoethane	5.00	5.36	5.57	107	111	80.0-122			3.84	20
Dibromomethane	5.00	5.27	5.46	105	109	80.0-120			3.54	20
1,2-Dichlorobenzene	5.00	4.57	4.81	91.4	96.2	79.0-121			5.12	20
1,3-Dichlorobenzene	5.00	4.72	4.96	94.4	99.2	79.0-120			4.96	20
1,4-Dichlorobenzene	5.00	4.78	4.96	95.6	99.2	79.0-120			3.70	20
Dichlorodifluoromethane	5.00	6.80	6.85	136	137	51.0-149			0.733	20
1,1-Dichloroethane	5.00	5.66	5.76	113	115	70.0-126			1.75	20
1,2-Dichloroethane	5.00	5.09	5.20	102	104	70.0-128			2.14	20
1,1-Dichloroethene	5.00	5.85	6.01	117	120	71.0-124			2.70	20
cis-1,2-Dichloroethene	5.00	5.49	5.55	110	111	73.0-120			1.09	20
trans-1,2-Dichloroethene	5.00	5.46	5.65	109	113	73.0-120			3.42	20
1,2-Dichloropropane	5.00	5.22	5.26	104	105	77.0-125			0.763	20
1,1-Dichloropropene	5.00	5.72	5.75	114	115	74.0-126			0.523	20
1,3-Dichloropropane	5.00	5.15	5.49	103	110	80.0-120			6.39	20
cis-1,3-Dichloropropene	5.00	5.69	5.85	114	117	80.0-123			2.77	20
trans-1,3-Dichloropropene	5.00	5.41	5.63	108	113	78.0-124			3.99	20
trans-1,4-Dichloro-2-butene	5.00	6.43	6.46	129	129	33.0-144			0.465	20
2,2-Dichloropropane	5.00	5.78	5.89	116	118	58.0-130			1.89	20

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

(LCS) R4076111-1 05/31/24 12:50 • (LCSD) R4076111-2 05/31/24 13:09

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	5.50	5.76	110	115	58.0-138			4.62	20
Ethylbenzene	5.00	4.95	5.08	99.0	102	79.0-123			2.59	20
Hexachloro-1,3-butadiene	5.00	4.92	5.42	98.4	108	54.0-138			9.67	20
2-Hexanone	25.0	33.6	34.4	134	138	67.0-149			2.35	20
n-Hexane	5.00	5.94	6.00	119	120	57.0-133			1.01	20
Iodomethane	25.0	28.9	28.9	116	116	33.0-147			0.000	26
Isopropylbenzene	5.00	5.14	5.17	103	103	76.0-127			0.582	20
p-Isopropyltoluene	5.00	4.78	5.17	95.6	103	76.0-125			7.84	20
2-Butanone (MEK)	25.0	46.8	44.8	187	179	44.0-160	J4	J4	4.37	20
Methylene Chloride	5.00	5.45	5.51	109	110	67.0-120			1.09	20
4-Methyl-2-pentanone (MIBK)	25.0	32.1	32.9	128	132	68.0-142			2.46	20
Methyl tert-butyl ether	5.00	5.52	5.52	110	110	68.0-125			0.000	20
Naphthalene	5.00	3.34	4.28	66.8	85.6	54.0-135		J3	24.7	20
n-Propylbenzene	5.00	5.22	5.35	104	107	77.0-124			2.46	20
Styrene	5.00	4.59	4.88	91.8	97.6	73.0-130			6.12	20
1,1,1,2-Tetrachloroethane	5.00	4.90	4.84	98.0	96.8	75.0-125			1.23	20
1,1,2,2-Tetrachloroethane	5.00	5.02	5.11	100	102	65.0-130			1.78	20
1,1,2-Trichlorotrifluoroethane	5.00	6.11	6.19	122	124	69.0-132			1.30	20
Tetrachloroethene	5.00	5.46	5.51	109	110	72.0-132			0.912	20
Toluene	5.00	4.92	5.01	98.4	100	79.0-120			1.81	20
1,2,3-Trichlorobenzene	5.00	3.85	4.92	77.0	98.4	50.0-138		J3	24.4	20
1,2,4-Trichlorobenzene	5.00	3.94	4.76	78.8	95.2	57.0-137			18.9	20
1,1,1-Trichloroethane	5.00	6.03	6.10	121	122	73.0-124			1.15	20
1,1,2-Trichloroethane	5.00	4.99	5.27	99.8	105	80.0-120			5.46	20
Trichloroethene	5.00	5.55	5.66	111	113	78.0-124			1.96	20
Trichlorofluoromethane	5.00	6.90	7.55	138	151	59.0-147		J4	9.00	20
1,2,3-Trichloropropane	5.00	5.57	5.43	111	109	73.0-130			2.55	20
1,2,4-Trimethylbenzene	5.00	4.70	4.87	94.0	97.4	76.0-121			3.55	20
1,2,3-Trimethylbenzene	5.00	4.52	4.81	90.4	96.2	77.0-120			6.22	20
1,3,5-Trimethylbenzene	5.00	4.83	4.94	96.6	98.8	76.0-122			2.25	20
Vinyl acetate	25.0	29.6	29.6	118	118	11.0-160			0.000	20
Vinyl chloride	5.00	5.50	5.69	110	114	67.0-131			3.40	20
Xylenes, Total	15.0	15.1	15.4	101	103	79.0-123			1.97	20
(S) Toluene-d8				*99.2*	*98.9*	*80.0-120*				
(S) 4-Bromofluorobenzene				*103*	*104*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*104*	*102*	*70.0-130*				

QUALITY CONTROL SUMMARY

L1739782-01,02

L1739648-15 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1739648-15 05/31/24 18:12 • (MS) R4076111-4 05/31/24 23:35 • (MSD) R4076111-5 05/31/24 23:54

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	37.3	44.6	149	178	1	10.0-160		J5	17.8	35
Acrylonitrile	25.0	U	38.0	46.9	152	188	1	21.0-160		J5	21.0	32
Benzene	5.00	U	3.78	5.95	75.6	119	1	17.0-158		J3	44.6	27
Bromobenzene	5.00	U	3.76	5.50	75.2	110	1	30.0-149		J3	37.6	28
Bromodichloromethane	5.00	U	4.40	6.43	88.0	129	1	31.0-150		J3	37.5	27
Bromochloromethane	5.00	U	4.32	6.12	86.4	122	1	38.0-142		J3	34.5	26
Bromoform	5.00	U	4.32	5.39	86.4	108	1	29.0-150			22.0	29
Bromomethane	5.00	U	3.70	5.87	74.0	117	1	10.0-160		J3	45.4	38
n-Butylbenzene	5.00	U	3.47	5.61	69.4	112	1	31.0-150		J3	47.1	30
sec-Butylbenzene	5.00	U	3.90	6.36	78.0	127	1	33.0-155		J3	48.0	29
tert-Butylbenzene	5.00	U	3.87	6.29	77.4	126	1	34.0-153		J3	47.6	28
Carbon disulfide	5.00	U	3.60	5.69	72.0	114	1	10.0-156		J3	45.0	28
Carbon tetrachloride	5.00	U	4.50	7.50	90.0	150	1	23.0-159		J3	50.0	28
Chlorobenzene	5.00	U	3.69	5.55	73.8	111	1	33.0-152		J3	40.3	27
Chlorodibromomethane	5.00	U	4.24	5.68	84.8	114	1	37.0-149		J3	29.0	27
Chloroethane	5.00	U	4.21	6.50	84.2	130	1	10.0-160		J3	42.8	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	U	3.92	5.83	78.4	117	1	29.0-154		J3	39.2	28
Chloromethane	5.00	U	3.74	6.17	74.8	123	1	10.0-160		J3	49.0	29
2-Chlorotoluene	5.00	U	3.76	6.09	75.2	122	1	32.0-153		J3	47.3	28
4-Chlorotoluene	5.00	U	3.71	5.75	74.2	115	1	32.0-150		J3	43.1	28
1,2-Dibromo-3-Chloropropane	5.00	U	4.59	6.12	91.8	122	1	22.0-151			28.6	34
1,2-Dibromoethane	5.00	U	4.42	5.84	88.4	117	1	34.0-147		J3	27.7	27
Dibromomethane	5.00	U	4.44	5.86	88.8	117	1	30.0-151		J3	27.6	27
1,2-Dichlorobenzene	5.00	U	3.87	5.24	77.4	105	1	34.0-149		J3	30.1	28
1,3-Dichlorobenzene	5.00	U	3.68	5.47	73.6	109	1	36.0-146		J3	39.1	27
1,4-Dichlorobenzene	5.00	0.121	3.78	5.41	73.2	106	1	35.0-142		J3	35.5	27
Dichlorodifluoromethane	5.00	U	4.67	7.97	93.4	159	1	10.0-160		J3	52.2	29
1,1-Dichloroethane	5.00	1.29	5.57	7.93	85.6	133	1	25.0-158		J3	35.0	27
1,2-Dichloroethane	5.00	5.27	9.24	11.4	79.4	123	1	29.0-151			20.9	27
1,1-Dichloroethene	5.00	7.40	12.2	15.9	96.0	170	1	11.0-160		J5	26.3	29
cis-1,2-Dichloroethene	5.00	0.879	5.02	7.02	82.8	123	1	10.0-160		J3	33.2	27
trans-1,2-Dichloroethene	5.00	U	3.95	6.23	79.0	125	1	17.0-153		J3	44.8	27
1,2-Dichloropropane	5.00	U	4.05	6.09	81.0	122	1	30.0-156		J3	40.2	27
1,1-Dichloropropene	5.00	U	4.21	6.75	84.2	135	1	25.0-158		J3	46.4	27
1,3-Dichloropropane	5.00	U	4.32	5.78	86.4	116	1	38.0-147		J3	28.9	27
cis-1,3-Dichloropropene	5.00	U	4.45	6.39	89.0	128	1	34.0-149		J3	35.8	28
trans-1,3-Dichloropropene	5.00	U	4.38	5.89	87.6	118	1	32.0-149		J3	29.4	28
trans-1,4-Dichloro-2-butene	5.00	U	4.74	6.56	94.8	131	1	10.0-157	J		32.2	37
2,2-Dichloropropane	5.00	U	4.49	7.41	89.8	148	1	24.0-152		J3	49.1	29

L1739648-15 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1739648-15 05/31/24 18:12 • (MS) R4076111-4 05/31/24 23:35 • (MSD) R4076111-5 05/31/24 23:54

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	4.60	6.46	92.0	129	1	21.0-160		J3	33.6	28
Ethylbenzene	5.00	U	3.63	6.00	72.6	120	1	30.0-155		J3	49.2	27
Hexachloro-1,3-butadiene	5.00	U	3.77	6.08	75.4	122	1	20.0-154		J3	46.9	34
2-Hexanone	25.0	U	29.1	36.6	116	146	1	21.0-160			22.8	29
n-Hexane	5.00	U	3.99	7.01	79.8	140	1	10.0-153	J	J3	54.9	28
Iodomethane	25.0	U	20.5	31.2	82.0	125	1	10.0-160		J3	41.4	40
Isopropylbenzene	5.00	U	3.72	5.88	74.4	118	1	28.0-157		J3	45.0	27
p-Isopropyltoluene	5.00	U	3.65	6.01	73.0	120	1	30.0-154		J3	48.9	29
2-Butanone (MEK)	25.0	U	29.1	47.2	116	189	1	10.0-160		J3 J5	47.4	32
Methylene Chloride	5.00	U	3.87	5.74	77.4	115	1	23.0-144		J3	38.9	28
4-Methyl-2-pentanone (MIBK)	25.0	U	29.2	37.4	117	150	1	29.0-160			24.6	29
Methyl tert-butyl ether	5.00	U	4.69	6.11	93.8	122	1	28.0-150			26.3	29
Naphthalene	5.00	U	3.47	4.69	69.4	93.8	1	12.0-156			29.9	35
n-Propylbenzene	5.00	U	3.83	6.32	76.6	126	1	31.0-154		J3	49.1	28
Styrene	5.00	U	1.81	2.90	36.2	58.0	1	33.0-155		J3	46.3	28
1,1,1,2-Tetrachloroethane	5.00	U	3.98	5.61	79.6	112	1	36.0-151		J3	34.0	29
1,1,2,2-Tetrachloroethane	5.00	U	4.67	6.08	93.4	122	1	33.0-150			26.2	28
1,1,2-Trichlorotrifluoroethane	5.00	U	4.13	7.41	82.6	148	1	23.0-160		J3	56.8	30
Tetrachloroethene	5.00	U	3.89	6.49	77.8	130	1	10.0-160		J3	50.1	27
Toluene	5.00	U	3.56	5.58	71.2	112	1	26.0-154		J3	44.2	28
1,2,3-Trichlorobenzene	5.00	U	3.74	5.20	74.8	104	1	17.0-150			32.7	36
1,2,4-Trichlorobenzene	5.00	U	3.47	4.80	69.4	96.0	1	24.0-150			32.2	33
1,1,1-Trichloroethane	5.00	U	4.45	7.43	89.0	149	1	23.0-160		J3	50.2	28
1,1,2-Trichloroethane	5.00	0.498	4.71	6.21	84.2	114	1	35.0-147		J3	27.5	27
Trichloroethene	5.00	2.92	7.01	9.64	81.8	134	1	10.0-160		J3	31.6	25
Trichlorofluoromethane	5.00	U	4.90	8.63	98.0	173	1	17.0-160		J3 J5	55.1	31
1,2,3-Trichloropropane	5.00	U	4.92	6.45	98.4	129	1	34.0-151			26.9	29
1,2,4-Trimethylbenzene	5.00	U	3.53	5.49	70.6	110	1	26.0-154		J3	43.5	27
1,2,3-Trimethylbenzene	5.00	U	3.52	5.35	70.4	107	1	32.0-149		J3	41.3	28
1,3,5-Trimethylbenzene	5.00	U	3.68	5.70	73.6	114	1	28.0-153		J3	43.1	27
Vinyl acetate	25.0	U	21.0	27.2	84.0	109	1	12.0-160			25.7	31
Vinyl chloride	5.00	0.866	4.78	7.49	78.3	132	1	10.0-160		J3	44.2	27
Xylenes, Total	15.0	U	10.9	17.5	72.7	117	1	29.0-154		J3	46.5	28
(S) Toluene-d8					*95.8*	*98.0*		*80.0-120*				
(S) 4-Bromofluorobenzene					*104*	*103*		*77.0-126*				
(S) 1,2-Dichloroethane-d4					*106*	*111*		*70.0-130*				

Method Blank (MB)

(MB) R4075624-1 05/30/24 14:10

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	*59.9*			*40.0-140*

Method Blank (MB)

(MB) R4075624-4 05/30/24 15:10

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	*74.5*			*40.0-140*
(S) 2-Fluorobiphenyl	*86.1*			*40.0-140*
(S) 2-Bromonaphthalene	*90.8*			*40.0-140*

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

(LCS) R4075624-2 05/30/24 14:25 • (LCSD) R4075624-3 05/30/24 14:47

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	319	319	53.2	53.2	40.0-140	J	J	0.000	25
Unadjusted C19-C36 Aliphatics	800	616	602	77.0	75.3	40.0-140			2.30	25
(S) 1-Chloro-octadecane				*64.6*	*63.5*	*40.0-140*				

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

(LCS) R4075624-5 05/30/24 15:32 • (LCSD) R4075624-6 05/30/24 15:54

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	1340	1380	78.8	81.2	40.0-140			2.94	25
(S) o-Terphenyl				*70.7*	*73.6*	*40.0-140*				
(S) 2-Fluorobiphenyl				*79.5*	*82.7*	*40.0-140*				
(S) 2-Bromonaphthalene				*84.1*	*86.9*	*40.0-140*				

Method Blank (MB)

(MB) R4075549-3 05/30/24 18:28

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

Method Blank (MB)

(MB) R4075549-3 05/30/24 18:28

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	*26.6*			*10.0-120*
(S) Phenol-d5	*16.1*			*10.0-120*
(S) Nitrobenzene-d5	*32.7*			*10.0-127*
(S) 2-Fluorobiphenyl	*37.8*			*10.0-130*
(S) 2,4,6-Tribromophenol	*34.0*			*10.0-155*
(S) p-Terphenyl-d14	*47.5*			*10.0-128*

Method Blank (MB)

(MB) R4075549-3 05/30/24 18:28

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

Method Blank (MB)

(MB) R4075549-3 05/30/24 18:28

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

Method Blank (MB)

(MB) R4075549-3 05/30/24 18:28

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

Method Blank (MB)

(MB) R4075549-3 05/30/24 18:28

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
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
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

Method Blank (MB)

(MB) R4075549-3 05/30/24 18:28

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
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
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	*26.6*			*10.0-120*
(S) Phenol-d5	*16.1*			*10.0-120*
(S) Nitrobenzene-d5	*32.7*			*10.0-127*
(S) 2-Fluorobiphenyl	*37.8*			*10.0-130*
(S) 2,4,6-Tribromophenol	*34.0*			*10.0-155*
(S) p-Terphenyl-d14	*47.5*			*10.0-128*

Laboratory Control Sample (LCS)

(LCS) R4075549-1 05/30/24 17:46

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	50.0	20.9	41.8	41.0-120	
Acenaphthylene	50.0	22.5	45.0	43.0-120	
Anthracene	50.0	27.4	54.8	45.0-120	
Benzidine	100	0.000	0.000	10.0-120	J4
Benzo(a)anthracene	50.0	36.4	72.8	47.0-120	
Benzo(b)fluoranthene	50.0	35.9	71.8	46.0-120	
Benzo(k)fluoranthene	50.0	36.2	72.4	46.0-120	
Benzo(g,h,i)perylene	50.0	40.5	81.0	48.0-121	
Benzo(a)pyrene	50.0	36.2	72.4	47.0-120	
Bis(2-chlorethoxy)methane	50.0	17.7	35.4	33.0-120	
Bis(2-chloroethyl)ether	50.0	17.1	34.2	23.0-120	
2,2-Oxybis(1-Chloropropane)	50.0	19.0	38.0	28.0-120	
4-Bromophenyl-phenylether	50.0	23.6	47.2	45.0-120	
2-Chloronaphthalene	50.0	19.4	38.8	37.0-120	
4-Chlorophenyl-phenylether	50.0	24.0	48.0	44.0-120	
Chrysene	50.0	36.1	72.2	48.0-120	
Dibenz(a,h)anthracene	50.0	39.5	79.0	47.0-120	
3,3-Dichlorobenzidine	100	65.7	65.7	44.0-120	
2,4-Dinitrotoluene	50.0	31.3	62.6	49.0-124	
2,6-Dinitrotoluene	50.0	25.9	51.8	46.0-120	

Laboratory Control Sample (LCS)

(LCS) R4075549-1 05/30/24 17:46

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Fluoranthene	50.0	42.4	84.8	51.0-120	
Fluorene	50.0	24.1	48.2	47.0-120	
Hexachlorobenzene	50.0	26.0	52.0	44.0-120	
Hexachloro-1,3-butadiene	50.0	19.0	38.0	19.0-120	
Hexachlorocyclopentadiene	50.0	12.0	24.0	15.0-120	
Hexachloroethane	50.0	16.6	33.2	15.0-120	
Indeno(1,2,3-cd)pyrene	50.0	37.4	74.8	49.0-122	
Isophorone	50.0	19.8	39.6	36.0-120	
Naphthalene	50.0	18.5	37.0	27.0-120	
Nitrobenzene	50.0	17.5	35.0	27.0-120	
n-Nitrosodimethylamine	50.0	16.3	32.6	10.0-120	
n-Nitrosodiphenylamine	50.0	22.5	45.0	47.0-120	J4
n-Nitrosodi-n-propylamine	50.0	20.0	40.0	31.0-120	
Phenanthrene	50.0	26.9	53.8	46.0-120	
Benzylbutyl phthalate	50.0	34.2	68.4	43.0-121	
Bis(2-Ethylhexyl)phthalate	50.0	31.8	63.6	43.0-122	
Di-n-butyl phthalate	50.0	40.1	80.2	49.0-121	
Diethyl phthalate	50.0	31.5	63.0	48.0-122	
Dimethyl phthalate	50.0	26.2	52.4	48.0-120	
Di-n-octyl phthalate	50.0	34.3	68.6	42.0-125	
Pyrene	50.0	32.3	64.6	47.0-120	
1,2,4-Trichlorobenzene	50.0	19.1	38.2	24.0-120	
Aniline	50.0	8.33	16.7	13.0-120	J
1,2-Diphenylhydrazine	50.0	21.1	42.2	41.0-126	N2
Benzyl alcohol	50.0	17.0	34.0	25.0-120	
4-Chloroaniline	50.0	17.1	34.2	25.0-120	
4-Chloro-3-methylphenol	50.0	21.7	43.4	40.0-120	
2-Chlorophenol	50.0	19.5	39.0	25.0-120	
Dibenzofuran	50.0	21.8	43.6	44.0-120	J4
2,4-Dichlorophenol	50.0	21.4	42.8	36.0-120	
2,4-Dimethylphenol	50.0	24.4	48.8	33.0-120	
4,6-Dinitro-2-methylphenol	50.0	35.3	70.6	38.0-138	
2,4-Dinitrophenol	50.0	30.0	60.0	10.0-120	
2-Methylnaphthalene	50.0	20.5	41.0	33.0-120	
2-Methylphenol	50.0	16.4	32.8	28.0-120	
3&4-Methyl Phenol	50.0	16.2	32.4	31.0-120	
2-Nitroaniline	50.0	23.1	46.2	43.0-120	
3-Nitroaniline	50.0	25.2	50.4	38.0-120	
4-Nitroaniline	50.0	31.6	63.2	18.0-160	
2-Nitrophenol	50.0	24.6	49.2	31.0-120	

Laboratory Control Sample (LCS)

(LCS) R4075549-1 05/30/24 17:46

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
4-Nitrophenol	50.0	13.5	27.0	10.0-120	
Pentachlorophenol	50.0	26.7	53.4	23.0-120	
Phenol	50.0	8.08	16.2	10.0-120	J
Pyridine	50.0	0.842	1.68	10.0-120	J J4
2,4,6-Trichlorophenol	50.0	21.9	43.8	42.0-120	
Acetophenone	50.0	20.3	40.6	29.0-120	
Diphenylamine	50.0	22.5	45.0	35.0-120	
1,2,4,5-Tetrachlorobenzene	50.0	24.1	48.2	31.0-121	
2,3,4,6-Tetrachlorophenol	50.0	28.9	57.8	42.0-132	
2,4,5-Trichlorophenol	50.0	23.9	47.8	44.0-120	
(S) 2-Fluorophenol			*26.3*	*10.0-120*	
(S) Phenol-d5			*18.6*	*10.0-120*	
(S) Nitrobenzene-d5			*40.9*	*10.0-127*	
(S) 2-Fluorobiphenyl			*42.5*	*10.0-130*	
(S) 2,4,6-Tribromophenol			*51.5*	*10.0-155*	
(S) p-Terphenyl-d14			*67.5*	*10.0-128*	

Laboratory Control Sample (LCS)

(LCS) R4075549-2 05/30/24 18:07

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Acetylaminofluorene	50.0	34.8	69.6	32.0-120	
4-Aminobiphenyl	50.0	17.3	34.6	20.0-120	
Chlorobenzilate	50.0	31.8	63.6	29.0-128	J
Diallate	50.0	23.7	47.4	30.0-120	
2,6-Dichlorophenol	50.0	24.7	49.4	19.0-136	
Dimethoate	50.0	28.9	57.8	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	28.2	56.4	27.0-120	
Dimethylbenz (A) Anthracene	50.0	31.9	63.8	14.0-124	
3,3-Dimethylbenzidine	50.0	2.11	4.22	13.0-120	J J4
a,a-Dimethylphenethylamine	50.0	0.0166	0.0332	10.0-129	J J4
1,3-Dinitrobenzene	50.0	27.7	55.4	34.0-120	
Diphenylamine	50.0	29.5	59.0	35.0-120	
Dinoseb	50.0	34.7	69.4	39.0-120	J
Disulfoton	50.0	25.4	50.8	32.0-120	
Ethyl methanesulfonate	50.0	21.2	42.4	10.0-120	
Ethyl Parathion	50.0	37.1	74.2	46.0-130	
Famphur	50.0	34.3	68.6	32.0-120	

Laboratory Control Sample (LCS)

(LCS) R4075549-2 05/30/24 18:07

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexachloropropene	50.0	17.8	35.6	10.0-120	J
Hexachlorophene	100	26.7	26.7	10.0-120	J
Isodrin	50.0	26.8	53.6	22.0-157	
Isosafrole	50.0	22.8	45.6	25.0-133	
Kepone	50.0	31.1	62.2	10.0-120	
Methapyrilene	50.0	1.85	3.70	10.0-120	J J4
3-Methylcholanthrene	50.0	34.1	68.2	30.0-160	
Methyl methanesulfonate	50.0	20.1	40.2	10.0-120	J
Methyl parathion	50.0	37.1	74.2	42.0-120	
1,4-Naphthoquinone	50.0	1.75	3.50	50.0-150	J J4
1-Naphthylamine	50.0	19.5	39.0	19.0-120	
2-Naphthylamine	50.0	20.9	41.8	10.0-120	
5-Nitro-o-toluidine	50.0	36.3	72.6	34.0-120	
4-Nitroquinoline 1-oxide	50.0	24.7	49.4	10.0-159	
n-Nitrosodiethylamine	50.0	23.6	47.2	10.0-120	
n-Nitrosodi-n-butylamine	50.0	25.5	51.0	13.0-143	
n-Nitrosomethylethylamine	50.0	21.9	43.8	10.0-120	
n-Nitrosomorpholine	50.0	24.8	49.6	10.0-120	
n-Nitrosopiperidine	50.0	26.7	53.4	10.0-160	
n-Nitrosopyrrolidine	50.0	24.4	48.8	10.0-124	
Pentachlorobenzene	50.0	23.1	46.2	25.0-120	
Pentachloroethane	50.0	22.2	44.4	10.0-120	J
Pentachloronitrobenzene	50.0	37.0	74.0	34.0-132	
Phenacetin	50.0	36.1	72.2	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	28.3	56.6	13.0-160	J
2-Picoline	50.0	3.29	6.58	10.0-120	J J4
Pronamide	50.0	33.8	67.6	38.0-130	
Safrole	50.0	24.0	48.0	21.0-120	
Sulfotep	50.0	30.2	60.4	52.0-120	J
Thionazin	50.0	30.5	61.0	38.0-121	
o-Toluidine	50.0	18.2	36.4	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	24.2	48.4	11.0-135	
1,3,5-Trinitrobenzene	50.0	41.8	83.6	37.0-147	

Laboratory Control Sample (LCS)

(LCS) R4075549-1 05/30/24 17:46

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	50.0	20.9	41.8	41.0-120	
Acenaphthylene	50.0	22.5	45.0	43.0-120	
Anthracene	50.0	27.4	54.8	45.0-120	
Benzidine	100	0.000	0.000	10.0-120	J4
Benzo(a)anthracene	50.0	36.4	72.8	47.0-120	
Benzo(b)fluoranthene	50.0	35.9	71.8	46.0-120	
Benzo(k)fluoranthene	50.0	36.2	72.4	46.0-120	
Benzo(g,h,i)perylene	50.0	40.5	81.0	48.0-121	
Benzo(a)pyrene	50.0	36.2	72.4	47.0-120	
Bis(2-chlorethoxy)methane	50.0	17.7	35.4	33.0-120	
Bis(2-chloroethyl)ether	50.0	17.1	34.2	23.0-120	
2,2-Oxybis(1-Chloropropane)	50.0	19.0	38.0	28.0-120	
4-Bromophenyl-phenylether	50.0	23.6	47.2	45.0-120	
2-Chloronaphthalene	50.0	19.4	38.8	37.0-120	
4-Chlorophenyl-phenylether	50.0	24.0	48.0	44.0-120	
Chrysene	50.0	36.1	72.2	48.0-120	
Dibenz(a,h)anthracene	50.0	39.5	79.0	47.0-120	
3,3-Dichlorobenzidine	100	65.7	65.7	44.0-120	
2,4-Dinitrotoluene	50.0	31.3	62.6	49.0-124	
2,6-Dinitrotoluene	50.0	25.9	51.8	46.0-120	
Fluoranthene	50.0	42.4	84.8	51.0-120	
Fluorene	50.0	24.1	48.2	47.0-120	
Hexachlorobenzene	50.0	26.0	52.0	44.0-120	
Hexachloro-1,3-butadiene	50.0	19.0	38.0	19.0-120	
Hexachlorocyclopentadiene	50.0	12.0	24.0	15.0-120	
Hexachloroethane	50.0	16.6	33.2	15.0-120	
Indeno(1,2,3-cd)pyrene	50.0	37.4	74.8	49.0-122	
Isophorone	50.0	19.8	39.6	36.0-120	
Naphthalene	50.0	18.5	37.0	27.0-120	
Nitrobenzene	50.0	17.5	35.0	27.0-120	
n-Nitrosodimethylamine	50.0	16.3	32.6	10.0-120	
n-Nitrosodiphenylamine	50.0	22.5	45.0	47.0-120	J4
n-Nitrosodi-n-propylamine	50.0	20.0	40.0	31.0-120	
Phenanthrene	50.0	26.9	53.8	46.0-120	
Benzylbutyl phthalate	50.0	34.2	68.4	43.0-121	
Bis(2-Ethylhexyl)phthalate	50.0	31.8	63.6	43.0-122	
Di-n-butyl phthalate	50.0	40.1	80.2	49.0-121	
Diethyl phthalate	50.0	31.5	63.0	48.0-122	
Dimethyl phthalate	50.0	26.2	52.4	48.0-120	
Di-n-octyl phthalate	50.0	34.3	68.6	42.0-125	

Laboratory Control Sample (LCS)

(LCS) R4075549-1 05/30/24 17:46

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Pyrene	50.0	32.3	64.6	47.0-120	
1,2,4-Trichlorobenzene	50.0	19.1	38.2	24.0-120	
Aniline	50.0	8.33	16.7	13.0-120	J
1,2-Diphenylhydrazine	50.0	21.1	42.2	41.0-126	N2
Benzyl alcohol	50.0	17.0	34.0	25.0-120	
4-Chloroaniline	50.0	17.1	34.2	25.0-120	
4-Chloro-3-methylphenol	50.0	21.7	43.4	40.0-120	
2-Chlorophenol	50.0	19.5	39.0	25.0-120	
Dibenzofuran	50.0	21.8	43.6	44.0-120	J4
2,4-Dichlorophenol	50.0	21.4	42.8	36.0-120	
2,4-Dimethylphenol	50.0	24.4	48.8	33.0-120	
4,6-Dinitro-2-methylphenol	50.0	35.3	70.6	38.0-138	
2,4-Dinitrophenol	50.0	30.0	60.0	10.0-120	
2-Methylnaphthalene	50.0	20.5	41.0	33.0-120	
2-Methylphenol	50.0	16.4	32.8	28.0-120	
3&4-Methyl Phenol	50.0	16.2	32.4	31.0-120	
2-Nitroaniline	50.0	23.1	46.2	43.0-120	
3-Nitroaniline	50.0	25.2	50.4	38.0-120	
4-Nitroaniline	50.0	31.6	63.2	18.0-160	
2-Nitrophenol	50.0	24.6	49.2	31.0-120	
4-Nitrophenol	50.0	13.5	27.0	10.0-120	
Pentachlorophenol	50.0	26.7	53.4	23.0-120	
Phenol	50.0	8.08	16.2	10.0-120	J
Pyridine	50.0	0.842	1.68	10.0-120	J J4
2,4,6-Trichlorophenol	50.0	21.9	43.8	42.0-120	
Acetophenone	50.0	20.3	40.6	29.0-120	
Diphenylamine	50.0	22.5	45.0	35.0-120	
1,2,4,5-Tetrachlorobenzene	50.0	24.1	48.2	31.0-121	
2,3,4,6-Tetrachlorophenol	50.0	28.9	57.8	42.0-132	
2,4,5-Trichlorophenol	50.0	23.9	47.8	44.0-120	
(S) 2-Fluorophenol			*26.3*	*10.0-120*	
(S) Phenol-d5			*18.6*	*10.0-120*	
(S) Nitrobenzene-d5			*40.9*	*10.0-127*	
(S) 2-Fluorobiphenyl			*42.5*	*10.0-130*	
(S) 2,4,6-Tribromophenol			*51.5*	*10.0-155*	
(S) p-Terphenyl-d14			*67.5*	*10.0-128*	

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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
C6	The initial calibration verification standard (SSCV) associated with this data responded low.
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.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
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.

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	LAO000356
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.

Company Name/Address:
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: CMR Great Falls - 2023 RFI Soil Sampling

City/State Collected:

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 Groves

Immediately Packed on Ice N ___ Y X

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

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/hubfs/pas-standard-terms.pdf

SDG # 1739782

D200

Acctnum: ENVIRONCO
Template: T245953
Prelogin: P1058821
PM: 841 - Kelly Mercer
PB: JD 3-14-24

Shipped Via: FedEX Ground

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	8270AP9 100ml Amb NoPres	Extract/Hold PAHs 40mlAmb-NoPres-WT	SVEPHSMT 1L-Amb-Add HCl	V8260LL 40mlAmb-HCl	V8260LL 40mlAmb-HCl-Blk	VPHMT 40mlAmb HCl	VPHMT 40mlAmb-HCl-Blk				Remarks	Sample # (lab only)
CMR-SP200-240522	grab	GW	—	05 22 24	1500	11	/	/	/	/	/	/	/					-01
		GW																
TRIP BLANK		GW																-02

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

Remarks: 5-23-24 CS

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: __ UPS __ FedEx __ Courier _____

Tracking # 7155 0301 9150

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

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	If preservation required by Login: Date/Time
Kyle A. Groves	5/22/24	1700			
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: 3.5+0.1=3.6 °C Bottles Received:	
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature) Charles Stevenson	Date: 5-23-24 Time: 9:00	Hold: / Condition: NCF / OK

ANALYTICAL REPORT

July 02, 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:	L1749453
Samples Received:	06/21/2024
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 National
12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 mydata.pacelabs.com

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CMR-SP200-240620 L1749453-01 GW

Collected by: Kyle A. Groves
Collected date/time: 06/20/24 14:00
Received date/time: 06/21/24 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2311771	50	06/26/24 01:41	06/26/24 01:41	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2312958	50	06/27/24 03:42	06/27/24 03:42	BAM	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2311606	10	06/25/24 03:37	06/28/24 11:04	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2311606	20	06/25/24 03:37	06/28/24 08:35	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2312200	10	06/27/24 08:01	06/28/24 01:11	ADF	Mt. Juliet, TN

TRIP BLANK L1749453-02 GW

Collected by: Kyle A. Groves
Collected date/time: 06/20/24 00:00
Received date/time: 06/21/24 09:15

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2311771	1	06/25/24 14:37	06/25/24 14:37	DWR	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2312958	1	06/26/24 22:17	06/26/24 22:17	BAM	Mt. Juliet, TN

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

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

An aliquot for analysis was taken from the original container received due to the level of sediment present in the sample. Rinsing of the original sample container for inclusion in the sample extraction was not performed.

Lab Sample ID	Project Sample ID	Method
L1749453-01	CMR-SP200-240620	8270C

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		1670	5000	50	06/26/2024 01:41	WG2311771
Unadjusted C9-C12 Aliphatics	7330		1670	5000	50	06/26/2024 01:41	WG2311771
Unadjusted C9-C10 Aromatics	4170	J	1670	5000	50	06/26/2024 01:41	WG2311771
Adjusted C5-C8 Aliphatics	U		1670	5000	50	06/26/2024 01:41	WG2311771
Adjusted C9-C12 Aliphatics	7240		1670	5000	50	06/26/2024 01:41	WG2311771
Total VPH	11500		3340	10000	50	06/26/2024 01:41	WG2311771
(S) 2,5-Dibromotoluene(FID)	*103*			*70.0-130*		*06/26/2024 01:41*	WG2311771
(S) 2,5-Dibromotoluene(PID)	*107*			*70.0-130*		*06/26/2024 01:41*	WG2311771

Sample Narrative:

L1749453-01 WG2311771: Dilution due to foam.

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		565	1250	50	06/27/2024 03:42	WG2312958
Acrylonitrile	U		33.6	250	50	06/27/2024 03:42	WG2312958
Benzene	11.1	J	4.71	25.0	50	06/27/2024 03:42	WG2312958
Bromobenzene	U		5.90	25.0	50	06/27/2024 03:42	WG2312958
Bromodichloromethane	U		6.80	25.0	50	06/27/2024 03:42	WG2312958
Bromochloromethane	U		6.40	25.0	50	06/27/2024 03:42	WG2312958
Bromoform	U		6.45	25.0	50	06/27/2024 03:42	WG2312958
Bromomethane	U		30.3	125	50	06/27/2024 03:42	WG2312958
n-Butylbenzene	U		7.85	25.0	50	06/27/2024 03:42	WG2312958
sec-Butylbenzene	U		6.25	25.0	50	06/27/2024 03:42	WG2312958
tert-Butylbenzene	U		6.35	25.0	50	06/27/2024 03:42	WG2312958
Carbon disulfide	U		4.81	25.0	50	06/27/2024 03:42	WG2312958
Carbon tetrachloride	U		6.40	25.0	50	06/27/2024 03:42	WG2312958
Chlorobenzene	U		5.85	25.0	50	06/27/2024 03:42	WG2312958
Chlorodibromomethane	U		7.00	25.0	50	06/27/2024 03:42	WG2312958
Chloroethane	U		9.60	125	50	06/27/2024 03:42	WG2312958
2-Chloroethyl vinyl ether	U		28.8	2500	50	06/27/2024 03:42	WG2312958
Chloroform	U		5.55	25.0	50	06/27/2024 03:42	WG2312958
Chloromethane	U		48.0	62.5	50	06/27/2024 03:42	WG2312958
2-Chlorotoluene	U		5.30	25.0	50	06/27/2024 03:42	WG2312958
4-Chlorotoluene	U		5.70	25.0	50	06/27/2024 03:42	WG2312958
1,2-Dibromo-3-Chloropropane	U		13.8	125	50	06/27/2024 03:42	WG2312958
1,2-Dibromoethane	U		6.30	25.0	50	06/27/2024 03:42	WG2312958
Dibromomethane	U		6.10	25.0	50	06/27/2024 03:42	WG2312958
1,2-Dichlorobenzene	U		5.35	25.0	50	06/27/2024 03:42	WG2312958
1,3-Dichlorobenzene	U		14.9	25.0	50	06/27/2024 03:42	WG2312958
1,4-Dichlorobenzene	U		6.00	25.0	50	06/27/2024 03:42	WG2312958
Dichlorodifluoromethane	U		18.7	125	50	06/27/2024 03:42	WG2312958
1,1-Dichloroethane	U		5.00	25.0	50	06/27/2024 03:42	WG2312958
1,2-Dichloroethane	U		4.09	25.0	50	06/27/2024 03:42	WG2312958
1,1-Dichloroethene	U		9.40	25.0	50	06/27/2024 03:42	WG2312958
cis-1,2-Dichloroethene	U		6.30	25.0	50	06/27/2024 03:42	WG2312958
trans-1,2-Dichloroethene	U		7.45	25.0	50	06/27/2024 03:42	WG2312958
1,2-Dichloropropane	U		7.45	25.0	50	06/27/2024 03:42	WG2312958
1,1-Dichloropropene	U		7.10	25.0	50	06/27/2024 03:42	WG2312958
1,3-Dichloropropane	U		5.45	50.0	50	06/27/2024 03:42	WG2312958
cis-1,3-Dichloropropene	U	J4	5.55	25.0	50	06/27/2024 03:42	WG2312958
trans-1,3-Dichloropropene	U		5.90	25.0	50	06/27/2024 03:42	WG2312958
trans-1,4-Dichloro-2-butene	U		23.4	250	50	06/27/2024 03:42	WG2312958
2,2-Dichloropropane	U		8.05	25.0	50	06/27/2024 03:42	WG2312958

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		5.25	25.0	50	06/27/2024 03:42	WG2312958
Ethylbenzene	U		6.85	25.0	50	06/27/2024 03:42	WG2312958
Hexachloro-1,3-butadiene	U		16.9	50.0	50	06/27/2024 03:42	WG2312958
2-Hexanone	U		39.4	250	50	06/27/2024 03:42	WG2312958
n-Hexane	U		37.4	250	50	06/27/2024 03:42	WG2312958
Iodomethane	U		27.7	250	50	06/27/2024 03:42	WG2312958
Isopropylbenzene	U		5.25	25.0	50	06/27/2024 03:42	WG2312958
p-Isopropyltoluene	7.20	J	6.00	25.0	50	06/27/2024 03:42	WG2312958
2-Butanone (MEK)	U		59.5	250	50	06/27/2024 03:42	WG2312958
Methylene Chloride	U		21.5	125	50	06/27/2024 03:42	WG2312958
4-Methyl-2-pentanone (MIBK)	U		23.9	250	50	06/27/2024 03:42	WG2312958
Methyl tert-butyl ether	U		5.05	25.0	50	06/27/2024 03:42	WG2312958
Naphthalene	70.0	J	8.70	125	50	06/27/2024 03:42	WG2312958
n-Propylbenzene	U		4.97	25.0	50	06/27/2024 03:42	WG2312958
Styrene	U		5.90	25.0	50	06/27/2024 03:42	WG2312958
1,1,1,2-Tetrachloroethane	U		7.35	25.0	50	06/27/2024 03:42	WG2312958
1,1,2,2-Tetrachloroethane	U		6.65	25.0	50	06/27/2024 03:42	WG2312958
1,1,2-Trichlorotrifluoroethane	U		9.00	25.0	50	06/27/2024 03:42	WG2312958
Tetrachloroethene	U		15.0	25.0	50	06/27/2024 03:42	WG2312958
Toluene	U		13.9	25.0	50	06/27/2024 03:42	WG2312958
1,2,3-Trichlorobenzene	U		8.20	25.0	50	06/27/2024 03:42	WG2312958
1,2,4-Trichlorobenzene	U		24.1	50.0	50	06/27/2024 03:42	WG2312958
1,1,1-Trichloroethane	U		7.45	25.0	50	06/27/2024 03:42	WG2312958
1,1,2-Trichloroethane	U		7.90	25.0	50	06/27/2024 03:42	WG2312958
Trichloroethene	U		9.50	25.0	50	06/27/2024 03:42	WG2312958
Trichlorofluoromethane	U		8.00	125	50	06/27/2024 03:42	WG2312958
1,2,3-Trichloropropane	U		11.9	125	50	06/27/2024 03:42	WG2312958
1,2,4-Trimethylbenzene	159		16.1	25.0	50	06/27/2024 03:42	WG2312958
1,2,3-Trimethylbenzene	144		5.20	25.0	50	06/27/2024 03:42	WG2312958
1,3,5-Trimethylbenzene	80.9		5.20	25.0	50	06/27/2024 03:42	WG2312958
Vinyl acetate	U		34.6	250	50	06/27/2024 03:42	WG2312958
Vinyl chloride	U		11.7	25.0	50	06/27/2024 03:42	WG2312958
Xylenes, Total	94.1		8.70	75.0	50	06/27/2024 03:42	WG2312958
(S) Toluene-d8	*112*			*80.0-120*		*06/27/2024 03:42*	WG2312958
(S) 4-Bromofluorobenzene	*93.0*			*77.0-126*		*06/27/2024 03:42*	WG2312958
(S) 1,2-Dichloroethane-d4	*98.5*			*70.0-130*		*06/27/2024 03:42*	WG2312958

Sample Narrative:

L1749453-01 WG2312958: Lowest possible dilution due to sample foaming.

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	80600		4000	12000	20	06/28/2024 08:35	WG2311606
Unadjusted C19-C36 Aliphatics	22300		4000	12000	20	06/28/2024 08:35	WG2311606
Unadjusted C11-C22 Aromatics	34100		2000	6000	10	06/28/2024 11:04	WG2311606
Unadjusted Total Petroleum Hydrocarbons	137000		2000	6000	10	06/28/2024 11:04	WG2311606
Adjusted C11-C22 Aromatics	34100		2000	6000	10	06/28/2024 11:04	WG2311606
Adjusted Total Petroleum Hydrocarbons	137000		2000	6000	10	06/28/2024 11:04	WG2311606
(S) o-Terphenyl	*53.6*			*40.0-140*		*06/28/2024 11:04*	WG2311606
(S) 1-Chloro-octadecane	*0.000*	J7		*40.0-140*		*06/28/2024 08:35*	WG2311606
(S) 2-Fluorobiphenyl	*253*	J1		*40.0-140*		*06/28/2024 11:04*	WG2311606
(S) 2-Bromonaphthalene	*109*			*40.0-140*		*06/28/2024 11:04*	WG2311606

TPH by Method MTDEQ EPH

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

Sample Narrative:

L1749453-01 WG2311606: 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	2.29	J J3	0.886	10.0	10	06/28/2024 01:11	WG2312200
Acenaphthylene	U	J3	0.921	10.0	10	06/28/2024 01:11	WG2312200
Anthracene	U	J3	0.804	10.0	10	06/28/2024 01:11	WG2312200
Benzidine	U	J3	37.4	100	10	06/28/2024 01:11	WG2312200
Benzo(a)anthracene	U	J3	1.99	10.0	10	06/28/2024 01:11	WG2312200
Benzo(b)fluoranthene	U	J3	1.30	10.0	10	06/28/2024 01:11	WG2312200
Benzo(k)fluoranthene	U	J3	1.20	10.0	10	06/28/2024 01:11	WG2312200
Benzo(g,h,i)perylene	U	J3	1.21	10.0	10	06/28/2024 01:11	WG2312200
Benzo(a)pyrene	U	J3	0.381	10.0	10	06/28/2024 01:11	WG2312200
Bis(2-chlorethoxy)methane	U	J3	1.16	100	10	06/28/2024 01:11	WG2312200
Bis(2-chloroethyl)ether	U		1.37	100	10	06/28/2024 01:11	WG2312200
2,2-Oxybis(1-Chloropropane)	U		2.10	100	10	06/28/2024 01:11	WG2312200
4-Bromophenyl-phenylether	U	J3	0.877	100	10	06/28/2024 01:11	WG2312200
2-Chloronaphthalene	U	J3	0.648	10.0	10	06/28/2024 01:11	WG2312200
4-Chlorophenyl-phenylether	U	J3	0.926	100	10	06/28/2024 01:11	WG2312200
Chrysene	U	J3	1.30	10.0	10	06/28/2024 01:11	WG2312200
Dibenz(a,h)anthracene	U	J3	0.644	10.0	10	06/28/2024 01:11	WG2312200
3,3-Dichlorobenzidine	U	J3	2.12	100	10	06/28/2024 01:11	WG2312200
2,4-Dinitrotoluene	U		0.983	100	10	06/28/2024 01:11	WG2312200
2,6-Dinitrotoluene	U	J3	2.50	100	10	06/28/2024 01:11	WG2312200
Fluoranthene	U	J3	1.02	10.0	10	06/28/2024 01:11	WG2312200
Fluorene	3.80	J J3	0.844	10.0	10	06/28/2024 01:11	WG2312200
Hexachlorobenzene	U	J3	0.755	10.0	10	06/28/2024 01:11	WG2312200
Hexachloro-1,3-butadiene	U		0.968	100	10	06/28/2024 01:11	WG2312200
Hexachlorocyclopentadiene	U		0.598	100	10	06/28/2024 01:11	WG2312200
Hexachloroethane	U		1.27	100	10	06/28/2024 01:11	WG2312200
Indeno(1,2,3-cd)pyrene	U	J3	2.79	10.0	10	06/28/2024 01:11	WG2312200
Isophorone	U		1.43	100	10	06/28/2024 01:11	WG2312200
Naphthalene	20.7		1.59	10.0	10	06/28/2024 01:11	WG2312200
Nitrobenzene	U		2.97	100	10	06/28/2024 01:11	WG2312200
n-Nitrosodimethylamine	U		9.98	100	10	06/28/2024 01:11	WG2312200
n-Nitrosodiphenylamine	U	J3	23.7	100	10	06/28/2024 01:11	WG2312200
n-Nitrosodi-n-propylamine	U		2.61	100	10	06/28/2024 01:11	WG2312200
Phenanthrene	2.74	J J3	1.12	10.0	10	06/28/2024 01:11	WG2312200
Benzylbutyl phthalate	U	J3	7.65	30.0	10	06/28/2024 01:11	WG2312200
Bis(2-Ethylhexyl)phthalate	U	J3	8.95	30.0	10	06/28/2024 01:11	WG2312200
Di-n-butyl phthalate	U	J3	4.53	30.0	10	06/28/2024 01:11	WG2312200
Diethyl phthalate	U	J3	2.87	30.0	10	06/28/2024 01:11	WG2312200
Dimethyl phthalate	U	J3	2.60	30.0	10	06/28/2024 01:11	WG2312200
Di-n-octyl phthalate	U	J3	9.32	30.0	10	06/28/2024 01:11	WG2312200
Pyrene	U	J3	1.07	10.0	10	06/28/2024 01:11	WG2312200
1,2,4-Trichlorobenzene	U		0.698	100	10	06/28/2024 01:11	WG2312200
Aniline	U	J3	16.5	100	10	06/28/2024 01:11	WG2312200
1,2-Diphenylhydrazine	U	J3 N2	1.05	100	10	06/28/2024 01:11	WG2312200
Benzyl alcohol	U	J3	5.63	100	10	06/28/2024 01:11	WG2312200
4-Chloroaniline	U	J3	2.34	100	10	06/28/2024 01:11	WG2312200
4-Chloro-3-methylphenol	U	J3	1.31	100	10	06/28/2024 01:11	WG2312200
2-Chlorophenol	U	J3	1.33	100	10	06/28/2024 01:11	WG2312200
Dibenzofuran	U	J3	0.970	100	10	06/28/2024 01:11	WG2312200
2,4-Dichlorophenol	U	J3	1.02	100	10	06/28/2024 01:11	WG2312200

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-Dimethylphenol	U	J3	0.636	100	10	06/28/2024 01:11	WG2312200
4,6-Dinitro-2-methylphenol	U		11.2	100	10	06/28/2024 01:11	WG2312200
2,4-Dinitrophenol	U		59.3	100	10	06/28/2024 01:11	WG2312200
2-Methylnaphthalene	26.3		1.17	10.0	10	06/28/2024 01:11	WG2312200
2-Methylphenol	U	J3	0.929	100	10	06/28/2024 01:11	WG2312200
3&4-Methyl Phenol	U	J3	1.68	100	10	06/28/2024 01:11	WG2312200
2-Nitroaniline	U	J3	1.02	100	10	06/28/2024 01:11	WG2312200
3-Nitroaniline	U	J3	0.869	100	10	06/28/2024 01:11	WG2312200
4-Nitroaniline	U	J3	0.910	100	10	06/28/2024 01:11	WG2312200
2-Nitrophenol	U		1.17	100	10	06/28/2024 01:11	WG2312200
4-Nitrophenol	U		1.43	100	10	06/28/2024 01:11	WG2312200
Pentachlorophenol	U	J3	3.13	100	10	06/28/2024 01:11	WG2312200
Phenol	U		43.3	100	10	06/28/2024 01:11	WG2312200
Pyridine	U		6.27	100	10	06/28/2024 01:11	WG2312200
2,4,6-Trichlorophenol	U	J3	1.00	100	10	06/28/2024 01:11	WG2312200
Acetophenone	U	J3	2.08	100	10	06/28/2024 01:11	WG2312200
2-Acetylaminofluorene	U		2.53	100	10	06/28/2024 01:11	WG2312200
4-Aminobiphenyl	U		4.61	100	10	06/28/2024 01:11	WG2312200
Chlorobenzilate	U		38.4	500	10	06/28/2024 01:11	WG2312200
Diallate	U		5.24	100	10	06/28/2024 01:11	WG2312200
2,6-Dichlorophenol	U		1.02	100	10	06/28/2024 01:11	WG2312200
Dimethoate	U		50.5	500	10	06/28/2024 01:11	WG2312200
P-(Dimethylamino) Azobenzene	U		36.9	100	10	06/28/2024 01:11	WG2312200
Dimethylbenz (A) Anthracene	U		17.1	100	10	06/28/2024 01:11	WG2312200
3,3-Dimethylbenzidine	U		33.9	100	10	06/28/2024 01:11	WG2312200
a,a-Dimethylphenethylamine	U	J4	31.3	500	10	06/28/2024 01:11	WG2312200
1,3-Dinitrobenzene	U		3.59	100	10	06/28/2024 01:11	WG2312200
Diphenylamine	U	J3	23.7	100	10	06/28/2024 01:11	WG2312200
Dinoseb	U		80.1	500	10	06/28/2024 01:11	WG2312200
Disulfoton	U		2.67	100	10	06/28/2024 01:11	WG2312200
Ethyl methanesulfonate	U		3.26	100	10	06/28/2024 01:11	WG2312200
Ethyl Parathion	U		3.79	100	10	06/28/2024 01:11	WG2312200
Famphur	U	C6	39.2	200	10	06/28/2024 01:11	WG2312200
Hexachloropropene	U		1.49	500	10	06/28/2024 01:11	WG2312200
Hexachlorophene	U		14.4	500	10	06/28/2024 01:11	WG2312200
Isodrin	U		41.1	100	10	06/28/2024 01:11	WG2312200
Isosafrole	U		38.8	100	10	06/28/2024 01:11	WG2312200
Kepone	U	C6	26.6	200	10	06/28/2024 01:11	WG2312200
Methapyrilene	U		100	500	10	06/28/2024 01:11	WG2312200
3-Methylcholanthrene	U		1.64	100	10	06/28/2024 01:11	WG2312200
Methyl methanesulfonate	U		34.0	500	10	06/28/2024 01:11	WG2312200
Methyl parathion	U		2.13	100	10	06/28/2024 01:11	WG2312200
1,4-Naphthoquinone	U	J4	55.6	500	10	06/28/2024 01:11	WG2312200
1-Naphthylamine	U		2.89	100	10	06/28/2024 01:11	WG2312200
2-Naphthylamine	U		44.8	100	10	06/28/2024 01:11	WG2312200
5-Nitro-o-toluidine	U		19.9	100	10	06/28/2024 01:11	WG2312200
4-Nitroquinoline 1-oxide	U		20.3	100	10	06/28/2024 01:11	WG2312200
n-Nitrosodiethylamine	U		35.7	100	10	06/28/2024 01:11	WG2312200
n-Nitrosodi-n-butylamine	U		39.1	100	10	06/28/2024 01:11	WG2312200
n-Nitrosomethylethylamine	U		32.5	100	10	06/28/2024 01:11	WG2312200
n-Nitrosomorpholine	U		32.5	100	10	06/28/2024 01:11	WG2312200
n-Nitrosopiperidine	U		37.2	100	10	06/28/2024 01:11	WG2312200
n-Nitrosopyrrolidine	U		33.9	100	10	06/28/2024 01:11	WG2312200
Pentachlorobenzene	U		41.5	100	10	06/28/2024 01:11	WG2312200
Pentachloroethane	U		28.3	500	10	06/28/2024 01:11	WG2312200
Pentachloronitrobenzene	U		41.5	100	10	06/28/2024 01:11	WG2312200

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
Phenacetin	U		46.6	100	10	06/28/2024 01:11	WG2312200
p-Phenylenediamine	U	J4	3870	69000	10	06/28/2024 01:11	WG2312200
Phorate	U		48.6	500	10	06/28/2024 01:11	WG2312200
2-Picoline	U		68.3	500	10	06/28/2024 01:11	WG2312200
Pronamide	U		42.1	100	10	06/28/2024 01:11	WG2312200
Safrole	U		36.8	100	10	06/28/2024 01:11	WG2312200
Sulfotep	U		39.9	500	10	06/28/2024 01:11	WG2312200
1,2,4,5-Tetrachlorobenzene	U		0.647	100	10	06/28/2024 01:11	WG2312200
2,3,4,6-Tetrachlorophenol	U	J3	2.31	100	10	06/28/2024 01:11	WG2312200
Thionazin	U		40.7	100	10	06/28/2024 01:11	WG2312200
o-Toluidine	U		35.3	100	10	06/28/2024 01:11	WG2312200
2,4,5-Trichlorophenol	U	J3	1.09	100	10	06/28/2024 01:11	WG2312200
O,O,O-Triethyl Phosphorothioate	U		29.3	100	10	06/28/2024 01:11	WG2312200
1,3,5-Trinitrobenzene	U		13.2	100	10	06/28/2024 01:11	WG2312200
(S) 2-Fluorophenol	*30.9*			*10.0-120*		*06/28/2024 01:11*	WG2312200
(S) Phenol-d5	*37.2*			*10.0-120*		*06/28/2024 01:11*	WG2312200
(S) Nitrobenzene-d5	*114*			*10.0-127*		*06/28/2024 01:11*	WG2312200
(S) 2-Fluorobiphenyl	*70.1*			*10.0-130*		*06/28/2024 01:11*	WG2312200
(S) 2,4,6-Tribromophenol	*78.4*			*10.0-155*		*06/28/2024 01:11*	WG2312200
(S) p-Terphenyl-d14	*96.0*			*10.0-128*		*06/28/2024 01:11*	WG2312200

Sample Narrative:

L1749453-01 WG2312200: Dilution due to matrix.

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	06/25/2024 14:37	WG2311771
Unadjusted C9-C12 Aliphatics	U		33.3	100	1	06/25/2024 14:37	WG2311771
Unadjusted C9-C10 Aromatics	U		33.3	100	1	06/25/2024 14:37	WG2311771
Adjusted C5-C8 Aliphatics	U		33.3	100	1	06/25/2024 14:37	WG2311771
Adjusted C9-C12 Aliphatics	U		33.3	100	1	06/25/2024 14:37	WG2311771
Total VPH	U		66.7	200	1	06/25/2024 14:37	WG2311771
(S) 2,5-Dibromotoluene(FID)	*115*			*70.0-130*		*06/25/2024 14:37*	WG2311771
(S) 2,5-Dibromotoluene(PID)	*118*			*70.0-130*		*06/25/2024 14:37*	WG2311771

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	06/26/2024 22:17	WG2312958
Acrylonitrile	U		0.671	5.00	1	06/26/2024 22:17	WG2312958
Benzene	U		0.0941	0.500	1	06/26/2024 22:17	WG2312958
Bromobenzene	U		0.118	0.500	1	06/26/2024 22:17	WG2312958
Bromodichloromethane	U		0.136	0.500	1	06/26/2024 22:17	WG2312958
Bromochloromethane	U		0.128	0.500	1	06/26/2024 22:17	WG2312958
Bromoform	U		0.129	0.500	1	06/26/2024 22:17	WG2312958
Bromomethane	U		0.605	2.50	1	06/26/2024 22:17	WG2312958
n-Butylbenzene	U		0.157	0.500	1	06/26/2024 22:17	WG2312958
sec-Butylbenzene	U		0.125	0.500	1	06/26/2024 22:17	WG2312958
tert-Butylbenzene	U		0.127	0.500	1	06/26/2024 22:17	WG2312958
Carbon disulfide	U		0.0962	0.500	1	06/26/2024 22:17	WG2312958
Carbon tetrachloride	U		0.128	0.500	1	06/26/2024 22:17	WG2312958
Chlorobenzene	U		0.117	0.500	1	06/26/2024 22:17	WG2312958
Chlorodibromomethane	U		0.140	0.500	1	06/26/2024 22:17	WG2312958
Chloroethane	U		0.192	2.50	1	06/26/2024 22:17	WG2312958
2-Chloroethyl vinyl ether	U		0.575	50.0	1	06/26/2024 22:17	WG2312958
Chloroform	U		0.111	0.500	1	06/26/2024 22:17	WG2312958
Chloromethane	U		0.960	1.25	1	06/26/2024 22:17	WG2312958
2-Chlorotoluene	U		0.106	0.500	1	06/26/2024 22:17	WG2312958
4-Chlorotoluene	U		0.114	0.500	1	06/26/2024 22:17	WG2312958
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	06/26/2024 22:17	WG2312958
1,2-Dibromoethane	U		0.126	0.500	1	06/26/2024 22:17	WG2312958
Dibromomethane	U		0.122	0.500	1	06/26/2024 22:17	WG2312958
1,2-Dichlorobenzene	U		0.107	0.500	1	06/26/2024 22:17	WG2312958
1,3-Dichlorobenzene	U		0.299	0.500	1	06/26/2024 22:17	WG2312958
1,4-Dichlorobenzene	U		0.120	0.500	1	06/26/2024 22:17	WG2312958
Dichlorodifluoromethane	U		0.374	2.50	1	06/26/2024 22:17	WG2312958
1,1-Dichloroethane	U		0.100	0.500	1	06/26/2024 22:17	WG2312958
1,2-Dichloroethane	U		0.0819	0.500	1	06/26/2024 22:17	WG2312958
1,1-Dichloroethene	U		0.188	0.500	1	06/26/2024 22:17	WG2312958
cis-1,2-Dichloroethene	U		0.126	0.500	1	06/26/2024 22:17	WG2312958
trans-1,2-Dichloroethene	U		0.149	0.500	1	06/26/2024 22:17	WG2312958
1,2-Dichloropropane	U		0.149	0.500	1	06/26/2024 22:17	WG2312958
1,1-Dichloropropene	U		0.142	0.500	1	06/26/2024 22:17	WG2312958
1,3-Dichloropropane	U		0.109	1.00	1	06/26/2024 22:17	WG2312958
cis-1,3-Dichloropropene	U	J4	0.111	0.500	1	06/26/2024 22:17	WG2312958
trans-1,3-Dichloropropene	U		0.118	0.500	1	06/26/2024 22:17	WG2312958
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	06/26/2024 22:17	WG2312958
2,2-Dichloropropane	U		0.161	0.500	1	06/26/2024 22:17	WG2312958
Di-isopropyl ether	U		0.105	0.500	1	06/26/2024 22:17	WG2312958
Ethylbenzene	U		0.137	0.500	1	06/26/2024 22:17	WG2312958
Hexachloro-1,3-butadiene	U		0.337	1.00	1	06/26/2024 22:17	WG2312958

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	06/26/2024 22:17	WG2312958
n-Hexane	U		0.749	5.00	1	06/26/2024 22:17	WG2312958
Iodomethane	U		0.554	5.00	1	06/26/2024 22:17	WG2312958
Isopropylbenzene	U		0.105	0.500	1	06/26/2024 22:17	WG2312958
p-Isopropyltoluene	U		0.120	0.500	1	06/26/2024 22:17	WG2312958
2-Butanone (MEK)	U		1.19	5.00	1	06/26/2024 22:17	WG2312958
Methylene Chloride	U		0.430	2.50	1	06/26/2024 22:17	WG2312958
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	06/26/2024 22:17	WG2312958
Methyl tert-butyl ether	U		0.101	0.500	1	06/26/2024 22:17	WG2312958
Naphthalene	U		0.174	2.50	1	06/26/2024 22:17	WG2312958
n-Propylbenzene	U		0.0993	0.500	1	06/26/2024 22:17	WG2312958
Styrene	U		0.118	0.500	1	06/26/2024 22:17	WG2312958
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	06/26/2024 22:17	WG2312958
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	06/26/2024 22:17	WG2312958
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	06/26/2024 22:17	WG2312958
Tetrachloroethene	U		0.300	0.500	1	06/26/2024 22:17	WG2312958
Toluene	U		0.278	0.500	1	06/26/2024 22:17	WG2312958
1,2,3-Trichlorobenzene	U		0.164	0.500	1	06/26/2024 22:17	WG2312958
1,2,4-Trichlorobenzene	U		0.481	1.00	1	06/26/2024 22:17	WG2312958
1,1,1-Trichloroethane	U		0.149	0.500	1	06/26/2024 22:17	WG2312958
1,1,2-Trichloroethane	U		0.158	0.500	1	06/26/2024 22:17	WG2312958
Trichloroethene	U		0.190	0.500	1	06/26/2024 22:17	WG2312958
Trichlorofluoromethane	U		0.160	2.50	1	06/26/2024 22:17	WG2312958
1,2,3-Trichloropropane	U		0.237	2.50	1	06/26/2024 22:17	WG2312958
1,2,4-Trimethylbenzene	U		0.322	0.500	1	06/26/2024 22:17	WG2312958
1,2,3-Trimethylbenzene	U		0.104	0.500	1	06/26/2024 22:17	WG2312958
1,3,5-Trimethylbenzene	U		0.104	0.500	1	06/26/2024 22:17	WG2312958
Vinyl acetate	U		0.692	5.00	1	06/26/2024 22:17	WG2312958
Vinyl chloride	U		0.234	0.500	1	06/26/2024 22:17	WG2312958
Xylenes, Total	U		0.174	1.50	1	06/26/2024 22:17	WG2312958
(S) Toluene-d8	*113*			*80.0-120*		*06/26/2024 22:17*	WG2312958
(S) 4-Bromofluorobenzene	*92.8*			*77.0-126*		*06/26/2024 22:17*	WG2312958
(S) 1,2-Dichloroethane-d4	*100*			*70.0-130*		*06/26/2024 22:17*	WG2312958

QUALITY CONTROL SUMMARY

L1749453-01,02

Method Blank (MB)

(MB) R4086646-3 06/25/24 12:50

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)	*116*			*70.0-130*
(S) 2,5-Dibromotoluene(PID)	*117*			*70.0-130*

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

(LCS) R4086646-1 06/25/24 10:22 • (LCSD) R4086646-2 06/25/24 10:59

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	1050	1030	87.5	85.8	70.0-130			1.92	50
Unadjusted C9-C12 Aliphatics	1400	1240	1230	88.6	87.9	70.0-130			0.810	50
Unadjusted C9-C10 Aromatics	200	183	181	91.5	90.5	70.0-130			1.10	50
Total VPH	2800	2470	2440	88.2	87.1	70.0-130			1.22	50
(S) 2,5-Dibromotoluene(FID)				*108*	*107*	*70.0-130*				
(S) 2,5-Dibromotoluene(PID)				*109*	*109*	*70.0-130*				

Method Blank (MB)

(MB) R4087540-3 06/26/24 19:58

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

Method Blank (MB)

(MB) R4087540-3 06/26/24 19:58

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	*113*			*80.0-120*
(S) 4-Bromofluorobenzene	*95.3*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*104*			*70.0-130*

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

(LCS) R4087540-1 06/26/24 19:01 • (LCSD) R4087540-2 06/26/24 19:20

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	29.7	27.4	119	110	19.0-160			8.06	27
Acrylonitrile	25.0	20.2	24.7	80.8	98.8	55.0-149			20.0	20
Benzene	5.00	4.44	4.10	88.8	82.0	70.0-123			7.96	20
Bromobenzene	5.00	5.76	5.43	115	109	73.0-121			5.90	20
Bromodichloromethane	5.00	4.13	4.09	82.6	81.8	75.0-120			0.973	20
Bromochloromethane	5.00	4.27	4.23	85.4	84.6	76.0-122			0.941	20
Bromoform	5.00	4.00	4.07	80.0	81.4	68.0-132			1.73	20
Bromomethane	5.00	4.48	4.36	89.6	87.2	10.0-160			2.71	25
n-Butylbenzene	5.00	5.24	5.03	105	101	73.0-125			4.09	20
sec-Butylbenzene	5.00	5.63	4.94	113	98.8	75.0-125			13.1	20
tert-Butylbenzene	5.00	5.59	5.11	112	102	76.0-124			8.97	20
Carbon disulfide	5.00	3.76	3.39	75.2	67.8	61.0-128			10.3	20
Carbon tetrachloride	5.00	4.36	4.17	87.2	83.4	68.0-126			4.45	20
Chlorobenzene	5.00	5.48	5.17	110	103	80.0-121			5.82	20
Chlorodibromomethane	5.00	4.62	4.40	92.4	88.0	77.0-125			4.88	20
Chloroethane	5.00	4.43	4.64	88.6	92.8	47.0-150			4.63	20
2-Chloroethyl vinyl ether	25.0	21.3	19.5	85.2	78.0	51.0-160	J	J	8.82	20
Chloroform	5.00	4.50	4.37	90.0	87.4	73.0-120			2.93	20
Chloromethane	5.00	5.58	5.02	112	100	41.0-142			10.6	20
2-Chlorotoluene	5.00	5.53	4.97	111	99.4	76.0-123			10.7	20
4-Chlorotoluene	5.00	5.47	5.28	109	106	75.0-122			3.53	20
1,2-Dibromo-3-Chloropropane	5.00	4.95	4.91	99.0	98.2	58.0-134			0.811	20
1,2-Dibromoethane	5.00	5.37	5.05	107	101	80.0-122			6.14	20
Dibromomethane	5.00	4.16	4.13	83.2	82.6	80.0-120			0.724	20
1,2-Dichlorobenzene	5.00	5.71	5.44	114	109	79.0-121			4.84	20
1,3-Dichlorobenzene	5.00	5.45	5.14	109	103	79.0-120			5.85	20
1,4-Dichlorobenzene	5.00	5.31	5.06	106	101	79.0-120			4.82	20
Dichlorodifluoromethane	5.00	5.61	5.25	112	105	51.0-149			6.63	20
1,1-Dichloroethane	5.00	4.46	4.27	89.2	85.4	70.0-126			4.35	20
1,2-Dichloroethane	5.00	4.63	4.43	92.6	88.6	70.0-128			4.42	20
1,1-Dichloroethene	5.00	4.47	4.05	89.4	81.0	71.0-124			9.86	20
cis-1,2-Dichloroethene	5.00	4.53	4.45	90.6	89.0	73.0-120			1.78	20
trans-1,2-Dichloroethene	5.00	4.49	4.05	89.8	81.0	73.0-120			10.3	20
1,2-Dichloropropane	5.00	4.37	4.19	87.4	83.8	77.0-125			4.21	20
1,1-Dichloropropene	5.00	4.30	4.15	86.0	83.0	74.0-126			3.55	20
1,3-Dichloropropane	5.00	5.34	4.92	107	98.4	80.0-120			8.19	20
cis-1,3-Dichloropropene	5.00	4.10	3.90	82.0	78.0	80.0-123		J4	5.00	20
trans-1,3-Dichloropropene	5.00	4.71	4.59	94.2	91.8	78.0-124			2.58	20
trans-1,4-Dichloro-2-butene	5.00	4.50	4.54	90.0	90.8	33.0-144	J	J	0.885	20
2,2-Dichloropropane	5.00	4.12	3.87	82.4	77.4	58.0-130			6.26	20

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

(LCS) R4087540-1 06/26/24 19:01 • (LCSD) R4087540-2 06/26/24 19:20

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	4.78	4.55	95.6	91.0	58.0-138			4.93	20
Ethylbenzene	5.00	5.42	4.97	108	99.4	79.0-123			8.66	20
Hexachloro-1,3-butadiene	5.00	5.31	4.92	106	98.4	54.0-138			7.62	20
2-Hexanone	25.0	24.8	24.7	99.2	98.8	67.0-149			0.404	20
n-Hexane	5.00	4.18	3.84	83.6	76.8	57.0-133	J	J	8.48	20
Iodomethane	25.0	22.7	21.3	90.8	85.2	33.0-147			6.36	26
Isopropylbenzene	5.00	5.32	4.98	106	99.6	76.0-127			6.60	20
p-Isopropyltoluene	5.00	5.67	5.11	113	102	76.0-125			10.4	20
2-Butanone (MEK)	25.0	19.3	20.3	77.2	81.2	44.0-160			5.05	20
Methylene Chloride	5.00	4.08	4.20	81.6	84.0	67.0-120			2.90	20
4-Methyl-2-pentanone (MIBK)	25.0	28.8	27.3	115	109	68.0-142			5.35	20
Methyl tert-butyl ether	5.00	4.12	4.30	82.4	86.0	68.0-125			4.28	20
Naphthalene	5.00	5.60	5.32	112	106	54.0-135			5.13	20
n-Propylbenzene	5.00	5.51	5.07	110	101	77.0-124			8.32	20
Styrene	5.00	5.28	4.81	106	96.2	73.0-130			9.32	20
1,1,1,2-Tetrachloroethane	5.00	5.10	5.12	102	102	75.0-125			0.391	20
1,1,2,2-Tetrachloroethane	5.00	5.54	5.29	111	106	65.0-130			4.62	20
1,1,2-Trichlorotrifluoroethane	5.00	4.42	4.31	88.4	86.2	69.0-132			2.52	20
Tetrachloroethene	5.00	5.35	4.87	107	97.4	72.0-132			9.39	20
Toluene	5.00	5.33	4.97	107	99.4	79.0-120			6.99	20
1,2,3-Trichlorobenzene	5.00	5.73	5.58	115	112	50.0-138			2.65	20
1,2,4-Trichlorobenzene	5.00	5.53	5.01	111	100	57.0-137			9.87	20
1,1,1-Trichloroethane	5.00	4.58	4.23	91.6	84.6	73.0-124			7.95	20
1,1,2-Trichloroethane	5.00	5.48	5.07	110	101	80.0-120			7.77	20
Trichloroethene	5.00	4.51	4.11	90.2	82.2	78.0-124			9.28	20
Trichlorofluoromethane	5.00	4.54	4.50	90.8	90.0	59.0-147			0.885	20
1,2,3-Trichloropropane	5.00	5.63	5.36	113	107	73.0-130			4.91	20
1,2,4-Trimethylbenzene	5.00	5.39	5.11	108	102	76.0-121			5.33	20
1,2,3-Trimethylbenzene	5.00	5.71	5.34	114	107	77.0-120			6.70	20
1,3,5-Trimethylbenzene	5.00	5.60	5.18	112	104	76.0-122			7.79	20
Vinyl acetate	25.0	22.7	23.2	90.8	92.8	11.0-160			2.18	20
Vinyl chloride	5.00	5.24	4.75	105	95.0	67.0-131			9.81	20
Xylenes, Total	15.0	16.1	14.7	107	98.0	79.0-123			9.09	20
(S) Toluene-d8				*111*	*111*	*80.0-120*				
(S) 4-Bromofluorobenzene				*95.8*	*95.0*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*101*	*102*	*70.0-130*				

Method Blank (MB)

(MB) R4086921-1 06/26/24 08:05

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	*64.1*			*40.0-140*

Method Blank (MB)

(MB) R4086921-2 06/26/24 09:17

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	*66.0*			*40.0-140*
(S) 2-Fluorobiphenyl	*90.6*			*40.0-140*
(S) 2-Bromonaphthalene	*87.1*			*40.0-140*

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

(LCS) R4086921-4 06/26/24 12:30 • (LCSD) R4086921-5 06/26/24 12:54

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	305	339	50.8	56.5	40.0-140	J	J	10.6	25
Unadjusted C19-C36 Aliphatics	800	773	808	96.6	101	40.0-140			4.43	25
(S) 1-Chloro-octadecane				*68.1*	*70.1*	*40.0-140*				

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

(LCS) R4086921-6 06/26/24 13:18 • (LCSD) R4086921-3 06/26/24 10:05

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	1330	1400	78.2	82.4	40.0-140			5.13	25
(S) o-Terphenyl				*67.1*	*67.3*	*40.0-140*				
(S) 2-Fluorobiphenyl				*86.1*	*86.6*	*40.0-140*				
(S) 2-Bromonaphthalene				*82.6*	*83.3*	*40.0-140*				

Method Blank (MB)

(MB) R4087549-4 06/27/24 18:50

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

Method Blank (MB)

(MB) R4087549-4 06/27/24 18:50

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	*56.6*			*10.0-127*
(S) 2-Fluorobiphenyl	*60.8*			*10.0-130*
(S) 2,4,6-Tribromophenol	*51.5*			*10.0-155*
(S) p-Terphenyl-d14	*74.5*			*10.0-128*

Method Blank (MB)

(MB) R4087549-5 06/27/24 18:50

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

Method Blank (MB)

(MB) R4087549-5 06/27/24 18:50

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) R4087549-1 06/27/24 17:45 • (LCSD) R4087549-2 06/27/24 18:07

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	38.9	29.9	77.8	59.8	41.0-120		J3	26.2	22
Acenaphthylene	50.0	41.2	31.1	82.4	62.2	43.0-120		J3	27.9	22
Anthracene	50.0	42.3	32.6	84.6	65.2	45.0-120		J3	25.9	20
Benzidine	100	29.1	18.1	29.1	18.1	10.0-120		J3	46.6	36
Benzo(a)anthracene	50.0	45.8	35.2	91.6	70.4	47.0-120		J3	26.2	20
Benzo(b)fluoranthene	50.0	44.9	34.9	89.8	69.8	46.0-120		J3	25.1	20
Benzo(k)fluoranthene	50.0	45.3	34.7	90.6	69.4	46.0-120		J3	26.5	21
Benzo(g,h,i)perylene	50.0	39.5	29.5	79.0	59.0	48.0-121		J3	29.0	20
Benzo(a)pyrene	50.0	42.1	32.1	84.2	64.2	47.0-120		J3	27.0	20
Bis(2-chlorethoxy)methane	50.0	36.9	28.8	73.8	57.6	33.0-120		J3	24.7	24
Bis(2-chloroethyl)ether	50.0	37.6	27.5	75.2	55.0	23.0-120			31.0	33
2,2-Oxybis(1-Chloropropane)	50.0	35.6	26.4	71.2	52.8	28.0-120			29.7	31
4-Bromophenyl-phenylether	50.0	45.5	33.9	91.0	67.8	45.0-120		J3	29.2	20
2-Chloronaphthalene	50.0	37.5	28.2	75.0	56.4	37.0-120		J3	28.3	25
4-Chlorophenyl-phenylether	50.0	47.4	36.9	94.8	73.8	44.0-120		J3	24.9	20
Chrysene	50.0	42.9	32.8	85.8	65.6	48.0-120		J3	26.7	20
Dibenz(a,h)anthracene	50.0	38.1	28.1	76.2	56.2	47.0-120		J3	30.2	20
3,3-Dichlorobenzidine	100	83.9	65.6	83.9	65.6	44.0-120		J3	24.5	20
2,4-Dinitrotoluene	50.0	44.2	36.3	88.4	72.6	49.0-124			19.6	20
2,6-Dinitrotoluene	50.0	44.9	34.7	89.8	69.4	46.0-120		J3	25.6	21
Fluoranthene	50.0	44.0	34.3	88.0	68.6	51.0-120		J3	24.8	20
Fluorene	50.0	44.5	34.7	89.0	69.4	47.0-120		J3	24.7	20

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

(LCS) R4087549-1 06/27/24 17:45 • (LCSD) R4087549-2 06/27/24 18:07

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 %
Hexachlorobenzene	50.0	43.2	32.9	86.4	65.8	44.0-120		J3	27.1	20
Hexachloro-1,3-butadiene	50.0	32.9	25.6	65.8	51.2	19.0-120			25.0	32
Hexachlorocyclopentadiene	50.0	32.1	25.2	64.2	50.4	15.0-120			24.1	31
Hexachloroethane	50.0	33.2	23.9	66.4	47.8	15.0-120			32.6	37
Indeno(1,2,3-cd)pyrene	50.0	37.7	28.6	75.4	57.2	49.0-122		J3	27.5	20
Isophorone	50.0	36.3	28.8	72.6	57.6	36.0-120			23.0	23
Naphthalene	50.0	32.2	25.3	64.4	50.6	27.0-120			24.0	27
Nitrobenzene	50.0	32.5	25.3	65.0	50.6	27.0-120			24.9	29
n-Nitrosodimethylamine	50.0	25.4	18.7	50.8	37.4	10.0-120			30.4	40
n-Nitrosodiphenylamine	50.0	41.1	31.6	82.2	63.2	47.0-120		J3	26.1	20
n-Nitrosodi-n-propylamine	50.0	40.8	31.0	81.6	62.0	31.0-120			27.3	28
Phenanthrene	50.0	42.5	32.2	85.0	64.4	46.0-120		J3	27.6	20
Benzylbutyl phthalate	50.0	45.1	35.6	90.2	71.2	43.0-121		J3	23.5	20
Bis(2-Ethylhexyl)phthalate	50.0	37.7	29.6	75.4	59.2	43.0-122		J3	24.1	20
Di-n-butyl phthalate	50.0	46.4	35.3	92.8	70.6	49.0-121		J3	27.2	20
Diethyl phthalate	50.0	45.0	36.1	90.0	72.2	48.0-122		J3	21.9	20
Dimethyl phthalate	50.0	45.7	35.0	91.4	70.0	48.0-120		J3	26.5	20
Di-n-octyl phthalate	50.0	40.6	31.1	81.2	62.2	42.0-125		J3	26.5	20
Pyrene	50.0	45.7	34.9	91.4	69.8	47.0-120		J3	26.8	20
1,2,4-Trichlorobenzene	50.0	32.9	25.9	65.8	51.8	24.0-120			23.8	29
Aniline	50.0	25.4	18.3	50.8	36.6	13.0-120		J3	32.5	31
1,2-Diphenylhydrazine	50.0	45.2	35.2	90.4	70.4	41.0-126	N2	J3 N2	24.9	20
Benzyl alcohol	50.0	29.3	21.0	58.6	42.0	25.0-120		J3	33.0	26
4-Chloroaniline	50.0	31.6	23.8	63.2	47.6	25.0-120		J3	28.2	25
4-Chloro-3-methylphenol	50.0	37.5	28.4	75.0	56.8	40.0-120		J3	27.6	21
2-Chlorophenol	50.0	32.5	22.2	65.0	44.4	25.0-120		J3	37.7	35
Dibenzofuran	50.0	41.5	32.1	83.0	64.2	44.0-120		J3	25.5	22
2,4-Dichlorophenol	50.0	35.5	26.7	71.0	53.4	36.0-120		J3	28.3	26
2,4-Dimethylphenol	50.0	39.3	29.8	78.6	59.6	33.0-120		J3	27.5	26
4,6-Dinitro-2-methylphenol	50.0	49.9	38.8	99.8	77.6	38.0-138			25.0	25
2,4-Dinitrophenol	50.0	53.8	43.1	108	86.2	10.0-120			22.1	39
2-Methylnaphthalene	50.0	35.1	28.1	70.2	56.2	33.0-120			22.2	25
2-Methylphenol	50.0	29.5	20.0	59.0	40.0	28.0-120		J3	38.4	29
3&4-Methyl Phenol	50.0	32.2	22.6	64.4	45.2	31.0-120		J3	35.0	30
2-Nitroaniline	50.0	45.0	34.7	90.0	69.4	43.0-120		J3	25.8	22
3-Nitroaniline	50.0	41.0	31.5	82.0	63.0	38.0-120		J3	26.2	21
4-Nitroaniline	50.0	43.5	34.2	87.0	68.4	18.0-160		J3	23.9	21
2-Nitrophenol	50.0	37.1	29.0	74.2	58.0	31.0-120			24.5	29
4-Nitrophenol	50.0	17.8	13.5	35.6	27.0	10.0-120			27.5	33
Pentachlorophenol	50.0	40.2	30.7	80.4	61.4	23.0-120		J3	26.8	25

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

(LCS) R4087549-1 06/27/24 17:45 • (LCSD) R4087549-2 06/27/24 18:07

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	14.5	10.7	29.0	21.4	10.0-120			30.2	36
Pyridine	50.0	12.5	8.81	25.0	17.6	10.0-120		J	34.6	38
2,4,6-Trichlorophenol	50.0	43.1	32.8	86.2	65.6	42.0-120		J3	27.1	23
Acetophenone	50.0	37.0	27.2	74.0	54.4	29.0-120		J3	30.5	28
Diphenylamine	50.0	41.1	31.6	82.2	63.2	35.0-120		J3	26.1	20
1,2,4,5-Tetrachlorobenzene	50.0	43.0	34.1	86.0	68.2	31.0-121			23.1	27
2,3,4,6-Tetrachlorophenol	50.0	49.9	38.5	99.8	77.0	42.0-132		J3	25.8	22
2,4,5-Trichlorophenol	50.0	48.7	36.0	97.4	72.0	44.0-120		J3	30.0	22
(S) 2-Fluorophenol				*38.6*	*28.5*	*10.0-120*				
(S) Phenol-d5				*26.5*	*20.3*	*10.0-120*				
(S) Nitrobenzene-d5				*61.2*	*46.3*	*10.0-127*				
(S) 2-Fluorobiphenyl				*75.0*	*57.3*	*10.0-130*				
(S) 2,4,6-Tribromophenol				*74.5*	*60.0*	*10.0-155*				
(S) p-Terphenyl-d14				*87.6*	*66.8*	*10.0-128*				

Laboratory Control Sample (LCS)

(LCS) R4087549-3 06/27/24 18:28

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Acetylaminofluorene	50.0	27.1	54.2	32.0-120	
4-Aminobiphenyl	50.0	17.9	35.8	20.0-120	
Chlorobenzilate	50.0	32.2	64.4	29.0-128	J
Diallate	50.0	26.2	52.4	30.0-120	
2,6-Dichlorophenol	50.0	24.1	48.2	19.0-136	
Dimethoate	50.0	23.3	46.6	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	26.3	52.6	27.0-120	
Dimethylbenz (A) Anthracene	50.0	36.9	73.8	14.0-124	
3,3-Dimethylbenzidine	50.0	6.60	13.2	13.0-120	J
a,a-Dimethylphenethylamine	50.0	0.0149	0.0298	10.0-129	J J4
1,3-Dinitrobenzene	50.0	28.7	57.4	34.0-120	
Diphenylamine	50.0	26.3	52.6	35.0-120	
Dinoseb	50.0	30.4	60.8	39.0-120	J
Disulfoton	50.0	25.0	50.0	32.0-120	
Ethyl methanesulfonate	50.0	26.3	52.6	10.0-120	
Ethyl Parathion	50.0	29.2	58.4	46.0-130	
Famphur	50.0	27.6	55.2	32.0-120	
Hexachloropropene	50.0	15.2	30.4	10.0-120	J
Hexachlorophene	100	27.1	27.1	10.0-120	J

Laboratory Control Sample (LCS)

(LCS) R4087549-3 06/27/24 18:28

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Isodrin	50.0	35.4	70.8	22.0-157	
Isosafrole	50.0	24.2	48.4	25.0-133	
Kepone	50.0	40.9	81.8	10.0-120	
Methapyrilene	50.0	5.80	11.6	10.0-120	J
3-Methylcholanthrene	50.0	35.8	71.6	30.0-160	
Methyl methanesulfonate	50.0	20.0	40.0	10.0-120	J
Methyl parathion	50.0	30.1	60.2	42.0-120	
1,4-Naphthoquinone	50.0	1.31	2.62	50.0-150	J J4
1-Naphthylamine	50.0	20.9	41.8	19.0-120	
2-Naphthylamine	50.0	13.8	27.6	10.0-120	
5-Nitro-o-toluidine	50.0	30.2	60.4	34.0-120	
4-Nitroquinoline 1-oxide	50.0	22.2	44.4	10.0-159	
n-Nitrosodiethylamine	50.0	22.3	44.6	10.0-120	
n-Nitrosodi-n-butylamine	50.0	28.7	57.4	13.0-143	
n-Nitrosomethylethylamine	50.0	19.6	39.2	10.0-120	
n-Nitrosomorpholine	50.0	28.7	57.4	10.0-120	
n-Nitrosopiperidine	50.0	31.4	62.8	10.0-160	
n-Nitrosopyrrolidine	50.0	26.7	53.4	10.0-124	
Pentachlorobenzene	50.0	25.0	50.0	25.0-120	
Pentachloroethane	50.0	19.3	38.6	10.0-120	J
Pentachloronitrobenzene	50.0	31.8	63.6	34.0-132	
Phenacetin	50.0	32.7	65.4	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	27.8	55.6	13.0-160	J
2-Picoline	50.0	9.08	18.2	10.0-120	J
Pronamide	50.0	33.4	66.8	38.0-130	
Safrole	50.0	23.9	47.8	21.0-120	
Sulfotep	50.0	30.3	60.6	52.0-120	J
Thionazin	50.0	30.5	61.0	38.0-121	
o-Toluidine	50.0	21.9	43.8	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	25.4	50.8	11.0-135	
1,3,5-Trinitrobenzene	50.0	41.3	82.6	37.0-147	

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
C6	The initial calibration verification standard (SSCV) associated with this data responded low.
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.
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.
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.

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	LAO000356
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.

Company Name/Address:
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: CMR Great Falls - 2023 RFI Soil Sampling

City/State Collected:

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):

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 ✓

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/hubfs/pas-standard-terms.pdf

SDG # 1799453

Ta I117

Acctnum: ENVIRONCO
Template: T245953
Prelogin: P1071916
PM: 841 - Kelly Mercer
PB: KT 5/17/24
Shipped Via: FedEX Ground

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	Pres Chk	8270AP9 100ml Amb NoPres	SVEPHMT 1L-Amb-Add HCl	V8260LL 40mlAmb-HCl	V8260LL 40mlAmb-HCl-Blk	VPHMT 40mlAmb HCl	VPHMT 40mlAmb-HCl-Blk	Remarks	Sample # (lab only)
CMR-SP200-240620	Grab	GW	–	06 20 24	1400	7		✓	✓	✓	✓	✓	✓		-01
TRIP BLANK		GW													-02

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

Remarks: 6-21-24

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: __ UPS __ FedEx __ Courier _____

Tracking # 7241 0719 1467

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

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR
Kyle A. Groves	06/20/24	1600		2

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C Bottles Received:
				5.3+0.3=5.6 7

If preservation required by Login: Date/Time

Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date:	Time:	Hold:	Condition: NCF / OK
			Charles Stevenson	6-21-24	9:15		OK

APPENDIX A3

PASSIVE TREATMENT TRENCH GROUNDWATER ANALYTICAL RESULTS

Pace Project Number:

L1744765

ANALYTICAL REPORT

July 22, 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:	L1744765
Samples Received:	06/08/2024
Project Number:	1690029619
Description:	Calumet GW
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 National

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

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CMR-MW-41S-240606 L1744765-01 GW

Collected by	Collected date/time	Received date/time
Kyle A. Groves	06/06/24 14:45	06/08/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 4500CO2 D-2011	WG2302569	1	06/11/24 14:45	06/11/24 14:45	KA	Mt. Juliet, TN
Wet Chemistry by Method 5210 B-2016	WG2301323	1	06/08/24 14:44	06/13/24 15:41	BGE	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG2301406	1	06/08/24 23:39	06/08/24 23:39	JD	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG2324864	1	07/18/24 14:02	07/18/24 17:33	ZSA	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG2324874	1	07/18/24 12:31	07/18/24 19:53	JTM	Mt. Juliet, TN
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2302206	1	06/11/24 01:58	06/11/24 01:58	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG2306205	1	06/17/24 13:02	06/17/24 13:02	CCM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2305836	1	06/15/24 16:17	06/15/24 16:17	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2306687	25	06/17/24 20:24	06/17/24 20:24	JAH	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2305499	1	06/13/24 15:22	06/17/24 10:35	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2305499	1	06/13/24 15:22	06/17/24 18:12	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2303253	1	06/13/24 08:00	06/13/24 15:24	AGW	Mt. Juliet, TN

TRIP BLANK L1744765-02 GW

Collected by	Collected date/time	Received date/time
Kyle A. Groves	06/06/24 00:00	06/08/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2302206	1	06/10/24 14:22	06/10/24 14:22	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2305836	1	06/15/24 14:23	06/15/24 14:23	ACG	Mt. Juliet, TN

CMR-MW-105-240606 L1744765-03 GW

Collected by	Collected date/time	Received date/time
Kyle A. Groves	06/06/24 00:00	06/08/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 4500CO2 D-2011	WG2302569	1	06/11/24 14:49	06/11/24 14:49	KA	Mt. Juliet, TN
Wet Chemistry by Method 5210 B-2016	WG2301323	1	06/08/24 15:14	06/13/24 15:44	BGE	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG2301406	1	06/08/24 23:52	06/08/24 23:52	JD	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG2324864	1	07/18/24 14:02	07/18/24 17:35	ZSA	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG2324874	1	07/18/24 12:31	07/18/24 19:54	JTM	Mt. Juliet, TN
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2302206	1	06/11/24 02:33	06/11/24 02:33	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG2306205	1	06/17/24 13:07	06/17/24 13:07	CCM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2305836	1	06/15/24 16:36	06/15/24 16:36	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2306687	1	06/17/24 17:30	06/17/24 17:30	JAH	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2305499	1	06/13/24 15:22	06/17/24 10:59	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2305499	1	06/13/24 15:22	06/17/24 17:48	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2303253	1	06/13/24 08:00	06/13/24 15:47	AGW	Mt. Juliet, TN

CMR-MW-106-240606 L1744765-04 GW

Collected by	Collected date/time	Received date/time
Kyle A. Groves	06/06/24 00:00	06/08/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 4500CO2 D-2011	WG2302569	1	06/11/24 14:52	06/11/24 14:52	KA	Mt. Juliet, TN
Wet Chemistry by Method 5210 B-2016	WG2301323	1	06/08/24 15:21	06/13/24 15:50	BGE	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG2301406	1	06/09/24 00:32	06/09/24 00:32	JD	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG2324864	1	07/18/24 14:02	07/18/24 17:37	ZSA	Mt. Juliet, TN
Metals (ICP) by Method 6010B	WG2324874	1	07/18/24 12:31	07/18/24 19:56	JTM	Mt. Juliet, TN
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2302206	1	06/11/24 03:08	06/11/24 03:08	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG2306205	1	06/17/24 13:12	06/17/24 13:12	CCM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2305836	1	06/15/24 16:55	06/15/24 16:55	ACG	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2306687	1	06/17/24 17:52	06/17/24 17:52	JAH	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2305499	1	06/13/24 15:22	06/17/24 11:23	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2305499	1	06/13/24 15:22	06/17/24 17:24	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2303253	1	06/13/24 08:00	06/13/24 16:09	AGW	Mt. Juliet, TN

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.

L1744765-01, -03, -04: Benzidine, a,a-Dimethylphenethylamine, p-Phenylenediamine, 1,4-Naphthoquinone, Methapyrilene, and 3,3-Dimethylbenzidine are reporting with critically low recovery in the laboratory control sample(s). These compounds are a method defined poor performer. Results are estimated.

Sample Delivery Group (SDG) Narrative

Analyzed from headspace vial.

Lab Sample ID	Project Sample ID	Method
L1744765-02	TRIP BLANK	8260B

pH outside of method requirement.

Lab Sample ID	Project Sample ID	Method
L1744765-04	CMR-MW-106-240606	8260B

The following analysis were performed from an unpreserved, insufficiently or inadequately preserved sample.

Lab Sample ID	Project Sample ID	Method
L1744765-04	CMR-MW-106-240606	MTDEQ EPH

Analysis was filtered in the laboratory.

Lab Sample ID	Project Sample ID	Method
L1744765-04	CMR-MW-106-240606	6010B

Wet Chemistry by Method 4500CO2 D-2011

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Free Carbon Dioxide	87900	T8	20000	1	06/11/2024 14:45	WG2302569

Sample Narrative:

L1744765-01 WG2302569: Endpoint pH 4.5 headspace

Wet Chemistry by Method 5210 B-2016

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
BOD	41.1	J+ J-	33.3	1	06/13/2024 15:41	WG2301323

Wet Chemistry by Method 9056A

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Nitrate as (N)	229	Q	48.0	100	1	06/08/2024 23:39	WG2301406
Sulfate	19500		594	5000	1	06/08/2024 23:39	WG2301406

Metals (ICP) by Method 6010B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Iron	3670		18.0	100	1	07/18/2024 19:53	WG2324874
Iron,Dissolved	4110		18.0	100	1	07/18/2024 17:33	WG2324864
Manganese	1860		0.934	10.0	1	07/18/2024 19:53	WG2324874
Manganese,Dissolved	2250		0.934	10.0	1	07/18/2024 17:33	WG2324864

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	1260		33.3	100	1	06/11/2024 01:58	WG2302206
Unadjusted C9-C12 Aliphatics	4050		33.3	100	1	06/11/2024 01:58	WG2302206
Unadjusted C9-C10 Aromatics	1380		33.3	100	1	06/11/2024 01:58	WG2302206
Adjusted C5-C8 Aliphatics	903		33.3	100	1	06/11/2024 01:58	WG2302206
Adjusted C9-C12 Aliphatics	2920		33.3	100	1	06/11/2024 01:58	WG2302206
Total VPH	6690		66.7	200	1	06/11/2024 01:58	WG2302206
(S) 2,5-Dibromotoluene(FID)	*96.2*			*70.0-130*		*06/11/2024 01:58*	WG2302206
(S) 2,5-Dibromotoluene(PID)	*94.8*			*70.0-130*		*06/11/2024 01:58*	WG2302206

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Methane	5180		2.91	10.0	1	06/17/2024 13:02	WG2306205

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	06/15/2024 16:17	WG2305836
Acrylonitrile	U		0.671	5.00	1	06/15/2024 16:17	WG2305836
Benzene	353		2.35	12.5	25	06/17/2024 20:24	WG2306687
Bromobenzene	U		0.118	0.500	1	06/15/2024 16:17	WG2305836
Bromodichloromethane	U		0.136	0.500	1	06/15/2024 16:17	WG2305836
Bromochloromethane	U		0.128	0.500	1	06/15/2024 16:17	WG2305836
Bromoform	U		0.129	0.500	1	06/15/2024 16:17	WG2305836
Bromomethane	U		0.605	2.50	1	06/15/2024 16:17	WG2305836
n-Butylbenzene	U		0.157	0.500	1	06/15/2024 16:17	WG2305836

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
sec-Butylbenzene	8.79		0.125	0.500	1	06/15/2024 16:17	WG2305836
tert-Butylbenzene	U		0.127	0.500	1	06/15/2024 16:17	WG2305836
Carbon disulfide	0.171	J	0.0962	0.500	1	06/15/2024 16:17	WG2305836
Carbon tetrachloride	U		0.128	0.500	1	06/15/2024 16:17	WG2305836
Chlorobenzene	U		0.117	0.500	1	06/15/2024 16:17	WG2305836
Chlorodibromomethane	U		0.140	0.500	1	06/15/2024 16:17	WG2305836
Chloroethane	U		0.192	2.50	1	06/15/2024 16:17	WG2305836
2-Chloroethyl vinyl ether	U		0.575	50.0	1	06/15/2024 16:17	WG2305836
Chloroform	U		0.111	0.500	1	06/15/2024 16:17	WG2305836
Chloromethane	U		0.960	1.25	1	06/15/2024 16:17	WG2305836
2-Chlorotoluene	U		0.106	0.500	1	06/15/2024 16:17	WG2305836
4-Chlorotoluene	U		0.114	0.500	1	06/15/2024 16:17	WG2305836
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	06/15/2024 16:17	WG2305836
1,2-Dibromoethane	U		0.126	0.500	1	06/15/2024 16:17	WG2305836
Dibromomethane	U		0.122	0.500	1	06/15/2024 16:17	WG2305836
1,2-Dichlorobenzene	U		0.107	0.500	1	06/15/2024 16:17	WG2305836
1,3-Dichlorobenzene	U		0.299	0.500	1	06/15/2024 16:17	WG2305836
1,4-Dichlorobenzene	U		0.120	0.500	1	06/15/2024 16:17	WG2305836
Dichlorodifluoromethane	U		0.374	2.50	1	06/15/2024 16:17	WG2305836
1,1-Dichloroethane	U		0.100	0.500	1	06/15/2024 16:17	WG2305836
1,2-Dichloroethane	U		0.0819	0.500	1	06/15/2024 16:17	WG2305836
1,1-Dichloroethene	U		0.188	0.500	1	06/15/2024 16:17	WG2305836
cis-1,2-Dichloroethene	U		0.126	0.500	1	06/15/2024 16:17	WG2305836
trans-1,2-Dichloroethene	U		0.149	0.500	1	06/15/2024 16:17	WG2305836
1,2-Dichloropropane	U		0.149	0.500	1	06/15/2024 16:17	WG2305836
1,1-Dichloropropene	U		0.142	0.500	1	06/15/2024 16:17	WG2305836
1,3-Dichloropropane	U		0.109	1.00	1	06/15/2024 16:17	WG2305836
cis-1,3-Dichloropropene	U		0.111	0.500	1	06/15/2024 16:17	WG2305836
trans-1,3-Dichloropropene	U		0.118	0.500	1	06/15/2024 16:17	WG2305836
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	06/15/2024 16:17	WG2305836
2,2-Dichloropropane	U		0.161	0.500	1	06/15/2024 16:17	WG2305836
Di-isopropyl ether	U		0.105	0.500	1	06/15/2024 16:17	WG2305836
Ethylbenzene	147		3.43	12.5	25	06/17/2024 20:24	WG2306687
Hexachloro-1,3-butadiene	U		0.337	1.00	1	06/15/2024 16:17	WG2305836
2-Hexanone	U		0.787	5.00	1	06/15/2024 16:17	WG2305836
n-Hexane	11.5		0.749	5.00	1	06/15/2024 16:17	WG2305836
Iodomethane	U		0.554	5.00	1	06/15/2024 16:17	WG2305836
Isopropylbenzene	8.31		0.105	0.500	1	06/15/2024 16:17	WG2305836
p-Isopropyltoluene	8.72		0.120	0.500	1	06/15/2024 16:17	WG2305836
2-Butanone (MEK)	U		1.19	5.00	1	06/15/2024 16:17	WG2305836
Methylene Chloride	U		0.430	2.50	1	06/15/2024 16:17	WG2305836
4-Methyl-2-pentanone (MIBK)	2.60	J	0.478	5.00	1	06/15/2024 16:17	WG2305836
Methyl tert-butyl ether	U		0.101	0.500	1	06/15/2024 16:17	WG2305836
Naphthalene	67.8		0.174	2.50	1	06/15/2024 16:17	WG2305836
n-Propylbenzene	23.5		0.0993	0.500	1	06/15/2024 16:17	WG2305836
Styrene	U		0.118	0.500	1	06/15/2024 16:17	WG2305836
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	06/15/2024 16:17	WG2305836
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	06/15/2024 16:17	WG2305836
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	06/15/2024 16:17	WG2305836
Tetrachloroethene	U		0.300	0.500	1	06/15/2024 16:17	WG2305836
Toluene	4.04		0.278	0.500	1	06/15/2024 16:17	WG2305836
1,2,3-Trichlorobenzene	U		0.164	0.500	1	06/15/2024 16:17	WG2305836
1,2,4-Trichlorobenzene	U		0.481	1.00	1	06/15/2024 16:17	WG2305836
1,1,1-Trichloroethane	U		0.149	0.500	1	06/15/2024 16:17	WG2305836
1,1,2-Trichloroethane	U		0.158	0.500	1	06/15/2024 16:17	WG2305836
Trichloroethene	U		0.190	0.500	1	06/15/2024 16:17	WG2305836

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Trichlorofluoromethane	U		0.160	2.50	1	06/15/2024 16:17	WG2305836
1,2,3-Trichloropropane	U		0.237	2.50	1	06/15/2024 16:17	WG2305836
1,2,4-Trimethylbenzene	656		8.05	12.5	25	06/17/2024 20:24	WG2306687
1,2,3-Trimethylbenzene	261		2.60	12.5	25	06/17/2024 20:24	WG2306687
1,3,5-Trimethylbenzene	91.5		0.104	0.500	1	06/15/2024 16:17	WG2305836
Vinyl acetate	U		0.692	5.00	1	06/15/2024 16:17	WG2305836
Vinyl chloride	U		0.234	0.500	1	06/15/2024 16:17	WG2305836
Xylenes, Total	987		4.35	37.5	25	06/17/2024 20:24	WG2306687
(S) Toluene-d8	*98.0*			*80.0-120*		*06/15/2024 16:17*	WG2305836
(S) Toluene-d8	*98.8*			*80.0-120*		*06/17/2024 20:24*	WG2306687
(S) 4-Bromofluorobenzene	*101*			*77.0-126*		*06/15/2024 16:17*	WG2305836
(S) 4-Bromofluorobenzene	*95.6*			*77.0-126*		*06/17/2024 20:24*	WG2306687
(S) 1,2-Dichloroethane-d4	*88.0*			*70.0-130*		*06/15/2024 16:17*	WG2305836
(S) 1,2-Dichloroethane-d4	*108*			*70.0-130*		*06/17/2024 20:24*	WG2306687

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	06/17/2024 10:35	WG2305499
Unadjusted C19-C36 Aliphatics	U		200	600	1	06/17/2024 10:35	WG2305499
Unadjusted C11-C22 Aromatics	405	J	200	600	1	06/17/2024 18:12	WG2305499
Unadjusted Total Petroleum Hydrocarbons	405	J	200	600	1	06/17/2024 18:12	WG2305499
Adjusted C11-C22 Aromatics	363	J	200	600	1	06/17/2024 18:12	WG2305499
Adjusted Total Petroleum Hydrocarbons	363	J	200	600	1	06/17/2024 18:12	WG2305499
(S) o-Terphenyl	*40.8*			*40.0-140*		*06/17/2024 18:12*	WG2305499
(S) 1-Chloro-octadecane	*27.8*	J2		*40.0-140*		*06/17/2024 10:35*	WG2305499
(S) 2-Fluorobiphenyl	*86.8*			*40.0-140*		*06/17/2024 18:12*	WG2305499
(S) 2-Bromonaphthalene	*80.5*			*40.0-140*		*06/17/2024 18:12*	WG2305499

Sample Narrative:

L1744765-01 WG2305499: Surrogate failure due to matrix interference during extraction procedure.

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	0.554	J	0.0886	1.00	1	06/13/2024 15:24	WG2303253
Acenaphthylene	U		0.0921	1.00	1	06/13/2024 15:24	WG2303253
Anthracene	U		0.0804	1.00	1	06/13/2024 15:24	WG2303253
Benzidine	U	J4	3.74	10.0	1	06/13/2024 15:24	WG2303253
Benzo(a)anthracene	U		0.199	1.00	1	06/13/2024 15:24	WG2303253
Benzo(b)fluoranthene	U		0.130	1.00	1	06/13/2024 15:24	WG2303253
Benzo(k)fluoranthene	U		0.120	1.00	1	06/13/2024 15:24	WG2303253
Benzo(g,h,i)perylene	U		0.121	1.00	1	06/13/2024 15:24	WG2303253
Benzo(a)pyrene	U		0.0381	1.00	1	06/13/2024 15:24	WG2303253
Bis(2-chlorethoxy)methane	U		0.116	10.0	1	06/13/2024 15:24	WG2303253
Bis(2-chloroethyl)ether	U		0.137	10.0	1	06/13/2024 15:24	WG2303253
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0	1	06/13/2024 15:24	WG2303253
4-Bromophenyl-phenylether	U		0.0877	10.0	1	06/13/2024 15:24	WG2303253
2-Chloronaphthalene	U		0.0648	1.00	1	06/13/2024 15:24	WG2303253
4-Chlorophenyl-phenylether	U		0.0926	10.0	1	06/13/2024 15:24	WG2303253
Chrysene	U		0.130	1.00	1	06/13/2024 15:24	WG2303253
Dibenz(a,h)anthracene	U		0.0644	1.00	1	06/13/2024 15:24	WG2303253
3,3-Dichlorobenzidine	U		0.212	10.0	1	06/13/2024 15:24	WG2303253
2,4-Dinitrotoluene	U		0.0983	10.0	1	06/13/2024 15:24	WG2303253

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
2,6-Dinitrotoluene	U		0.250	10.0	1	06/13/2024 15:24	WG2303253
Fluoranthene	U		0.102	1.00	1	06/13/2024 15:24	WG2303253
Fluorene	0.820	J	0.0844	1.00	1	06/13/2024 15:24	WG2303253
Hexachlorobenzene	U		0.0755	1.00	1	06/13/2024 15:24	WG2303253
Hexachloro-1,3-butadiene	U		0.0968	10.0	1	06/13/2024 15:24	WG2303253
Hexachlorocyclopentadiene	U		0.0598	10.0	1	06/13/2024 15:24	WG2303253
Hexachloroethane	U		0.127	10.0	1	06/13/2024 15:24	WG2303253
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	06/13/2024 15:24	WG2303253
Isophorone	U		0.143	10.0	1	06/13/2024 15:24	WG2303253
Naphthalene	24.4		0.159	1.00	1	06/13/2024 15:24	WG2303253
Nitrobenzene	U		0.297	10.0	1	06/13/2024 15:24	WG2303253
n-Nitrosodimethylamine	U		0.998	10.0	1	06/13/2024 15:24	WG2303253
n-Nitrosodiphenylamine	U		2.37	10.0	1	06/13/2024 15:24	WG2303253
n-Nitrosodi-n-propylamine	U		0.261	10.0	1	06/13/2024 15:24	WG2303253
Phenanthrene	0.582	J	0.112	1.00	1	06/13/2024 15:24	WG2303253
Benzylbutyl phthalate	U		0.765	3.00	1	06/13/2024 15:24	WG2303253
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00	1	06/13/2024 15:24	WG2303253
Di-n-butyl phthalate	U		0.453	3.00	1	06/13/2024 15:24	WG2303253
Diethyl phthalate	U		0.287	3.00	1	06/13/2024 15:24	WG2303253
Dimethyl phthalate	U		0.260	3.00	1	06/13/2024 15:24	WG2303253
Di-n-octyl phthalate	U		0.932	3.00	1	06/13/2024 15:24	WG2303253
Pyrene	U		0.107	1.00	1	06/13/2024 15:24	WG2303253
1,2,4-Trichlorobenzene	U		0.0698	10.0	1	06/13/2024 15:24	WG2303253
Aniline	U		1.65	10.0	1	06/13/2024 15:24	WG2303253
1,2-Diphenylhydrazine	U	N2	0.105	10.0	1	06/13/2024 15:24	WG2303253
Benzyl alcohol	U		0.563	10.0	1	06/13/2024 15:24	WG2303253
4-Chloroaniline	U		0.234	10.0	1	06/13/2024 15:24	WG2303253
4-Chloro-3-methylphenol	U		0.131	10.0	1	06/13/2024 15:24	WG2303253
2-Chlorophenol	U		0.133	10.0	1	06/13/2024 15:24	WG2303253
Dibenzofuran	U		0.0970	10.0	1	06/13/2024 15:24	WG2303253
2,4-Dichlorophenol	U		0.102	10.0	1	06/13/2024 15:24	WG2303253
2,4-Dimethylphenol	8.34	J	0.0636	10.0	1	06/13/2024 15:24	WG2303253
4,6-Dinitro-2-methylphenol	U		1.12	10.0	1	06/13/2024 15:24	WG2303253
2,4-Dinitrophenol	U		5.93	10.0	1	06/13/2024 15:24	WG2303253
2-Methylnaphthalene	16.2		0.117	1.00	1	06/13/2024 15:24	WG2303253
2-Methylphenol	U		0.0929	10.0	1	06/13/2024 15:24	WG2303253
3&4-Methyl Phenol	U		0.168	10.0	1	06/13/2024 15:24	WG2303253
2-Nitroaniline	U		0.102	10.0	1	06/13/2024 15:24	WG2303253
3-Nitroaniline	U		0.0869	10.0	1	06/13/2024 15:24	WG2303253
4-Nitroaniline	U		0.0910	10.0	1	06/13/2024 15:24	WG2303253
2-Nitrophenol	U		0.117	10.0	1	06/13/2024 15:24	WG2303253
4-Nitrophenol	U		0.143	10.0	1	06/13/2024 15:24	WG2303253
Pentachlorophenol	U		0.313	10.0	1	06/13/2024 15:24	WG2303253
Phenol	4.65	J	4.33	10.0	1	06/13/2024 15:24	WG2303253
Pyridine	U	J4	0.627	10.0	1	06/13/2024 15:24	WG2303253
2,4,6-Trichlorophenol	U		0.100	10.0	1	06/13/2024 15:24	WG2303253
Acetophenone	U		0.208	10.0	1	06/13/2024 15:24	WG2303253
2-Acetylaminofluorene	U		0.253	10.0	1	06/13/2024 15:24	WG2303253
4-Aminobiphenyl	U		0.461	10.0	1	06/13/2024 15:24	WG2303253
Chlorobenzilate	U		3.84	50.0	1	06/13/2024 15:24	WG2303253
Diallate	U		0.524	10.0	1	06/13/2024 15:24	WG2303253
2,6-Dichlorophenol	U		0.102	10.0	1	06/13/2024 15:24	WG2303253
Dimethoate	U		5.05	50.0	1	06/13/2024 15:24	WG2303253
P-(Dimethylamino) Azobenzene	U		3.69	10.0	1	06/13/2024 15:24	WG2303253
Dimethylbenz (A) Anthracene	U		1.71	10.0	1	06/13/2024 15:24	WG2303253
3,3-Dimethylbenzidine	U	J4	3.39	10.0	1	06/13/2024 15:24	WG2303253

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
a,a-Dimethylphenethylamine	U	J4	3.13	50.0	1	06/13/2024 15:24	WG2303253
1,3-Dinitrobenzene	U		0.359	10.0	1	06/13/2024 15:24	WG2303253
Diphenylamine	U		2.37	10.0	1	06/13/2024 15:24	WG2303253
Dinoseb	U		8.01	50.0	1	06/13/2024 15:24	WG2303253
Disulfoton	U		0.267	10.0	1	06/13/2024 15:24	WG2303253
Ethyl methanesulfonate	U		0.326	10.0	1	06/13/2024 15:24	WG2303253
Ethyl Parathion	U		0.379	10.0	1	06/13/2024 15:24	WG2303253
Famphur	U	C6	3.92	20.0	1	06/13/2024 15:24	WG2303253
Hexachloropropene	U		0.149	50.0	1	06/13/2024 15:24	WG2303253
Hexachlorophene	U		1.44	50.0	1	06/13/2024 15:24	WG2303253
Isodrin	U		4.11	10.0	1	06/13/2024 15:24	WG2303253
Isosafrole	U		3.88	10.0	1	06/13/2024 15:24	WG2303253
Kepone	U	C6	2.66	20.0	1	06/13/2024 15:24	WG2303253
Methapyrilene	U	J4	10.0	50.0	1	06/13/2024 15:24	WG2303253
3-Methylcholanthrene	U		0.164	10.0	1	06/13/2024 15:24	WG2303253
Methyl methanesulfonate	U		3.40	50.0	1	06/13/2024 15:24	WG2303253
Methyl parathion	U		0.213	10.0	1	06/13/2024 15:24	WG2303253
1,4-Naphthoquinone	U	J4	5.56	50.0	1	06/13/2024 15:24	WG2303253
1-Naphthylamine	U		0.289	10.0	1	06/13/2024 15:24	WG2303253
2-Naphthylamine	U		4.48	10.0	1	06/13/2024 15:24	WG2303253
5-Nitro-o-toluidine	U		1.99	10.0	1	06/13/2024 15:24	WG2303253
4-Nitroquinoline 1-oxide	U		2.03	10.0	1	06/13/2024 15:24	WG2303253
n-Nitrosodiethylamine	U		3.57	10.0	1	06/13/2024 15:24	WG2303253
n-Nitrosodi-n-butylamine	U		3.91	10.0	1	06/13/2024 15:24	WG2303253
n-Nitrosomethylethylamine	U		3.25	10.0	1	06/13/2024 15:24	WG2303253
n-Nitrosomorpholine	U		3.25	10.0	1	06/13/2024 15:24	WG2303253
n-Nitrosopiperidine	U		3.72	10.0	1	06/13/2024 15:24	WG2303253
n-Nitrosopyrrolidine	U		3.39	10.0	1	06/13/2024 15:24	WG2303253
Pentachlorobenzene	U		4.15	10.0	1	06/13/2024 15:24	WG2303253
Pentachloroethane	U		2.83	50.0	1	06/13/2024 15:24	WG2303253
Pentachloronitrobenzene	U		4.15	10.0	1	06/13/2024 15:24	WG2303253
Phenacetin	U		4.66	10.0	1	06/13/2024 15:24	WG2303253
p-Phenylenediamine	U	J4	387	6900	1	06/13/2024 15:24	WG2303253
Phorate	U		4.86	50.0	1	06/13/2024 15:24	WG2303253
2-Picoline	U		6.83	50.0	1	06/13/2024 15:24	WG2303253
Pronamide	U		4.21	10.0	1	06/13/2024 15:24	WG2303253
Safrole	U		3.68	10.0	1	06/13/2024 15:24	WG2303253
Sulfotep	U		3.99	50.0	1	06/13/2024 15:24	WG2303253
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0	1	06/13/2024 15:24	WG2303253
2,3,4,6-Tetrachlorophenol	U		0.231	10.0	1	06/13/2024 15:24	WG2303253
Thionazin	U		4.07	10.0	1	06/13/2024 15:24	WG2303253
o-Toluidine	U		3.53	10.0	1	06/13/2024 15:24	WG2303253
2,4,5-Trichlorophenol	U		0.109	10.0	1	06/13/2024 15:24	WG2303253
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0	1	06/13/2024 15:24	WG2303253
1,3,5-Trinitrobenzene	U		1.32	10.0	1	06/13/2024 15:24	WG2303253
(S) 2-Fluorophenol	*22.5*			*10.0-120*		*06/13/2024 15:24*	WG2303253
(S) Phenol-d5	*21.1*			*10.0-120*		*06/13/2024 15:24*	WG2303253
(S) Nitrobenzene-d5	*75.1*			*10.0-127*		*06/13/2024 15:24*	WG2303253
(S) 2-Fluorobiphenyl	*56.3*			*10.0-130*		*06/13/2024 15:24*	WG2303253
(S) 2,4,6-Tribromophenol	*46.3*			*10.0-155*		*06/13/2024 15:24*	WG2303253
(S) p-Terphenyl-d14	*32.0*			*10.0-128*		*06/13/2024 15:24*	WG2303253

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	06/10/2024 14:22	WG2302206
Unadjusted C9-C12 Aliphatics	U		33.3	100	1	06/10/2024 14:22	WG2302206
Unadjusted C9-C10 Aromatics	U		33.3	100	1	06/10/2024 14:22	WG2302206
Adjusted C5-C8 Aliphatics	U		33.3	100	1	06/10/2024 14:22	WG2302206
Adjusted C9-C12 Aliphatics	U		33.3	100	1	06/10/2024 14:22	WG2302206
Total VPH	U		66.7	200	1	06/10/2024 14:22	WG2302206
(S) 2,5-Dibromotoluene(FID)	*91.7*			*70.0-130*		*06/10/2024 14:22*	WG2302206
(S) 2,5-Dibromotoluene(PID)	*97.0*			*70.0-130*		*06/10/2024 14:22*	WG2302206

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	06/15/2024 14:23	WG2305836
Acrylonitrile	U		0.671	5.00	1	06/15/2024 14:23	WG2305836
Benzene	U		0.0941	0.500	1	06/15/2024 14:23	WG2305836
Bromobenzene	U		0.118	0.500	1	06/15/2024 14:23	WG2305836
Bromodichloromethane	U		0.136	0.500	1	06/15/2024 14:23	WG2305836
Bromochloromethane	U		0.128	0.500	1	06/15/2024 14:23	WG2305836
Bromoform	U		0.129	0.500	1	06/15/2024 14:23	WG2305836
Bromomethane	U		0.605	2.50	1	06/15/2024 14:23	WG2305836
n-Butylbenzene	U		0.157	0.500	1	06/15/2024 14:23	WG2305836
sec-Butylbenzene	U		0.125	0.500	1	06/15/2024 14:23	WG2305836
tert-Butylbenzene	U		0.127	0.500	1	06/15/2024 14:23	WG2305836
Carbon disulfide	U		0.0962	0.500	1	06/15/2024 14:23	WG2305836
Carbon tetrachloride	U		0.128	0.500	1	06/15/2024 14:23	WG2305836
Chlorobenzene	U		0.117	0.500	1	06/15/2024 14:23	WG2305836
Chlorodibromomethane	U		0.140	0.500	1	06/15/2024 14:23	WG2305836
Chloroethane	U		0.192	2.50	1	06/15/2024 14:23	WG2305836
2-Chloroethyl vinyl ether	U		0.575	50.0	1	06/15/2024 14:23	WG2305836
Chloroform	U		0.111	0.500	1	06/15/2024 14:23	WG2305836
Chloromethane	U		0.960	1.25	1	06/15/2024 14:23	WG2305836
2-Chlorotoluene	U		0.106	0.500	1	06/15/2024 14:23	WG2305836
4-Chlorotoluene	U		0.114	0.500	1	06/15/2024 14:23	WG2305836
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	06/15/2024 14:23	WG2305836
1,2-Dibromoethane	U		0.126	0.500	1	06/15/2024 14:23	WG2305836
Dibromomethane	U		0.122	0.500	1	06/15/2024 14:23	WG2305836
1,2-Dichlorobenzene	U		0.107	0.500	1	06/15/2024 14:23	WG2305836
1,3-Dichlorobenzene	U		0.299	0.500	1	06/15/2024 14:23	WG2305836
1,4-Dichlorobenzene	U		0.120	0.500	1	06/15/2024 14:23	WG2305836
Dichlorodifluoromethane	U		0.374	2.50	1	06/15/2024 14:23	WG2305836
1,1-Dichloroethane	U		0.100	0.500	1	06/15/2024 14:23	WG2305836
1,2-Dichloroethane	U		0.0819	0.500	1	06/15/2024 14:23	WG2305836
1,1-Dichloroethene	U		0.188	0.500	1	06/15/2024 14:23	WG2305836
cis-1,2-Dichloroethene	U		0.126	0.500	1	06/15/2024 14:23	WG2305836
trans-1,2-Dichloroethene	U		0.149	0.500	1	06/15/2024 14:23	WG2305836
1,2-Dichloropropane	U		0.149	0.500	1	06/15/2024 14:23	WG2305836
1,1-Dichloropropene	U		0.142	0.500	1	06/15/2024 14:23	WG2305836
1,3-Dichloropropane	U		0.109	1.00	1	06/15/2024 14:23	WG2305836
cis-1,3-Dichloropropene	U		0.111	0.500	1	06/15/2024 14:23	WG2305836
trans-1,3-Dichloropropene	U		0.118	0.500	1	06/15/2024 14:23	WG2305836
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	06/15/2024 14:23	WG2305836
2,2-Dichloropropane	U		0.161	0.500	1	06/15/2024 14:23	WG2305836
Di-isopropyl ether	U		0.105	0.500	1	06/15/2024 14:23	WG2305836
Ethylbenzene	U		0.137	0.500	1	06/15/2024 14:23	WG2305836
Hexachloro-1,3-butadiene	U		0.337	1.00	1	06/15/2024 14:23	WG2305836

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	06/15/2024 14:23	WG2305836
n-Hexane	U		0.749	5.00	1	06/15/2024 14:23	WG2305836
Iodomethane	U		0.554	5.00	1	06/15/2024 14:23	WG2305836
Isopropylbenzene	U		0.105	0.500	1	06/15/2024 14:23	WG2305836
p-Isopropyltoluene	U		0.120	0.500	1	06/15/2024 14:23	WG2305836
2-Butanone (MEK)	U		1.19	5.00	1	06/15/2024 14:23	WG2305836
Methylene Chloride	4.06		0.430	2.50	1	06/15/2024 14:23	WG2305836
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	06/15/2024 14:23	WG2305836
Methyl tert-butyl ether	U		0.101	0.500	1	06/15/2024 14:23	WG2305836
Naphthalene	U		0.174	2.50	1	06/15/2024 14:23	WG2305836
n-Propylbenzene	U		0.0993	0.500	1	06/15/2024 14:23	WG2305836
Styrene	U		0.118	0.500	1	06/15/2024 14:23	WG2305836
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	06/15/2024 14:23	WG2305836
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	06/15/2024 14:23	WG2305836
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	06/15/2024 14:23	WG2305836
Tetrachloroethene	U		0.300	0.500	1	06/15/2024 14:23	WG2305836
Toluene	U		0.278	0.500	1	06/15/2024 14:23	WG2305836
1,2,3-Trichlorobenzene	U		0.164	0.500	1	06/15/2024 14:23	WG2305836
1,2,4-Trichlorobenzene	U		0.481	1.00	1	06/15/2024 14:23	WG2305836
1,1,1-Trichloroethane	U		0.149	0.500	1	06/15/2024 14:23	WG2305836
1,1,2-Trichloroethane	U		0.158	0.500	1	06/15/2024 14:23	WG2305836
Trichloroethene	U		0.190	0.500	1	06/15/2024 14:23	WG2305836
Trichlorofluoromethane	U		0.160	2.50	1	06/15/2024 14:23	WG2305836
1,2,3-Trichloropropane	U		0.237	2.50	1	06/15/2024 14:23	WG2305836
1,2,4-Trimethylbenzene	U		0.322	0.500	1	06/15/2024 14:23	WG2305836
1,2,3-Trimethylbenzene	U		0.104	0.500	1	06/15/2024 14:23	WG2305836
1,3,5-Trimethylbenzene	U		0.104	0.500	1	06/15/2024 14:23	WG2305836
Vinyl acetate	U		0.692	5.00	1	06/15/2024 14:23	WG2305836
Vinyl chloride	U		0.234	0.500	1	06/15/2024 14:23	WG2305836
Xylenes, Total	U		0.174	1.50	1	06/15/2024 14:23	WG2305836
(S) Toluene-d8	*100*			*80.0-120*		*06/15/2024 14:23*	WG2305836
(S) 4-Bromofluorobenzene	*109*			*77.0-126*		*06/15/2024 14:23*	WG2305836
(S) 1,2-Dichloroethane-d4	*91.1*			*70.0-130*		*06/15/2024 14:23*	WG2305836

Wet Chemistry by Method 4500CO2 D-2011

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Free Carbon Dioxide	81000	T8	20000	1	06/11/2024 14:49	WG2302569

Sample Narrative:

L1744765-03 WG2302569: Endpoint pH 4.5 headspace

Wet Chemistry by Method 5210 B-2016

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
BOD	ND	J+ J- T8	3.33	1	06/13/2024 15:44	WG2301323

Wet Chemistry by Method 9056A

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Nitrate as (N)	204	Q	48.0	100	1	06/08/2024 23:52	WG2301406
Sulfate	70800	J6	594	5000	1	06/08/2024 23:52	WG2301406

Metals (ICP) by Method 6010B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Iron	135	B	18.0	100	1	07/18/2024 19:54	WG2324874
Iron,Dissolved	99.4	J	18.0	100	1	07/18/2024 17:35	WG2324864
Manganese	562		0.934	10.0	1	07/18/2024 19:54	WG2324874
Manganese,Dissolved	422		0.934	10.0	1	07/18/2024 17:35	WG2324864

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	668		33.3	100	1	06/11/2024 02:33	WG2302206
Unadjusted C9-C12 Aliphatics	211		33.3	100	1	06/11/2024 02:33	WG2302206
Unadjusted C9-C10 Aromatics	56.5	J	33.3	100	1	06/11/2024 02:33	WG2302206
Adjusted C5-C8 Aliphatics	664		33.3	100	1	06/11/2024 02:33	WG2302206
Adjusted C9-C12 Aliphatics	205		33.3	100	1	06/11/2024 02:33	WG2302206
Total VPH	936		66.7	200	1	06/11/2024 02:33	WG2302206
(S) 2,5-Dibromotoluene(FID)	*99.2*			*70.0-130*		*06/11/2024 02:33*	WG2302206
(S) 2,5-Dibromotoluene(PID)	*102*			*70.0-130*		*06/11/2024 02:33*	WG2302206

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Methane	371		2.91	10.0	1	06/17/2024 13:07	WG2306205

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	06/15/2024 16:36	WG2305836
Acrylonitrile	U		0.671	5.00	1	06/15/2024 16:36	WG2305836
Benzene	37.6		0.0941	0.500	1	06/15/2024 16:36	WG2305836
Bromobenzene	U		0.118	0.500	1	06/15/2024 16:36	WG2305836
Bromodichloromethane	U		0.136	0.500	1	06/15/2024 16:36	WG2305836
Bromochloromethane	U		0.128	0.500	1	06/15/2024 16:36	WG2305836
Bromoform	U		0.129	0.500	1	06/15/2024 16:36	WG2305836
Bromomethane	U		0.605	2.50	1	06/15/2024 16:36	WG2305836
n-Butylbenzene	0.569		0.157	0.500	1	06/15/2024 16:36	WG2305836

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
sec-Butylbenzene	0.439	J	0.125	0.500	1	06/15/2024 16:36	WG2305836
tert-Butylbenzene	U		0.127	0.500	1	06/15/2024 16:36	WG2305836
Carbon disulfide	U		0.0962	0.500	1	06/15/2024 16:36	WG2305836
Carbon tetrachloride	U		0.128	0.500	1	06/15/2024 16:36	WG2305836
Chlorobenzene	U		0.117	0.500	1	06/15/2024 16:36	WG2305836
Chlorodibromomethane	U		0.140	0.500	1	06/15/2024 16:36	WG2305836
Chloroethane	U		0.192	2.50	1	06/15/2024 16:36	WG2305836
2-Chloroethyl vinyl ether	U		0.575	50.0	1	06/15/2024 16:36	WG2305836
Chloroform	U		0.111	0.500	1	06/15/2024 16:36	WG2305836
Chloromethane	U		0.960	1.25	1	06/15/2024 16:36	WG2305836
2-Chlorotoluene	U		0.106	0.500	1	06/15/2024 16:36	WG2305836
4-Chlorotoluene	U		0.114	0.500	1	06/15/2024 16:36	WG2305836
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	06/15/2024 16:36	WG2305836
1,2-Dibromoethane	U		0.126	0.500	1	06/15/2024 16:36	WG2305836
Dibromomethane	U		0.122	0.500	1	06/15/2024 16:36	WG2305836
1,2-Dichlorobenzene	U		0.107	0.500	1	06/15/2024 16:36	WG2305836
1,3-Dichlorobenzene	U		0.299	0.500	1	06/15/2024 16:36	WG2305836
1,4-Dichlorobenzene	U		0.120	0.500	1	06/15/2024 16:36	WG2305836
Dichlorodifluoromethane	U		0.374	2.50	1	06/15/2024 16:36	WG2305836
1,1-Dichloroethane	U		0.100	0.500	1	06/15/2024 16:36	WG2305836
1,2-Dichloroethane	U		0.0819	0.500	1	06/15/2024 16:36	WG2305836
1,1-Dichloroethene	U		0.188	0.500	1	06/15/2024 16:36	WG2305836
cis-1,2-Dichloroethene	U		0.126	0.500	1	06/15/2024 16:36	WG2305836
trans-1,2-Dichloroethene	U		0.149	0.500	1	06/15/2024 16:36	WG2305836
1,2-Dichloropropane	U		0.149	0.500	1	06/15/2024 16:36	WG2305836
1,1-Dichloropropene	U		0.142	0.500	1	06/15/2024 16:36	WG2305836
1,3-Dichloropropane	U		0.109	1.00	1	06/15/2024 16:36	WG2305836
cis-1,3-Dichloropropene	U		0.111	0.500	1	06/15/2024 16:36	WG2305836
trans-1,3-Dichloropropene	U		0.118	0.500	1	06/15/2024 16:36	WG2305836
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	06/15/2024 16:36	WG2305836
2,2-Dichloropropane	U		0.161	0.500	1	06/15/2024 16:36	WG2305836
Di-isopropyl ether	U		0.105	0.500	1	06/15/2024 16:36	WG2305836
Ethylbenzene	84.8		0.137	0.500	1	06/15/2024 16:36	WG2305836
Hexachloro-1,3-butadiene	U		0.337	1.00	1	06/15/2024 16:36	WG2305836
2-Hexanone	U		0.787	5.00	1	06/15/2024 16:36	WG2305836
n-Hexane	10.4		0.749	5.00	1	06/15/2024 16:36	WG2305836
Iodomethane	U		0.554	5.00	1	06/15/2024 16:36	WG2305836
Isopropylbenzene	2.52		0.105	0.500	1	06/15/2024 16:36	WG2305836
p-Isopropyltoluene	0.366	J	0.120	0.500	1	06/15/2024 16:36	WG2305836
2-Butanone (MEK)	U		1.19	5.00	1	06/15/2024 16:36	WG2305836
Methylene Chloride	U		0.430	2.50	1	06/15/2024 16:36	WG2305836
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	06/15/2024 16:36	WG2305836
Methyl tert-butyl ether	U		0.101	0.500	1	06/15/2024 16:36	WG2305836
Naphthalene	3.38		0.174	2.50	1	06/15/2024 16:36	WG2305836
n-Propylbenzene	10.7		0.0993	0.500	1	06/15/2024 16:36	WG2305836
Styrene	U		0.118	0.500	1	06/15/2024 16:36	WG2305836
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	06/15/2024 16:36	WG2305836
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	06/15/2024 16:36	WG2305836
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	06/15/2024 16:36	WG2305836
Tetrachloroethene	U		0.300	0.500	1	06/15/2024 16:36	WG2305836
Toluene	3.83		0.278	0.500	1	06/15/2024 16:36	WG2305836
1,2,3-Trichlorobenzene	U		0.164	0.500	1	06/15/2024 16:36	WG2305836
1,2,4-Trichlorobenzene	U		0.481	1.00	1	06/15/2024 16:36	WG2305836
1,1,1-Trichloroethane	U		0.149	0.500	1	06/15/2024 16:36	WG2305836
1,1,2-Trichloroethane	U		0.158	0.500	1	06/15/2024 16:36	WG2305836
Trichloroethene	U		0.190	0.500	1	06/15/2024 16:36	WG2305836

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Trichlorofluoromethane	U		0.160	2.50	1	06/15/2024 16:36	WG2305836
1,2,3-Trichloropropane	U		0.237	2.50	1	06/15/2024 16:36	WG2305836
1,2,4-Trimethylbenzene	3.22		0.322	0.500	1	06/17/2024 17:30	WG2306687
1,2,3-Trimethylbenzene	2.60		0.104	0.500	1	06/17/2024 17:30	WG2306687
1,3,5-Trimethylbenzene	0.332	J	0.104	0.500	1	06/15/2024 16:36	WG2305836
Vinyl acetate	U		0.692	5.00	1	06/15/2024 16:36	WG2305836
Vinyl chloride	U		0.234	0.500	1	06/15/2024 16:36	WG2305836
Xylenes, Total	5.09		0.174	1.50	1	06/17/2024 17:30	WG2306687
(S) Toluene-d8	*99.7*			*80.0-120*		*06/15/2024 16:36*	WG2305836
(S) Toluene-d8	*97.5*			*80.0-120*		*06/17/2024 17:30*	WG2306687
(S) 4-Bromofluorobenzene	*103*			*77.0-126*		*06/15/2024 16:36*	WG2305836
(S) 4-Bromofluorobenzene	*93.9*			*77.0-126*		*06/17/2024 17:30*	WG2306687
(S) 1,2-Dichloroethane-d4	*94.9*			*70.0-130*		*06/15/2024 16:36*	WG2305836
(S) 1,2-Dichloroethane-d4	*109*			*70.0-130*		*06/17/2024 17:30*	WG2306687

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	06/17/2024 10:59	WG2305499
Unadjusted C19-C36 Aliphatics	U		200	600	1	06/17/2024 10:59	WG2305499
Unadjusted C11-C22 Aromatics	U		200	600	1	06/17/2024 17:48	WG2305499
Unadjusted Total Petroleum Hydrocarbons	U		200	600	1	06/17/2024 17:48	WG2305499
Adjusted C11-C22 Aromatics	U		200	600	1	06/17/2024 17:48	WG2305499
Adjusted Total Petroleum Hydrocarbons	U		200	600	1	06/17/2024 17:48	WG2305499
(S) o-Terphenyl	*63.3*			*40.0-140*		*06/17/2024 17:48*	WG2305499
(S) 1-Chloro-octadecane	*54.2*			*40.0-140*		*06/17/2024 10:59*	WG2305499
(S) 2-Fluorobiphenyl	*84.9*			*40.0-140*		*06/17/2024 17:48*	WG2305499
(S) 2-Bromonaphthalene	*81.2*			*40.0-140*		*06/17/2024 17:48*	WG2305499

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	06/13/2024 15:47	WG2303253
Acenaphthylene	U		0.0921	1.00	1	06/13/2024 15:47	WG2303253
Anthracene	U		0.0804	1.00	1	06/13/2024 15:47	WG2303253
Benzidine	U	J4	3.74	10.0	1	06/13/2024 15:47	WG2303253
Benzo(a)anthracene	U		0.199	1.00	1	06/13/2024 15:47	WG2303253
Benzo(b)fluoranthene	U		0.130	1.00	1	06/13/2024 15:47	WG2303253
Benzo(k)fluoranthene	U		0.120	1.00	1	06/13/2024 15:47	WG2303253
Benzo(g,h,i)perylene	U		0.121	1.00	1	06/13/2024 15:47	WG2303253
Benzo(a)pyrene	U		0.0381	1.00	1	06/13/2024 15:47	WG2303253
Bis(2-chlorethoxy)methane	U		0.116	10.0	1	06/13/2024 15:47	WG2303253
Bis(2-chloroethyl)ether	U		0.137	10.0	1	06/13/2024 15:47	WG2303253
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0	1	06/13/2024 15:47	WG2303253
4-Bromophenyl-phenylether	U		0.0877	10.0	1	06/13/2024 15:47	WG2303253
2-Chloronaphthalene	U		0.0648	1.00	1	06/13/2024 15:47	WG2303253
4-Chlorophenyl-phenylether	U		0.0926	10.0	1	06/13/2024 15:47	WG2303253
Chrysene	U		0.130	1.00	1	06/13/2024 15:47	WG2303253
Dibenz(a,h)anthracene	U		0.0644	1.00	1	06/13/2024 15:47	WG2303253
3,3-Dichlorobenzidine	U		0.212	10.0	1	06/13/2024 15:47	WG2303253
2,4-Dinitrotoluene	U		0.0983	10.0	1	06/13/2024 15:47	WG2303253
2,6-Dinitrotoluene	U		0.250	10.0	1	06/13/2024 15:47	WG2303253
Fluoranthene	U		0.102	1.00	1	06/13/2024 15:47	WG2303253
Fluorene	U		0.0844	1.00	1	06/13/2024 15:47	WG2303253

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
Hexachlorobenzene	U		0.0755	1.00	1	06/13/2024 15:47	WG2303253
Hexachloro-1,3-butadiene	U		0.0968	10.0	1	06/13/2024 15:47	WG2303253
Hexachlorocyclopentadiene	U		0.0598	10.0	1	06/13/2024 15:47	WG2303253
Hexachloroethane	U		0.127	10.0	1	06/13/2024 15:47	WG2303253
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	06/13/2024 15:47	WG2303253
Isophorone	U		0.143	10.0	1	06/13/2024 15:47	WG2303253
Naphthalene	2.15		0.159	1.00	1	06/13/2024 15:47	WG2303253
Nitrobenzene	U		0.297	10.0	1	06/13/2024 15:47	WG2303253
n-Nitrosodimethylamine	U		0.998	10.0	1	06/13/2024 15:47	WG2303253
n-Nitrosodiphenylamine	U		2.37	10.0	1	06/13/2024 15:47	WG2303253
n-Nitrosodi-n-propylamine	U		0.261	10.0	1	06/13/2024 15:47	WG2303253
Phenanthrene	U		0.112	1.00	1	06/13/2024 15:47	WG2303253
Benzylbutyl phthalate	U		0.765	3.00	1	06/13/2024 15:47	WG2303253
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00	1	06/13/2024 15:47	WG2303253
Di-n-butyl phthalate	U		0.453	3.00	1	06/13/2024 15:47	WG2303253
Diethyl phthalate	U		0.287	3.00	1	06/13/2024 15:47	WG2303253
Dimethyl phthalate	U		0.260	3.00	1	06/13/2024 15:47	WG2303253
Di-n-octyl phthalate	U		0.932	3.00	1	06/13/2024 15:47	WG2303253
Pyrene	U		0.107	1.00	1	06/13/2024 15:47	WG2303253
1,2,4-Trichlorobenzene	U		0.0698	10.0	1	06/13/2024 15:47	WG2303253
Aniline	U		1.65	10.0	1	06/13/2024 15:47	WG2303253
1,2-Diphenylhydrazine	U	N2	0.105	10.0	1	06/13/2024 15:47	WG2303253
Benzyl alcohol	U		0.563	10.0	1	06/13/2024 15:47	WG2303253
4-Chloroaniline	U		0.234	10.0	1	06/13/2024 15:47	WG2303253
4-Chloro-3-methylphenol	U		0.131	10.0	1	06/13/2024 15:47	WG2303253
2-Chlorophenol	U		0.133	10.0	1	06/13/2024 15:47	WG2303253
Dibenzofuran	U		0.0970	10.0	1	06/13/2024 15:47	WG2303253
2,4-Dichlorophenol	U		0.102	10.0	1	06/13/2024 15:47	WG2303253
2,4-Dimethylphenol	U		0.0636	10.0	1	06/13/2024 15:47	WG2303253
4,6-Dinitro-2-methylphenol	U		1.12	10.0	1	06/13/2024 15:47	WG2303253
2,4-Dinitrophenol	U		5.93	10.0	1	06/13/2024 15:47	WG2303253
2-Methylnaphthalene	0.299	J	0.117	1.00	1	06/13/2024 15:47	WG2303253
2-Methylphenol	U		0.0929	10.0	1	06/13/2024 15:47	WG2303253
3&4-Methyl Phenol	U		0.168	10.0	1	06/13/2024 15:47	WG2303253
2-Nitroaniline	U		0.102	10.0	1	06/13/2024 15:47	WG2303253
3-Nitroaniline	U		0.0869	10.0	1	06/13/2024 15:47	WG2303253
4-Nitroaniline	U		0.0910	10.0	1	06/13/2024 15:47	WG2303253
2-Nitrophenol	U		0.117	10.0	1	06/13/2024 15:47	WG2303253
4-Nitrophenol	U		0.143	10.0	1	06/13/2024 15:47	WG2303253
Pentachlorophenol	U		0.313	10.0	1	06/13/2024 15:47	WG2303253
Phenol	U		4.33	10.0	1	06/13/2024 15:47	WG2303253
Pyridine	U	J4	0.627	10.0	1	06/13/2024 15:47	WG2303253
2,4,6-Trichlorophenol	U		0.100	10.0	1	06/13/2024 15:47	WG2303253
Acetophenone	U		0.208	10.0	1	06/13/2024 15:47	WG2303253
2-Acetylaminofluorene	U		0.253	10.0	1	06/13/2024 15:47	WG2303253
4-Aminobiphenyl	U		0.461	10.0	1	06/13/2024 15:47	WG2303253
Chlorobenzilate	U		3.84	50.0	1	06/13/2024 15:47	WG2303253
Diallate	U		0.524	10.0	1	06/13/2024 15:47	WG2303253
2,6-Dichlorophenol	U		0.102	10.0	1	06/13/2024 15:47	WG2303253
Dimethoate	U		5.05	50.0	1	06/13/2024 15:47	WG2303253
P-(Dimethylamino) Azobenzene	U		3.69	10.0	1	06/13/2024 15:47	WG2303253
Dimethylbenz (A) Anthracene	U		1.71	10.0	1	06/13/2024 15:47	WG2303253
3,3-Dimethylbenzidine	U	J4	3.39	10.0	1	06/13/2024 15:47	WG2303253
a,a-Dimethylphenethylamine	U	J4	3.13	50.0	1	06/13/2024 15:47	WG2303253
1,3-Dinitrobenzene	U		0.359	10.0	1	06/13/2024 15:47	WG2303253
Diphenylamine	U		2.37	10.0	1	06/13/2024 15:47	WG2303253

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
Dinoseb	U		8.01	50.0	1	06/13/2024 15:47	WG2303253
Disulfoton	U		0.267	10.0	1	06/13/2024 15:47	WG2303253
Ethyl methanesulfonate	U		0.326	10.0	1	06/13/2024 15:47	WG2303253
Ethyl Parathion	U		0.379	10.0	1	06/13/2024 15:47	WG2303253
Famphur	U	C6	3.92	20.0	1	06/13/2024 15:47	WG2303253
Hexachloropropene	U		0.149	50.0	1	06/13/2024 15:47	WG2303253
Hexachlorophene	U		1.44	50.0	1	06/13/2024 15:47	WG2303253
Isodrin	U		4.11	10.0	1	06/13/2024 15:47	WG2303253
Isosafrole	U		3.88	10.0	1	06/13/2024 15:47	WG2303253
Kepone	U	C6	2.66	20.0	1	06/13/2024 15:47	WG2303253
Methapyrilene	U	J4	10.0	50.0	1	06/13/2024 15:47	WG2303253
3-Methylcholanthrene	U		0.164	10.0	1	06/13/2024 15:47	WG2303253
Methyl methanesulfonate	U		3.40	50.0	1	06/13/2024 15:47	WG2303253
Methyl parathion	U		0.213	10.0	1	06/13/2024 15:47	WG2303253
1,4-Naphthoquinone	U	J4	5.56	50.0	1	06/13/2024 15:47	WG2303253
1-Naphthylamine	U		0.289	10.0	1	06/13/2024 15:47	WG2303253
2-Naphthylamine	U		4.48	10.0	1	06/13/2024 15:47	WG2303253
5-Nitro-o-toluidine	U		1.99	10.0	1	06/13/2024 15:47	WG2303253
4-Nitroquinoline 1-oxide	U		2.03	10.0	1	06/13/2024 15:47	WG2303253
n-Nitrosodiethylamine	U		3.57	10.0	1	06/13/2024 15:47	WG2303253
n-Nitrosodi-n-butylamine	U		3.91	10.0	1	06/13/2024 15:47	WG2303253
n-Nitrosomethylethylamine	U		3.25	10.0	1	06/13/2024 15:47	WG2303253
n-Nitrosomorpholine	U		3.25	10.0	1	06/13/2024 15:47	WG2303253
n-Nitrosopiperidine	U		3.72	10.0	1	06/13/2024 15:47	WG2303253
n-Nitrosopyrrolidine	U		3.39	10.0	1	06/13/2024 15:47	WG2303253
Pentachlorobenzene	U		4.15	10.0	1	06/13/2024 15:47	WG2303253
Pentachloroethane	U		2.83	50.0	1	06/13/2024 15:47	WG2303253
Pentachloronitrobenzene	U		4.15	10.0	1	06/13/2024 15:47	WG2303253
Phenacetin	U		4.66	10.0	1	06/13/2024 15:47	WG2303253
p-Phenylenediamine	U	J4	387	6900	1	06/13/2024 15:47	WG2303253
Phorate	U		4.86	50.0	1	06/13/2024 15:47	WG2303253
2-Picoline	U		6.83	50.0	1	06/13/2024 15:47	WG2303253
Pronamide	U		4.21	10.0	1	06/13/2024 15:47	WG2303253
Safrole	U		3.68	10.0	1	06/13/2024 15:47	WG2303253
Sulfotep	U		3.99	50.0	1	06/13/2024 15:47	WG2303253
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0	1	06/13/2024 15:47	WG2303253
2,3,4,6-Tetrachlorophenol	U		0.231	10.0	1	06/13/2024 15:47	WG2303253
Thionazin	U		4.07	10.0	1	06/13/2024 15:47	WG2303253
o-Toluidine	U		3.53	10.0	1	06/13/2024 15:47	WG2303253
2,4,5-Trichlorophenol	U		0.109	10.0	1	06/13/2024 15:47	WG2303253
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0	1	06/13/2024 15:47	WG2303253
1,3,5-Trinitrobenzene	U		1.32	10.0	1	06/13/2024 15:47	WG2303253
(S) 2-Fluorophenol	*33.3*			*10.0-120*		*06/13/2024 15:47*	WG2303253
(S) Phenol-d5	*25.3*			*10.0-120*		*06/13/2024 15:47*	WG2303253
(S) Nitrobenzene-d5	*63.8*			*10.0-127*		*06/13/2024 15:47*	WG2303253
(S) 2-Fluorobiphenyl	*68.4*			*10.0-130*		*06/13/2024 15:47*	WG2303253
(S) 2,4,6-Tribromophenol	*70.9*			*10.0-155*		*06/13/2024 15:47*	WG2303253
(S) p-Terphenyl-d14	*70.0*			*10.0-128*		*06/13/2024 15:47*	WG2303253

Wet Chemistry by Method 4500CO2 D-2011

Analyte	Result ug/l	Qualifier	RDL ug/l	Dilution	Analysis date / time	Batch
Free Carbon Dioxide	87000	T8	20000	1	06/11/2024 14:52	WG2302569

Sample Narrative:

L1744765-04 WG2302569: Endpoint pH 4.5 headspace

Wet Chemistry by Method 5210 B-2016

Analyte	Result mg/l	Qualifier	RDL mg/l	Dilution	Analysis date / time	Batch
BOD	ND	J+ J- T8	3.33	1	06/13/2024 15:50	WG2301323

Wet Chemistry by Method 9056A

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Nitrate as (N)	U	Q	48.0	100	1	06/09/2024 00:32	WG2301406
Sulfate	62900		594	5000	1	06/09/2024 00:32	WG2301406

Metals (ICP) by Method 6010B

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Iron	4040		18.0	100	1	07/18/2024 19:56	WG2324874
Iron,Dissolved	4070		18.0	100	1	07/18/2024 17:37	WG2324864
Manganese	2210		0.934	10.0	1	07/18/2024 19:56	WG2324874
Manganese,Dissolved	2290		0.934	10.0	1	07/18/2024 17:37	WG2324864

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	59.3	J	33.3	100	1	06/11/2024 03:08	WG2302206
Unadjusted C9-C12 Aliphatics	U		33.3	100	1	06/11/2024 03:08	WG2302206
Unadjusted C9-C10 Aromatics	U		33.3	100	1	06/11/2024 03:08	WG2302206
Adjusted C5-C8 Aliphatics	59.3	J	33.3	100	1	06/11/2024 03:08	WG2302206
Adjusted C9-C12 Aliphatics	U		33.3	100	1	06/11/2024 03:08	WG2302206
Total VPH	U		66.7	200	1	06/11/2024 03:08	WG2302206
(S) 2,5-Dibromotoluene(FID)	*97.8*			*70.0-130*		*06/11/2024 03:08*	WG2302206
(S) 2,5-Dibromotoluene(PID)	*101*			*70.0-130*		*06/11/2024 03:08*	WG2302206

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Methane	818		2.91	10.0	1	06/17/2024 13:12	WG2306205

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	06/15/2024 16:55	WG2305836
Acrylonitrile	U		0.671	5.00	1	06/15/2024 16:55	WG2305836
Benzene	1.40		0.0941	0.500	1	06/15/2024 16:55	WG2305836
Bromobenzene	U		0.118	0.500	1	06/15/2024 16:55	WG2305836
Bromodichloromethane	U		0.136	0.500	1	06/15/2024 16:55	WG2305836
Bromochloromethane	U		0.128	0.500	1	06/15/2024 16:55	WG2305836
Bromoform	U		0.129	0.500	1	06/15/2024 16:55	WG2305836
Bromomethane	U		0.605	2.50	1	06/15/2024 16:55	WG2305836
n-Butylbenzene	U		0.157	0.500	1	06/15/2024 16:55	WG2305836

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
sec-Butylbenzene	U		0.125	0.500	1	06/15/2024 16:55	WG2305836
tert-Butylbenzene	U		0.127	0.500	1	06/15/2024 16:55	WG2305836
Carbon disulfide	U		0.0962	0.500	1	06/15/2024 16:55	WG2305836
Carbon tetrachloride	U		0.128	0.500	1	06/15/2024 16:55	WG2305836
Chlorobenzene	U		0.117	0.500	1	06/15/2024 16:55	WG2305836
Chlorodibromomethane	U		0.140	0.500	1	06/15/2024 16:55	WG2305836
Chloroethane	U		0.192	2.50	1	06/15/2024 16:55	WG2305836
2-Chloroethyl vinyl ether	U		0.575	50.0	1	06/15/2024 16:55	WG2305836
Chloroform	U		0.111	0.500	1	06/15/2024 16:55	WG2305836
Chloromethane	U		0.960	1.25	1	06/15/2024 16:55	WG2305836
2-Chlorotoluene	U		0.106	0.500	1	06/15/2024 16:55	WG2305836
4-Chlorotoluene	U		0.114	0.500	1	06/15/2024 16:55	WG2305836
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	06/15/2024 16:55	WG2305836
1,2-Dibromoethane	U		0.126	0.500	1	06/15/2024 16:55	WG2305836
Dibromomethane	U		0.122	0.500	1	06/15/2024 16:55	WG2305836
1,2-Dichlorobenzene	U		0.107	0.500	1	06/15/2024 16:55	WG2305836
1,3-Dichlorobenzene	U		0.299	0.500	1	06/15/2024 16:55	WG2305836
1,4-Dichlorobenzene	U		0.120	0.500	1	06/15/2024 16:55	WG2305836
Dichlorodifluoromethane	U		0.374	2.50	1	06/15/2024 16:55	WG2305836
1,1-Dichloroethane	U		0.100	0.500	1	06/15/2024 16:55	WG2305836
1,2-Dichloroethane	U		0.0819	0.500	1	06/15/2024 16:55	WG2305836
1,1-Dichloroethene	U		0.188	0.500	1	06/15/2024 16:55	WG2305836
cis-1,2-Dichloroethene	U		0.126	0.500	1	06/15/2024 16:55	WG2305836
trans-1,2-Dichloroethene	U		0.149	0.500	1	06/15/2024 16:55	WG2305836
1,2-Dichloropropane	U		0.149	0.500	1	06/15/2024 16:55	WG2305836
1,1-Dichloropropene	U		0.142	0.500	1	06/15/2024 16:55	WG2305836
1,3-Dichloropropane	U		0.109	1.00	1	06/15/2024 16:55	WG2305836
cis-1,3-Dichloropropene	U		0.111	0.500	1	06/15/2024 16:55	WG2305836
trans-1,3-Dichloropropene	U		0.118	0.500	1	06/15/2024 16:55	WG2305836
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	06/15/2024 16:55	WG2305836
2,2-Dichloropropane	U		0.161	0.500	1	06/15/2024 16:55	WG2305836
Di-isopropyl ether	U		0.105	0.500	1	06/15/2024 16:55	WG2305836
Ethylbenzene	U		0.137	0.500	1	06/17/2024 17:52	WG2306687
Hexachloro-1,3-butadiene	U		0.337	1.00	1	06/15/2024 16:55	WG2305836
2-Hexanone	U		0.787	5.00	1	06/15/2024 16:55	WG2305836
n-Hexane	U		0.749	5.00	1	06/15/2024 16:55	WG2305836
Iodomethane	U		0.554	5.00	1	06/15/2024 16:55	WG2305836
Isopropylbenzene	U		0.105	0.500	1	06/15/2024 16:55	WG2305836
p-Isopropyltoluene	U		0.120	0.500	1	06/15/2024 16:55	WG2305836
2-Butanone (MEK)	U		1.19	5.00	1	06/15/2024 16:55	WG2305836
Methylene Chloride	U		0.430	2.50	1	06/15/2024 16:55	WG2305836
4-Methyl-2-pentanone (MIBK)	1.79	J	0.478	5.00	1	06/15/2024 16:55	WG2305836
Methyl tert-butyl ether	U		0.101	0.500	1	06/15/2024 16:55	WG2305836
Naphthalene	0.354	J	0.174	2.50	1	06/15/2024 16:55	WG2305836
n-Propylbenzene	U		0.0993	0.500	1	06/15/2024 16:55	WG2305836
Styrene	U		0.118	0.500	1	06/15/2024 16:55	WG2305836
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	06/15/2024 16:55	WG2305836
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	06/15/2024 16:55	WG2305836
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	06/15/2024 16:55	WG2305836
Tetrachloroethene	U		0.300	0.500	1	06/15/2024 16:55	WG2305836
Toluene	U		0.278	0.500	1	06/15/2024 16:55	WG2305836
1,2,3-Trichlorobenzene	U		0.164	0.500	1	06/15/2024 16:55	WG2305836
1,2,4-Trichlorobenzene	U		0.481	1.00	1	06/15/2024 16:55	WG2305836
1,1,1-Trichloroethane	U		0.149	0.500	1	06/15/2024 16:55	WG2305836
1,1,2-Trichloroethane	U		0.158	0.500	1	06/15/2024 16:55	WG2305836
Trichloroethene	U		0.190	0.500	1	06/15/2024 16:55	WG2305836

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Trichlorofluoromethane	U		0.160	2.50	1	06/15/2024 16:55	WG2305836
1,2,3-Trichloropropane	U		0.237	2.50	1	06/15/2024 16:55	WG2305836
1,2,4-Trimethylbenzene	U		0.322	0.500	1	06/17/2024 17:52	WG2306687
1,2,3-Trimethylbenzene	U		0.104	0.500	1	06/17/2024 17:52	WG2306687
1,3,5-Trimethylbenzene	U		0.104	0.500	1	06/15/2024 16:55	WG2305836
Vinyl acetate	U		0.692	5.00	1	06/15/2024 16:55	WG2305836
Vinyl chloride	U		0.234	0.500	1	06/15/2024 16:55	WG2305836
Xylenes, Total	U		0.174	1.50	1	06/17/2024 17:52	WG2306687
(S) Toluene-d8	*100*			*80.0-120*		*06/15/2024 16:55*	WG2305836
(S) Toluene-d8	*98.6*			*80.0-120*		*06/17/2024 17:52*	WG2306687
(S) 4-Bromofluorobenzene	*101*			*77.0-126*		*06/15/2024 16:55*	WG2305836
(S) 4-Bromofluorobenzene	*95.3*			*77.0-126*		*06/17/2024 17:52*	WG2306687
(S) 1,2-Dichloroethane-d4	*95.7*			*70.0-130*		*06/15/2024 16:55*	WG2305836
(S) 1,2-Dichloroethane-d4	*111*			*70.0-130*		*06/17/2024 17:52*	WG2306687

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	06/17/2024 11:23	WG2305499
Unadjusted C19-C36 Aliphatics	U		200	600	1	06/17/2024 11:23	WG2305499
Unadjusted C11-C22 Aromatics	U		200	600	1	06/17/2024 17:24	WG2305499
Unadjusted Total Petroleum Hydrocarbons	U		200	600	1	06/17/2024 17:24	WG2305499
Adjusted C11-C22 Aromatics	U		200	600	1	06/17/2024 17:24	WG2305499
Adjusted Total Petroleum Hydrocarbons	U		200	600	1	06/17/2024 17:24	WG2305499
(S) o-Terphenyl	*55.5*			*40.0-140*		*06/17/2024 17:24*	WG2305499
(S) 1-Chloro-octadecane	*40.9*			*40.0-140*		*06/17/2024 11:23*	WG2305499
(S) 2-Fluorobiphenyl	*83.6*			*40.0-140*		*06/17/2024 17:24*	WG2305499
(S) 2-Bromonaphthalene	*79.6*			*40.0-140*		*06/17/2024 17:24*	WG2305499

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	06/13/2024 16:09	WG2303253
Acenaphthylene	U		0.0921	1.00	1	06/13/2024 16:09	WG2303253
Anthracene	U		0.0804	1.00	1	06/13/2024 16:09	WG2303253
Benzidine	U	J4	3.74	10.0	1	06/13/2024 16:09	WG2303253
Benzo(a)anthracene	U		0.199	1.00	1	06/13/2024 16:09	WG2303253
Benzo(b)fluoranthene	U		0.130	1.00	1	06/13/2024 16:09	WG2303253
Benzo(k)fluoranthene	U		0.120	1.00	1	06/13/2024 16:09	WG2303253
Benzo(g,h,i)perylene	U		0.121	1.00	1	06/13/2024 16:09	WG2303253
Benzo(a)pyrene	U		0.0381	1.00	1	06/13/2024 16:09	WG2303253
Bis(2-chlorethoxy)methane	U		0.116	10.0	1	06/13/2024 16:09	WG2303253
Bis(2-chloroethyl)ether	U		0.137	10.0	1	06/13/2024 16:09	WG2303253
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0	1	06/13/2024 16:09	WG2303253
4-Bromophenyl-phenylether	U		0.0877	10.0	1	06/13/2024 16:09	WG2303253
2-Chloronaphthalene	U		0.0648	1.00	1	06/13/2024 16:09	WG2303253
4-Chlorophenyl-phenylether	U		0.0926	10.0	1	06/13/2024 16:09	WG2303253
Chrysene	U		0.130	1.00	1	06/13/2024 16:09	WG2303253
Dibenz(a,h)anthracene	U		0.0644	1.00	1	06/13/2024 16:09	WG2303253
3,3-Dichlorobenzidine	U		0.212	10.0	1	06/13/2024 16:09	WG2303253
2,4-Dinitrotoluene	U		0.0983	10.0	1	06/13/2024 16:09	WG2303253
2,6-Dinitrotoluene	U		0.250	10.0	1	06/13/2024 16:09	WG2303253
Fluoranthene	U		0.102	1.00	1	06/13/2024 16:09	WG2303253
Fluorene	U		0.0844	1.00	1	06/13/2024 16:09	WG2303253

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
Hexachlorobenzene	U		0.0755	1.00	1	06/13/2024 16:09	WG2303253
Hexachloro-1,3-butadiene	U		0.0968	10.0	1	06/13/2024 16:09	WG2303253
Hexachlorocyclopentadiene	U		0.0598	10.0	1	06/13/2024 16:09	WG2303253
Hexachloroethane	U		0.127	10.0	1	06/13/2024 16:09	WG2303253
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	06/13/2024 16:09	WG2303253
Isophorone	U		0.143	10.0	1	06/13/2024 16:09	WG2303253
Naphthalene	U		0.159	1.00	1	06/13/2024 16:09	WG2303253
Nitrobenzene	U		0.297	10.0	1	06/13/2024 16:09	WG2303253
n-Nitrosodimethylamine	U		0.998	10.0	1	06/13/2024 16:09	WG2303253
n-Nitrosodiphenylamine	U		2.37	10.0	1	06/13/2024 16:09	WG2303253
n-Nitrosodi-n-propylamine	U		0.261	10.0	1	06/13/2024 16:09	WG2303253
Phenanthrene	U		0.112	1.00	1	06/13/2024 16:09	WG2303253
Benzylbutyl phthalate	U		0.765	3.00	1	06/13/2024 16:09	WG2303253
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00	1	06/13/2024 16:09	WG2303253
Di-n-butyl phthalate	U		0.453	3.00	1	06/13/2024 16:09	WG2303253
Diethyl phthalate	U		0.287	3.00	1	06/13/2024 16:09	WG2303253
Dimethyl phthalate	U		0.260	3.00	1	06/13/2024 16:09	WG2303253
Di-n-octyl phthalate	U		0.932	3.00	1	06/13/2024 16:09	WG2303253
Pyrene	U		0.107	1.00	1	06/13/2024 16:09	WG2303253
1,2,4-Trichlorobenzene	U		0.0698	10.0	1	06/13/2024 16:09	WG2303253
Aniline	U		1.65	10.0	1	06/13/2024 16:09	WG2303253
1,2-Diphenylhydrazine	U	N2	0.105	10.0	1	06/13/2024 16:09	WG2303253
Benzyl alcohol	U		0.563	10.0	1	06/13/2024 16:09	WG2303253
4-Chloroaniline	U		0.234	10.0	1	06/13/2024 16:09	WG2303253
4-Chloro-3-methylphenol	U		0.131	10.0	1	06/13/2024 16:09	WG2303253
2-Chlorophenol	U		0.133	10.0	1	06/13/2024 16:09	WG2303253
Dibenzofuran	U		0.0970	10.0	1	06/13/2024 16:09	WG2303253
2,4-Dichlorophenol	U		0.102	10.0	1	06/13/2024 16:09	WG2303253
2,4-Dimethylphenol	U		0.0636	10.0	1	06/13/2024 16:09	WG2303253
4,6-Dinitro-2-methylphenol	U		1.12	10.0	1	06/13/2024 16:09	WG2303253
2,4-Dinitrophenol	U		5.93	10.0	1	06/13/2024 16:09	WG2303253
2-Methylnaphthalene	U		0.117	1.00	1	06/13/2024 16:09	WG2303253
2-Methylphenol	U		0.0929	10.0	1	06/13/2024 16:09	WG2303253
3&4-Methyl Phenol	U		0.168	10.0	1	06/13/2024 16:09	WG2303253
2-Nitroaniline	U		0.102	10.0	1	06/13/2024 16:09	WG2303253
3-Nitroaniline	U		0.0869	10.0	1	06/13/2024 16:09	WG2303253
4-Nitroaniline	U		0.0910	10.0	1	06/13/2024 16:09	WG2303253
2-Nitrophenol	U		0.117	10.0	1	06/13/2024 16:09	WG2303253
4-Nitrophenol	U		0.143	10.0	1	06/13/2024 16:09	WG2303253
Pentachlorophenol	U		0.313	10.0	1	06/13/2024 16:09	WG2303253
Phenol	7.72	J	4.33	10.0	1	06/13/2024 16:09	WG2303253
Pyridine	U	J4	0.627	10.0	1	06/13/2024 16:09	WG2303253
2,4,6-Trichlorophenol	U		0.100	10.0	1	06/13/2024 16:09	WG2303253
Acetophenone	U		0.208	10.0	1	06/13/2024 16:09	WG2303253
2-Acetylaminofluorene	U		0.253	10.0	1	06/13/2024 16:09	WG2303253
4-Aminobiphenyl	U		0.461	10.0	1	06/13/2024 16:09	WG2303253
Chlorobenzilate	U		3.84	50.0	1	06/13/2024 16:09	WG2303253
Diallate	U		0.524	10.0	1	06/13/2024 16:09	WG2303253
2,6-Dichlorophenol	U		0.102	10.0	1	06/13/2024 16:09	WG2303253
Dimethoate	U		5.05	50.0	1	06/13/2024 16:09	WG2303253
P-(Dimethylamino) Azobenzene	U		3.69	10.0	1	06/13/2024 16:09	WG2303253
Dimethylbenz (A) Anthracene	U		1.71	10.0	1	06/13/2024 16:09	WG2303253
3,3-Dimethylbenzidine	U	J4	3.39	10.0	1	06/13/2024 16:09	WG2303253
a,a-Dimethylphenethylamine	U	J4	3.13	50.0	1	06/13/2024 16:09	WG2303253
1,3-Dinitrobenzene	U		0.359	10.0	1	06/13/2024 16:09	WG2303253
Diphenylamine	U		2.37	10.0	1	06/13/2024 16:09	WG2303253

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
Dinoseb	U		8.01	50.0	1	06/13/2024 16:09	WG2303253
Disulfoton	U		0.267	10.0	1	06/13/2024 16:09	WG2303253
Ethyl methanesulfonate	U		0.326	10.0	1	06/13/2024 16:09	WG2303253
Ethyl Parathion	U		0.379	10.0	1	06/13/2024 16:09	WG2303253
Famphur	U	C6	3.92	20.0	1	06/13/2024 16:09	WG2303253
Hexachloropropene	U		0.149	50.0	1	06/13/2024 16:09	WG2303253
Hexachlorophene	U		1.44	50.0	1	06/13/2024 16:09	WG2303253
Isodrin	U		4.11	10.0	1	06/13/2024 16:09	WG2303253
Isosafrole	U		3.88	10.0	1	06/13/2024 16:09	WG2303253
Kepone	U	C6	2.66	20.0	1	06/13/2024 16:09	WG2303253
Methapyrilene	U	J4	10.0	50.0	1	06/13/2024 16:09	WG2303253
3-Methylcholanthrene	U		0.164	10.0	1	06/13/2024 16:09	WG2303253
Methyl methanesulfonate	U		3.40	50.0	1	06/13/2024 16:09	WG2303253
Methyl parathion	U		0.213	10.0	1	06/13/2024 16:09	WG2303253
1,4-Naphthoquinone	U	J4	5.56	50.0	1	06/13/2024 16:09	WG2303253
1-Naphthylamine	U		0.289	10.0	1	06/13/2024 16:09	WG2303253
2-Naphthylamine	U		4.48	10.0	1	06/13/2024 16:09	WG2303253
5-Nitro-o-toluidine	U		1.99	10.0	1	06/13/2024 16:09	WG2303253
4-Nitroquinoline 1-oxide	U		2.03	10.0	1	06/13/2024 16:09	WG2303253
n-Nitrosodiethylamine	U		3.57	10.0	1	06/13/2024 16:09	WG2303253
n-Nitrosodi-n-butylamine	U		3.91	10.0	1	06/13/2024 16:09	WG2303253
n-Nitrosomethylethylamine	U		3.25	10.0	1	06/13/2024 16:09	WG2303253
n-Nitrosomorpholine	U		3.25	10.0	1	06/13/2024 16:09	WG2303253
n-Nitrosopiperidine	U		3.72	10.0	1	06/13/2024 16:09	WG2303253
n-Nitrosopyrrolidine	U		3.39	10.0	1	06/13/2024 16:09	WG2303253
Pentachlorobenzene	U		4.15	10.0	1	06/13/2024 16:09	WG2303253
Pentachloroethane	U		2.83	50.0	1	06/13/2024 16:09	WG2303253
Pentachloronitrobenzene	U		4.15	10.0	1	06/13/2024 16:09	WG2303253
Phenacetin	U		4.66	10.0	1	06/13/2024 16:09	WG2303253
p-Phenylenediamine	U	J4	387	6900	1	06/13/2024 16:09	WG2303253
Phorate	U		4.86	50.0	1	06/13/2024 16:09	WG2303253
2-Picoline	U		6.83	50.0	1	06/13/2024 16:09	WG2303253
Pronamide	U		4.21	10.0	1	06/13/2024 16:09	WG2303253
Safrole	U		3.68	10.0	1	06/13/2024 16:09	WG2303253
Sulfotep	U		3.99	50.0	1	06/13/2024 16:09	WG2303253
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0	1	06/13/2024 16:09	WG2303253
2,3,4,6-Tetrachlorophenol	U		0.231	10.0	1	06/13/2024 16:09	WG2303253
Thionazin	U		4.07	10.0	1	06/13/2024 16:09	WG2303253
o-Toluidine	U		3.53	10.0	1	06/13/2024 16:09	WG2303253
2,4,5-Trichlorophenol	U		0.109	10.0	1	06/13/2024 16:09	WG2303253
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0	1	06/13/2024 16:09	WG2303253
1,3,5-Trinitrobenzene	U		1.32	10.0	1	06/13/2024 16:09	WG2303253
(S) 2-Fluorophenol	*30.4*			*10.0-120*		*06/13/2024 16:09*	WG2303253
(S) Phenol-d5	*24.3*			*10.0-120*		*06/13/2024 16:09*	WG2303253
(S) Nitrobenzene-d5	*129*	J1		*10.0-127*		*06/13/2024 16:09*	WG2303253
(S) 2-Fluorobiphenyl	*74.0*			*10.0-130*		*06/13/2024 16:09*	WG2303253
(S) 2,4,6-Tribromophenol	*80.2*			*10.0-155*		*06/13/2024 16:09*	WG2303253
(S) p-Terphenyl-d14	*66.5*			*10.0-128*		*06/13/2024 16:09*	WG2303253

Method Blank (MB)

(MB) R4080318-3 06/11/24 12:06

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Free Carbon Dioxide	7370	J	6670	20000

Sample Narrative:

BLANK: Endpoint pH 4.5

L1708061-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1708061-04 06/11/24 12:15 • (DUP) R4080318-5 06/11/24 12:20

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Free Carbon Dioxide	ND	ND	1	0.000		20

Sample Narrative:

OS: Endpoint pH 4.5 headspace

DUP: Endpoint pH 4.5

L1744615-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1744615-01 06/11/24 14:37 • (DUP) R4080318-7 06/11/24 14:41

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Free Carbon Dioxide	69600	69400	1	0.269		20

Sample Narrative:

OS: Endpoint pH 4.5 headspace

DUP: Endpoint pH 4.5

QUALITY CONTROL SUMMARY

L1744765-01,03,04

Method Blank (MB)

(MB) R4081706-1 06/13/24 11:16

Analyte	MB Result mg/l	MB Qualifier	MB MDL mg/l	MB RDL mg/l
BOD	U		0.200	0.200

L1744720-11 Original Sample (OS) • Duplicate (DUP)

(OS) L1744720-11 06/13/24 14:38 • (DUP) R4081706-3 06/13/24 14:40

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
BOD	ND	ND	1	0		30

L1744721-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1744721-01 06/13/24 15:27 • (DUP) R4081706-4 06/13/24 15:32

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
BOD	ND	ND	1	0	K1	30

Laboratory Control Sample (LCS)

(LCS) R4081706-2 06/13/24 14:14

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
BOD	198	117	59.2	84.6-115	J-

Laboratory Control Sample (LCS)

(LCS) R4081706-5 06/13/24 15:50

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
BOD	198	235	119	84.6-115	J+

QUALITY CONTROL SUMMARY

L1744765-01,03,04

Method Blank (MB)

(MB) R4079639-1 06/08/24 12:42

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Nitrate as (N)	U		48.0	100
Sulfate	U		594	5000

L1744484-17 Original Sample (OS) • Duplicate (DUP)

(OS) L1744484-17 06/08/24 19:37 • (DUP) R4079639-3 06/08/24 19:50

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Nitrate as (N)	1120	1010	1	10.5		15
Sulfate	2630	1280	1	68.8	J P1	15

L1744765-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1744765-03 06/08/24 23:52 • (DUP) R4079639-6 06/09/24 00:06

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Nitrate as (N)	204	235	1	13.9		15
Sulfate	70800	71800	1	1.45		15

Laboratory Control Sample (LCS)

(LCS) R4079639-2 06/08/24 12:55

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Nitrate as (N)	8000	7690	96.1	80.0-120	
Sulfate	40000	39000	97.5	80.0-120	

L1744484-17 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1744484-17 06/08/24 19:37 • (MS) R4079639-4 06/08/24 20:04 • (MSD) R4079639-5 06/08/24 20:17

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 %
Nitrate as (N)	8000	1120	8630	8720	93.9	95.0	1	80.0-120			1.03	15
Sulfate	40000	2630	39900	40300	93.2	94.3	1	80.0-120			1.07	15

L1744765-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1744765-03 06/08/24 23:52 • (MS) R4079639-7 06/09/24 00:19

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Nitrate as (N)	8000	204	7760	94.5	1	80.0-120	
Sulfate	40000	70800	94500	59.4	1	80.0-120	J6

Method Blank (MB)

(MB) R4095719-1 07/18/24 17:23

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Iron,Dissolved	U		18.0	100
Manganese,Dissolved	U		0.934	10.0

Laboratory Control Sample (LCS)

(LCS) R4095719-2 07/18/24 17:25

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Iron,Dissolved	10000	9740	97.4	80.0-120	
Manganese,Dissolved	1000	1010	101	80.0-120	

L1756509-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1756509-01 07/18/24 17:27 • (MS) R4095719-4 07/18/24 17:30 • (MSD) R4095719-5 07/18/24 17:32

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 %
Iron,Dissolved	10000	705	10400	10300	96.8	96.3	1	75.0-125			0.479	20
Manganese,Dissolved	1000	367	1360	1340	99.2	97.4	1	75.0-125			1.30	20

QUALITY CONTROL SUMMARY

L1744765-01,03,04

Method Blank (MB)

(MB) R4095828-1 07/18/24 19:42

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Iron	27.1	J	18.0	100
Manganese	U		0.934	10.0

Laboratory Control Sample (LCS)

(LCS) R4095828-2 07/18/24 19:44

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Iron	10000	9610	96.1	80.0-120	
Manganese	1000	988	98.8	80.0-120	

L1756065-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1756065-05 07/18/24 19:46 • (MS) R4095828-4 07/18/24 19:49 • (MSD) R4095828-5 07/18/24 19:51

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 %
Iron	10000	54.3	9780	9670	97.3	96.2	1	75.0-125			1.13	20
Manganese	1000	28.5	1020	1010	99.1	98.1	1	75.0-125			0.965	20

Method Blank (MB)

(MB) R4080403-3 06/10/24 13:08

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)	*97.7*			*70.0-130*
(S) 2,5-Dibromotoluene(PID)	*103*			*70.0-130*

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

(LCS) R4080403-1 06/10/24 10:49 • (LCSD) R4080403-2 06/10/24 11:23

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	1110	1130	92.5	94.2	70.0-130			1.79	50
Unadjusted C9-C12 Aliphatics	1400	1480	1500	106	107	70.0-130			1.34	50
Unadjusted C9-C10 Aromatics	200	222	226	111	113	70.0-130			1.79	50
Total VPH	2800	2810	2860	100	102	70.0-130			1.76	50
(S) 2,5-Dibromotoluene(FID)				*92.0*	*86.8*	*70.0-130*				
(S) 2,5-Dibromotoluene(PID)				*94.2*	*88.9*	*70.0-130*				

L1744885-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1744885-05 06/10/24 16:41 • (MS) R4080403-4 06/11/24 03:43 • (MSD) R4080403-5 06/11/24 04:18

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	984	1030	82.0	85.8	1	70.0-130			4.57	50
Unadjusted C9-C12 Aliphatics	1400	U	1260	1380	90.0	98.6	1	70.0-130			9.09	50
Unadjusted C9-C10 Aromatics	200	U	206	220	103	110	1	70.0-130			6.57	50
Total VPH	2800	U	2450	2630	87.5	93.9	1	70.0-130			7.09	50
(S) 2,5-Dibromotoluene(FID)					*98.5*	*94.8*		*70.0-130*				
(S) 2,5-Dibromotoluene(PID)					*101*	*97.0*		*70.0-130*				

Method Blank (MB)

(MB) R4082867-2 06/17/24 12:25

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Methane	U		2.91	10.0

L1744407-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1744407-02 06/17/24 12:28 • (DUP) R4082867-3 06/17/24 14:22

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Methane	U	U	1	0.000		20

L1744885-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1744885-04 06/17/24 14:26 • (DUP) R4082867-4 06/17/24 16:12

Analyte	Original Result ug/l	DUP Result ug/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
Methane	U	U	1	0.000		20

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

(LCS) R4082867-1 06/17/24 12:19 • (LCSD) R4082867-7 06/17/24 16:28

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 %
Methane	67.8	58.0	59.8	85.5	88.2	85.0-115			3.06	20

L1744885-05 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1744885-05 06/17/24 14:30 • (MS) R4082867-5 06/17/24 16:18 • (MSD) R4082867-6 06/17/24 16:25

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 %
Methane	67.8	40.2	115	97.3	110	84.2	1	50.0-150			16.7	20

Method Blank (MB)

(MB) R4082708-3 06/15/24 13:05

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

Method Blank (MB)

(MB) R4082708-3 06/15/24 13:05

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	*105*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*92.9*			*70.0-130*

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

(LCS) R4082708-1 06/15/24 12:08 • (LCSD) R4082708-2 06/15/24 12:27

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	20.7	19.5	82.8	78.0	19.0-160	J	J	5.97	27
Acrylonitrile	25.0	24.9	23.4	99.6	93.6	55.0-149			6.21	20
Benzene	5.00	4.37	4.23	87.4	84.6	70.0-123			3.26	20
Bromobenzene	5.00	4.68	4.50	93.6	90.0	73.0-121			3.92	20
Bromodichloromethane	5.00	4.75	4.72	95.0	94.4	75.0-120			0.634	20
Bromochloromethane	5.00	4.61	4.73	92.2	94.6	76.0-122			2.57	20
Bromoform	5.00	5.10	4.66	102	93.2	68.0-132			9.02	20
Bromomethane	5.00	4.53	4.40	90.6	88.0	10.0-160			2.91	25
n-Butylbenzene	5.00	5.73	5.35	115	107	73.0-125			6.86	20
sec-Butylbenzene	5.00	5.03	4.73	101	94.6	75.0-125			6.15	20
tert-Butylbenzene	5.00	4.92	4.69	98.4	93.8	76.0-124			4.79	20
Carbon disulfide	5.00	4.76	4.54	95.2	90.8	61.0-128			4.73	20
Carbon tetrachloride	5.00	4.88	4.63	97.6	92.6	68.0-126			5.26	20
Chlorobenzene	5.00	4.64	4.54	92.8	90.8	80.0-121			2.18	20
Chlorodibromomethane	5.00	4.90	4.69	98.0	93.8	77.0-125			4.38	20
Chloroethane	5.00	4.28	4.15	85.6	83.0	47.0-150			3.08	20
2-Chloroethyl vinyl ether	25.0	23.3	21.9	93.2	87.6	51.0-160	J	J	6.19	20
Chloroform	5.00	4.58	4.38	91.6	87.6	73.0-120			4.46	20
Chloromethane	5.00	4.55	4.60	91.0	92.0	41.0-142			1.09	20
2-Chlorotoluene	5.00	4.71	4.55	94.2	91.0	76.0-123			3.46	20
4-Chlorotoluene	5.00	4.63	4.54	92.6	90.8	75.0-122			1.96	20
1,2-Dibromo-3-Chloropropane	5.00	4.85	4.56	97.0	91.2	58.0-134			6.16	20
1,2-Dibromoethane	5.00	4.80	4.67	96.0	93.4	80.0-122			2.75	20
Dibromomethane	5.00	4.64	4.66	92.8	93.2	80.0-120			0.430	20
1,2-Dichlorobenzene	5.00	4.85	4.64	97.0	92.8	79.0-121			4.43	20
1,3-Dichlorobenzene	5.00	4.82	4.58	96.4	91.6	79.0-120			5.11	20
1,4-Dichlorobenzene	5.00	4.54	4.50	90.8	90.0	79.0-120			0.885	20
Dichlorodifluoromethane	5.00	4.94	4.80	98.8	96.0	51.0-149			2.87	20
1,1-Dichloroethane	5.00	4.43	4.41	88.6	88.2	70.0-126			0.452	20
1,2-Dichloroethane	5.00	4.38	3.83	87.6	76.6	70.0-128			13.4	20
1,1-Dichloroethene	5.00	4.77	4.58	95.4	91.6	71.0-124			4.06	20
cis-1,2-Dichloroethene	5.00	4.77	4.56	95.4	91.2	73.0-120			4.50	20
trans-1,2-Dichloroethene	5.00	4.77	4.68	95.4	93.6	73.0-120			1.90	20
1,2-Dichloropropane	5.00	4.52	4.20	90.4	84.0	77.0-125			7.34	20
1,1-Dichloropropene	5.00	4.75	4.59	95.0	91.8	74.0-126			3.43	20
1,3-Dichloropropane	5.00	4.93	4.81	98.6	96.2	80.0-120			2.46	20
cis-1,3-Dichloropropene	5.00	5.21	4.80	104	96.0	80.0-123			8.19	20
trans-1,3-Dichloropropene	5.00	4.97	4.62	99.4	92.4	78.0-124			7.30	20
trans-1,4-Dichloro-2-butene	5.00	4.62	3.80	92.4	76.0	33.0-144	J	J	19.5	20
2,2-Dichloropropane	5.00	5.10	5.02	102	100	58.0-130			1.58	20

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

(LCS) R4082708-1 06/15/24 12:08 • (LCSD) R4082708-2 06/15/24 12:27

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	4.54	4.24	90.8	84.8	58.0-138			6.83	20
Ethylbenzene	5.00	4.90	4.69	98.0	93.8	79.0-123			4.38	20
Hexachloro-1,3-butadiene	5.00	6.14	6.09	123	122	54.0-138			0.818	20
2-Hexanone	25.0	22.2	20.5	88.8	82.0	67.0-149			7.96	20
n-Hexane	5.00	5.18	4.98	104	99.6	57.0-133		J	3.94	20
Iodomethane	25.0	22.1	21.6	88.4	86.4	33.0-147			2.29	26
Isopropylbenzene	5.00	4.88	4.78	97.6	95.6	76.0-127			2.07	20
p-Isopropyltoluene	5.00	4.79	4.59	95.8	91.8	76.0-125			4.26	20
2-Butanone (MEK)	25.0	23.8	21.5	95.2	86.0	44.0-160			10.2	20
Methylene Chloride	5.00	4.50	4.27	90.0	85.4	67.0-120			5.25	20
4-Methyl-2-pentanone (MIBK)	25.0	24.4	22.9	97.6	91.6	68.0-142			6.34	20
Methyl tert-butyl ether	5.00	4.73	4.67	94.6	93.4	68.0-125			1.28	20
Naphthalene	5.00	4.57	4.72	91.4	94.4	54.0-135			3.23	20
n-Propylbenzene	5.00	4.84	4.58	96.8	91.6	77.0-124			5.52	20
Styrene	5.00	4.85	4.68	97.0	93.6	73.0-130			3.57	20
1,1,1,2-Tetrachloroethane	5.00	4.97	4.54	99.4	90.8	75.0-125			9.04	20
1,1,2,2-Tetrachloroethane	5.00	4.30	4.06	86.0	81.2	65.0-130			5.74	20
1,1,2-Trichlorotrifluoroethane	5.00	5.29	4.71	106	94.2	69.0-132			11.6	20
Tetrachloroethene	5.00	5.30	4.99	106	99.8	72.0-132			6.03	20
Toluene	5.00	4.61	4.47	92.2	89.4	79.0-120			3.08	20
1,2,3-Trichlorobenzene	5.00	5.07	5.32	101	106	50.0-138			4.81	20
1,2,4-Trichlorobenzene	5.00	5.32	5.46	106	109	57.0-137			2.60	20
1,1,1-Trichloroethane	5.00	4.68	4.68	93.6	93.6	73.0-124			0.000	20
1,1,2-Trichloroethane	5.00	4.63	4.42	92.6	88.4	80.0-120			4.64	20
Trichloroethene	5.00	4.97	4.55	99.4	91.0	78.0-124			8.82	20
Trichlorofluoromethane	5.00	5.24	4.75	105	95.0	59.0-147			9.81	20
1,2,3-Trichloropropane	5.00	4.09	4.14	81.8	82.8	73.0-130			1.22	20
1,2,4-Trimethylbenzene	5.00	4.64	4.53	92.8	90.6	76.0-121			2.40	20
1,2,3-Trimethylbenzene	5.00	4.59	4.38	91.8	87.6	77.0-120			4.68	20
1,3,5-Trimethylbenzene	5.00	4.64	4.48	92.8	89.6	76.0-122			3.51	20
Vinyl acetate	25.0	29.3	30.1	117	120	11.0-160			2.69	20
Vinyl chloride	5.00	4.84	4.56	96.8	91.2	67.0-131			5.96	20
Xylenes, Total	15.0	14.7	14.0	98.0	93.3	79.0-123			4.88	20
(S) Toluene-d8				*100*	*101*	*80.0-120*				
(S) 4-Bromofluorobenzene				*103*	*105*	*77.0-126*				
(S) 1,2-Dichloroethane-d4				*90.0*	*91.9*	*70.0-130*				

Method Blank (MB)

(MB) R4083115-2 06/17/24 15:58

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Benzene	U		0.0941	0.500
Ethylbenzene	U		0.137	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	*101*			*80.0-120*
(S) 4-Bromofluorobenzene	*94.3*			*77.0-126*
(S) 1,2-Dichloroethane-d4	*111*			*70.0-130*

Laboratory Control Sample (LCS)

(LCS) R4083115-1 06/17/24 14:52

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Benzene	5.00	5.21	104	70.0-123	
Ethylbenzene	5.00	4.92	98.4	79.0-123	
1,2,4-Trimethylbenzene	5.00	4.88	97.6	76.0-121	
1,2,3-Trimethylbenzene	5.00	5.11	102	77.0-120	
Xylenes, Total	15.0	14.3	95.3	79.0-123	
(S) Toluene-d8			*98.3*	*80.0-120*	
(S) 4-Bromofluorobenzene			*94.8*	*77.0-126*	
(S) 1,2-Dichloroethane-d4			*114*	*70.0-130*	

Method Blank (MB)

(MB) R4083006-1 06/17/24 08:11

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	*65.5*			*40.0-140*

Method Blank (MB)

(MB) R4083006-4 06/17/24 09:23

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	*62.9*			*40.0-140*
(S) 2-Fluorobiphenyl	*80.9*			*40.0-140*
(S) 2-Bromonaphthalene	*77.4*			*40.0-140*

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

(LCS) R4083006-2 06/17/24 08:35 • (LCSD) R4083006-3 06/17/24 08:59

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	371	362	61.8	60.3	40.0-140	J	J	2.46	25
Unadjusted C19-C36 Aliphatics	800	715	672	89.4	84.0	40.0-140			6.20	25
(S) 1-Chloro-octadecane				*69.0*	*65.0*	*40.0-140*				

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

(LCS) R4083006-5 06/17/24 09:47 • (LCSD) R4083006-6 06/17/24 10:11

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	1270	1350	74.7	79.4	40.0-140			6.11	25
(S) o-Terphenyl				*64.6*	*66.1*	*40.0-140*				
(S) 2-Fluorobiphenyl				*82.4*	*86.4*	*40.0-140*				
(S) 2-Bromonaphthalene				*78.9*	*82.9*	*40.0-140*				

Method Blank (MB)

(MB) R4081579-4 06/13/24 15:02

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	0.175	J	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

Method Blank (MB)

(MB) R4081579-4 06/13/24 15:02

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	*29.1*			*10.0-120*
(S) Phenol-d5	*21.2*			*10.0-120*
(S) Nitrobenzene-d5	*52.7*			*10.0-127*
(S) 2-Fluorobiphenyl	*54.9*			*10.0-130*
(S) 2,4,6-Tribromophenol	*54.0*			*10.0-155*
(S) p-Terphenyl-d14	*67.6*			*10.0-128*

Method Blank (MB)

(MB) R4081579-4 06/13/24 15:02

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

Method Blank (MB)

(MB) R4081579-4 06/13/24 15:02

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) R4081579-1 06/13/24 13:55 • (LCSD) R4081579-2 06/13/24 14:17

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	32.2	34.2	64.4	68.4	41.0-120			6.02	22
Acenaphthylene	50.0	34.9	36.9	69.8	73.8	43.0-120			5.57	22
Anthracene	50.0	35.2	37.0	70.4	74.0	45.0-120			4.99	20
Benzidine	100	3.54	3.50	0.000	0.000	10.0-120	J J4	J J4	0.000	36
Benzo(a)anthracene	50.0	39.3	37.3	78.6	74.6	47.0-120			5.22	20
Benzo(b)fluoranthene	50.0	38.4	35.8	76.8	71.6	46.0-120			7.01	20
Benzo(k)fluoranthene	50.0	37.8	36.1	75.6	72.2	46.0-120			4.60	21
Benzo(g,h,i)perylene	50.0	38.6	34.5	77.2	69.0	48.0-121			11.2	20
Benzo(a)pyrene	50.0	37.7	34.1	75.4	68.2	47.0-120			10.0	20
Bis(2-chlorethoxy)methane	50.0	31.5	31.4	63.0	62.8	33.0-120			0.318	24
Bis(2-chloroethyl)ether	50.0	30.2	31.0	60.4	62.0	23.0-120			2.61	33
2,2-Oxybis(1-Chloropropane)	50.0	26.9	28.3	53.8	56.6	28.0-120			5.07	31
4-Bromophenyl-phenylether	50.0	36.5	38.5	73.0	77.0	45.0-120			5.33	20
2-Chloronaphthalene	50.0	31.6	33.3	63.2	66.6	37.0-120			5.24	25
4-Chlorophenyl-phenylether	50.0	34.9	37.2	69.8	74.4	44.0-120			6.38	20
Chrysene	50.0	37.4	36.6	74.8	73.2	48.0-120			2.16	20
Dibenz(a,h)anthracene	50.0	36.8	32.9	73.6	65.8	47.0-120			11.2	20
3,3-Dichlorobenzidine	100	64.3	58.8	64.3	58.8	44.0-120			8.94	20
2,4-Dinitrotoluene	50.0	38.5	37.9	77.0	75.8	49.0-124			1.57	20
2,6-Dinitrotoluene	50.0	38.5	37.8	77.0	75.6	46.0-120			1.83	21
Fluoranthene	50.0	35.8	37.5	71.6	75.0	51.0-120			4.64	20
Fluorene	50.0	35.1	36.3	70.2	72.6	47.0-120			3.36	20
Hexachlorobenzene	50.0	37.2	35.3	74.4	70.6	44.0-120			5.24	20

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

(LCS) R4081579-1 06/13/24 13:55 • (LCSD) R4081579-2 06/13/24 14:17

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 %
Hexachloro-1,3-butadiene	50.0	23.7	27.5	47.4	55.0	19.0-120			14.8	32
Hexachlorocyclopentadiene	50.0	26.5	29.3	53.0	58.6	15.0-120			10.0	31
Hexachloroethane	50.0	22.6	26.8	45.2	53.6	15.0-120			17.0	37
Indeno(1,2,3-cd)pyrene	50.0	36.6	32.7	73.2	65.4	49.0-122			11.3	20
Isophorone	50.0	30.2	30.9	60.4	61.8	36.0-120			2.29	23
Naphthalene	50.0	27.2	30.2	54.4	60.4	27.0-120			10.5	27
Nitrobenzene	50.0	27.6	29.4	55.2	58.8	27.0-120			6.32	29
n-Nitrosodimethylamine	50.0	20.5	19.1	41.0	38.2	10.0-120			7.07	40
n-Nitrosodiphenylamine	50.0	35.3	35.5	70.6	71.0	47.0-120			0.565	20
n-Nitrosodi-n-propylamine	50.0	29.5	30.8	59.0	61.6	31.0-120			4.31	28
Phenanthrene	50.0	34.4	36.8	68.8	73.6	46.0-120			6.74	20
Benzylbutyl phthalate	50.0	35.0	36.2	70.0	72.4	43.0-121			3.37	20
Bis(2-Ethylhexyl)phthalate	50.0	32.9	30.4	65.8	60.8	43.0-122			7.90	20
Di-n-butyl phthalate	50.0	35.2	37.7	70.4	75.4	49.0-121			6.86	20
Diethyl phthalate	50.0	34.4	36.4	68.8	72.8	48.0-122			5.65	20
Dimethyl phthalate	50.0	38.0	37.2	76.0	74.4	48.0-120			2.13	20
Di-n-octyl phthalate	50.0	38.5	35.0	77.0	70.0	42.0-125			9.52	20
Pyrene	50.0	35.7	35.5	71.4	71.0	47.0-120			0.562	20
1,2,4-Trichlorobenzene	50.0	26.0	29.4	52.0	58.8	24.0-120			12.3	29
Aniline	50.0	7.96	7.23	15.9	14.5	13.0-120	J	J	9.61	31
1,2-Diphenylhydrazine	50.0	33.4	35.4	66.8	70.8	41.0-126	N2	N2	5.81	20
Benzyl alcohol	50.0	27.5	24.9	55.0	49.8	25.0-120			9.92	26
4-Chloroaniline	50.0	25.7	23.1	51.4	46.2	25.0-120			10.7	25
4-Chloro-3-methylphenol	50.0	32.0	32.1	64.0	64.2	40.0-120			0.312	21
2-Chlorophenol	50.0	26.0	27.9	52.0	55.8	25.0-120			7.05	35
Dibenzofuran	50.0	33.9	35.8	67.8	71.6	44.0-120			5.45	22
2,4-Dichlorophenol	50.0	30.8	31.4	61.6	62.8	36.0-120			1.93	26
2,4-Dimethylphenol	50.0	34.5	33.9	69.0	67.8	33.0-120			1.75	26
4,6-Dinitro-2-methylphenol	50.0	41.1	41.1	82.2	82.2	38.0-138			0.000	25
2,4-Dinitrophenol	50.0	43.4	43.9	86.8	87.8	10.0-120			1.15	39
2-Methylnaphthalene	50.0	27.5	30.2	55.0	60.4	33.0-120			9.36	25
2-Methylphenol	50.0	25.3	25.7	50.6	51.4	28.0-120			1.57	29
3&4-Methyl Phenol	50.0	26.7	25.9	53.4	51.8	31.0-120			3.04	30
2-Nitroaniline	50.0	42.0	40.5	84.0	81.0	43.0-120			3.64	22
3-Nitroaniline	50.0	39.8	36.8	79.6	73.6	38.0-120			7.83	21
4-Nitroaniline	50.0	40.5	37.7	81.0	75.4	18.0-160			7.16	21
2-Nitrophenol	50.0	32.3	33.6	64.6	67.2	31.0-120			3.95	29
4-Nitrophenol	50.0	17.8	18.4	35.6	36.8	10.0-120			3.31	33
Pentachlorophenol	50.0	29.1	33.5	58.2	67.0	23.0-120			14.1	25
Phenol	50.0	14.4	14.2	28.8	28.4	10.0-120			1.40	36

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

(LCS) R4081579-1 06/13/24 13:55 • (LCSD) R4081579-2 06/13/24 14:17

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 %
Pyridine	50.0	2.55	3.70	5.10	7.40	10.0-120	J J4	J J4	36.8	38
2,4,6-Trichlorophenol	50.0	37.8	37.1	75.6	74.2	42.0-120			1.87	23
Acetophenone	50.0	28.2	29.1	56.4	58.2	29.0-120			3.14	28
Diphenylamine	50.0	35.3	35.5	70.6	71.0	35.0-120			0.565	20
1,2,4,5-Tetrachlorobenzene	50.0	30.6	33.6	61.2	67.2	31.0-121			9.35	27
2,3,4,6-Tetrachlorophenol	50.0	39.1	40.5	78.2	81.0	42.0-132			3.52	22
2,4,5-Trichlorophenol	50.0	39.5	40.7	79.0	81.4	44.0-120			2.99	22
(S) 2-Fluorophenol				*40.8*	*41.6*	*10.0-120*				
(S) Phenol-d5				*30.1*	*30.0*	*10.0-120*				
(S) Nitrobenzene-d5				*57.1*	*55.4*	*10.0-127*				
(S) 2-Fluorobiphenyl				*68.7*	*73.3*	*10.0-130*				
(S) 2,4,6-Tribromophenol				*79.0*	*82.5*	*10.0-155*				
(S) p-Terphenyl-d14				*81.8*	*78.0*	*10.0-128*				

Laboratory Control Sample (LCS)

(LCS) R4081579-3 06/13/24 14:40

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Acetylaminofluorene	50.0	33.5	67.0	32.0-120	
4-Aminobiphenyl	50.0	10.9	21.8	20.0-120	
Chlorobenzilate	50.0	35.1	70.2	29.0-128	J
Diallate	50.0	31.9	63.8	30.0-120	
2,6-Dichlorophenol	50.0	28.5	57.0	19.0-136	
Dimethoate	50.0	31.7	63.4	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	29.2	58.4	27.0-120	
Dimethylbenz (A) Anthracene	50.0	32.6	65.2	14.0-124	
3,3-Dimethylbenzidine	50.0	0.474	0.000	13.0-120	J J4
a,a-Dimethylphenethylamine	50.0	0.0127	0.0254	10.0-129	J J4
1,3-Dinitrobenzene	50.0	32.6	65.2	34.0-120	
Diphenylamine	50.0	27.8	55.6	35.0-120	
Dinoseb	50.0	32.1	64.2	39.0-120	J
Disulfoton	50.0	28.3	56.6	32.0-120	
Ethyl methanesulfonate	50.0	28.9	57.8	10.0-120	
Ethyl Parathion	50.0	32.5	65.0	46.0-130	
Famphur	50.0	33.3	66.6	32.0-120	
Hexachloropropene	50.0	20.0	40.0	10.0-120	J
Hexachlorophene	100	42.8	42.8	10.0-120	J
Isodrin	50.0	31.0	62.0	22.0-157	

Laboratory Control Sample (LCS)

(LCS) R4081579-3 06/13/24 14:40

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Isosafrole	50.0	29.7	59.4	25.0-133	
Kepone	50.0	53.2	106	10.0-120	
Methapyrilene	50.0	1.10	2.20	10.0-120	J J4
3-Methylcholanthrene	50.0	32.4	64.8	30.0-160	
Methyl methanesulfonate	50.0	20.8	41.6	10.0-120	J
Methyl parathion	50.0	36.2	72.4	42.0-120	
1,4-Naphthoquinone	50.0	1.85	3.70	50.0-150	J J4
1-Naphthylamine	50.0	13.6	27.2	19.0-120	
2-Naphthylamine	50.0	10.0	20.0	10.0-120	J
5-Nitro-o-toluidine	50.0	31.5	63.0	34.0-120	
4-Nitroquinoline 1-oxide	50.0	29.9	59.8	10.0-159	
n-Nitrosodiethylamine	50.0	25.3	50.6	10.0-120	
n-Nitrosodi-n-butylamine	50.0	31.2	62.4	13.0-143	
n-Nitrosomethylethylamine	50.0	23.1	46.2	10.0-120	
n-Nitrosomorpholine	50.0	25.3	50.6	10.0-120	
n-Nitrosopiperidine	50.0	30.1	60.2	10.0-160	
n-Nitrosopyrrolidine	50.0	27.1	54.2	10.0-124	
Pentachlorobenzene	50.0	29.6	59.2	25.0-120	
Pentachloroethane	50.0	24.6	49.2	10.0-120	J
Pentachloronitrobenzene	50.0	35.9	71.8	34.0-132	
Phenacetin	50.0	36.9	73.8	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	32.9	65.8	13.0-160	J
2-Picoline	50.0	10.6	21.2	10.0-120	J
Pronamide	50.0	36.0	72.0	38.0-130	
Safrole	50.0	27.6	55.2	21.0-120	
Sulfotep	50.0	30.9	61.8	52.0-120	J
Thionazin	50.0	32.4	64.8	38.0-121	
o-Toluidine	50.0	18.2	36.4	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	27.3	54.6	11.0-135	
1,3,5-Trinitrobenzene	50.0	40.4	80.8	37.0-147	

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

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.
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.
C6	The initial calibration verification standard (SSCV) associated with this data responded low.
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.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
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.
J-	The associated batch QC was outside the lower control limits; associated data has a potential negative bias.
J+	The associated batch QC was outside the upper control limits; associated data has a potential positive bias.
K1	The sample dilutions set-up for the BOD/CBOD analysis did not meet the oxygen depletion criteria of at least 2 mg/L. Reported result is an estimated value.

GLOSSARY OF TERMS

Qualifier	Description
N2	Analyte reported using a calibration and validation based on Azobenzene (CAS 103-33-3). 1,2-Diphenylhydrazine decomposes into Azobenzene during the analysis.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.
Q	Sample was prepared and/or analyzed past holding time as defined in the method. Concentrations should be considered minimum values.
T8	Sample(s) received past/too close to holding time expiration.

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	LAO000356
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.

Company Name/Address:
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 GW

City/State Collected:

Please Circle: PT MT CT ET

Phone: 303-382-5474

Client Project # 1690029619

Lab Project # ENVIRONCO-CALUMET GW

Collected by (print): Kyle A. Graves

Site/Facility ID # GREAT FALLS, MT

P.O. #

Collected by (signature): Kyle A. Graves

Immediately Packed on Ice N ___ Y ✓

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

Pres Chk: N, N

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/hubfs/pas-standard-terms.pdf

SDG # U744765

A174

Acctnum: ENVIRONCO
Template: T252807
Prelogin: P1075157
PM: 841 - Kelly Mercer
PB: BF 5/20/24
Shipped Via: FedEX Ground

Sample ID	Comp/Grab	Matrix *	Depth	Date	Time	No. of Cntrs	**BOD 500mlHDPE-NoPres	**Nitrate, Sulfate 125mlHDPE-NoPres	8270AP9 100ml Amb NoPres	CO2 40mlAmb-NoPres	Diss Fe, Mn 6020 250mlHDPE-HNO3	RSK175 (Methane) 40mlAmb HCl	SVEPHMT 1L-Amb-Add HCl	Total Fe, Mn 6020 250mlHDPE-HNO3	V8260LL 40mlAmb-HCl	VPHMT 40mlAmb HCl	Remarks	Sample # (lab only)
CMR-MW-413-240606	grab	GW		06/06/24	1445	17	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		-01
TRIP BLANK		GW																-02
CMR-MW-105-240606	grab	GW		06/06/24		17	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		-03
CMR-MW-106-240606	grab	GW		06/06/24		17	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		-04
		GW																

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

Remarks:

pH _____ Temp _____
Flow _____ Other _____

Samples returned via: __ UPS ✓ FedEx __ Courier _____

Tracking # 7155 0314 1236

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

Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Trip Blank Received: Yes / No HCL / MeoH TBR	Bottles Received:
Kyle A. Graves	06/07/24	1000		1	
Relinquished by : (Signature)	Date:	Time:	Received by: (Signature)	Temp: °C	
				1.9 +0.3 = 2.2	34
Relinquished by : (Signature)	Date:	Time:	Received for lab by: (Signature)	Date:	Time:
				06-08-24	0900

If preservation required by Login: PH-10BDH5021 TRC-2352362 CR6-20221V Date/Time

Hold:

Condition: NCF / OK

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	SP301		SP301		SP301	
	Ramboll Sample ID	CMR-SP301-211015		CMR-SP301-211016		CMR-SP301-211017	
	Sample Date	10/15/2021		10/16/2021		10/17/2021	
	Blower Flow (scfm)	41		41		41	
	Period Operational Time (hrs)	26		24		24	
	Notes						
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	SP301		SP301		SP301	
	Ramboll Sample ID	CMR-SP301-2		CMR-SP301-211201		CMR-SP301-211208	
	Sample Date	11/19/2021		12/1/2021		12/8/2021	
	Blower Flow (scfm)	41		56		65	
	Period Operational Time (hrs)	--		283		144	
	Notes						
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	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	SP301		SP301		SP301	
	Ramboll Sample ID	CMR-SP301-211216		CMR-SP301-220216		CMR-SP301-110309	
	Sample Date	12/31/2021		2/16/2022		3/9/2022	
	Blower Flow (scfm)	61		66		70	
	Period Operational Time (hrs)	334		--		949	
	Notes						
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	SP301		SP301		SP301	
	Ramboll Sample ID	CMR-SP301-2022411		CMR-SP301-220511		CMR-SP301-220617	
	Sample Date	4/11/2022		5/11/2022		6/17/2022	
	Blower Flow (scfm)	102		128		172	
	Period Operational Time (hrs)	632		742		517	
	Notes						
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	SP301		SP301		SP301	
	Ramboll Sample ID	CMR-SP301-220727		CMR-SP301-083122		CMR-SP301-083122	
	Sample Date	7/27/2022		8/31/2022		9/30/2022[4]	
	Blower Flow (scfm)	155		37		76	
	Period Operational Time (hrs)	715		506		720	
	Notes						
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	SP301		SP301		SP301		SP301
	Ramboll Sample ID	CMR-SP301-221214		CMR-SP301-221214		CMR-SP301-221214		CMR-DS3-221214
	Sample Date	10/31/2022		11/30/2022		12/14/2022		12/14/2022
	Blower Flow (scfm)	22		11		88		--
	Period Operational Time (hrs)	75		20		469		--
	Notes							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	SP301		SP301		SP301	
	Ramboll Sample ID	CMR-SP301-230130		CMR-SP301-230228		CMR-SP301-230321	
	Sample Date	1/30/2023		2/28/2023		3/21/2023	
	Blower Flow (scfm)	44		105		147	
	Period Operational Time (hrs)	703		534		734	
	Notes						
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	SP301		SP301		SP301	
	Ramboll Sample ID	CMR-SP301-230531		CMR-SP301-230531		CMR-SP301-290623	
	Sample Date	4/30/2023		5/31/2023		6/29/2023	
	Blower Flow (scfm)	81		75		70	
	Period Operational Time (hrs)	533		510		449	
	Notes						
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	SP301		SP301		SP301	
	Ramboll Sample ID	CMR-SP301-110723		CMR-SB-301-101223		CMR-SP301-122723	
	Sample Date	7/11/2023		10/12/2023		12/27/2023	
	Blower Flow (scfm)	78		26		41	
	Period Operational Time (hrs)	310		238		595	
	Notes						
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
Naphthalene	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	SP301		SP301		SP301	
	Ramboll Sample ID	CMR-SP301-013124		CMR-SP301-240208		CMR-SP301-240327	
	Sample Date	1/31/2024		2/8/2024		3/27/2024	
	Blower Flow (scfm)	46		143		116	
	Period Operational Time (hrs)	558		689		739	
	Notes						
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)		**2,888**		**2,894**		**2,895**	

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

	Location	SP301		SP301	
	Ramboll Sample ID	CMR-SP301-240531		CMR-SP301-240620	
	Sample Date	5/31/2024		6/20/2024	
	Blower Flow (scfm)	66		100	
	Period Operational Time (hrs)	1018		714	
	Notes				
VOCs	CAS No.	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
1,1,2,2-Tetrachloroethane	79-34-5	1 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	2 U	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	1 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	1 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	5 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	325	0.08	157	0.04
1,2-Dibromoethane (EDB)	106-93-4	2 U	0.00	2 U	0.00
1,2-Dichlorobenzene	95-50-1	1 U	0.00	1 U	0.00
1,2-Dichloroethane	107-06-2	1 U	0.00	1 U	0.00
1,2-Dichloropropane	78-87-5	1 U	0.00	1 U	0.00
1,3,5-Trimethylbenzene	108-67-8	318	0.08	200	0.05
1,3-Butadiene	106-99-0	4 U	0.00	4 U	0.00
1,3-Dichlorobenzene	541-73-1	1 U	0.00	1 U	0.00
1,4-Dichlorobenzene	106-46-7	1 U	0.00	1 U	0.00
2-Butanone (MEK)	78-93-3	5	0.00	4 U	0.00
2-Hexanone	591-78-6	5 U	0.00	5 U	0.00
2-Propanol	67-63-0	3 U	0.00	3 U	0.00
4-Ethyltoluene	622-96-8	91	0.02	195	0.05
4-Methyl-2-pentanone (MIBK)	108-10-1	5 U	0.00	5 U	0.00
Acetone	67-64-1	14	0.00	23	0.01
Benzene	71-43-2	923	0.23	1,100	0.29
Benzyl chloride	100-44-7	1 U	0.00	1 U	0.00
Bromodichloromethane	75-27-4	1 U	0.00	1 U	0.00
Bromoform	75-25-2	6 U	0.00	6 U	0.00
Bromomethane	74-83-9	1 U	0.00	1 U	0.00
Carbon disulfide	75-15-0	1	0.00	1 U	0.00
Carbon tetrachloride	56-23-5	1 U	0.00	1 U	0.00
Chlorobenzene	108-90-7	1 U	0.00	1 U	0.00
Chloroethane	75-00-3	1 U	0.00	1 U	0.00
Chloroform	67-66-3	1 U	0.00	1 U	0.00
Chloromethane	74-87-3	1	0.00	0 U	0.00
cis-1,2-Dichloroethene	156-59-2	1 U	0.00	1 U	0.00
cis-1,3-Dichloropropene	10061-01-5	1 U	0.00	1 U	0.00
Cyclohexane	110-82-7	1,210	0.30	1,230	0.33
Dibromochloromethane	124-48-1	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	2	0.00	3	0.00
Dichlorotetrafluoroethane	76-14-2	1 U	0.00	1 U	0.00
Ethanol	64-17-5	9	0.00	5 U	0.00
Ethyl acetate	141-78-6	-- --	--	-- --	--
Ethylbenzene	100-41-4	153	0.04	214	0.06
Hexachloro-1,3-butadiene	87-68-3	7 U	0.00	7 U	0.00
m&p-Xylene	179601-23-1	1,070	0.27	1,500	0.40
Methylene Chloride	75-09-2	1 U	0.00	1 U	0.00
Methyl-tert-butyl ether	1634-04-4	1 U	0.00	1 U	0.00
Naphthalene	91-20-3	3 U	0.00	3 U	0.00
n-Heptane	142-82-5	560	0.14	900	0.24
n-Hexane	110-54-3	1,610	0.41	2,290	0.61
o-Xylene	95-47-6	328	0.08	328	0.09
Propylene	115-07-1	9	0.00	2 U	0.00
Styrene	100-42-5	2 U	0.00	2 U	0.00
Tetrachloroethene	127-18-4	1 U	0.00	1 U	0.00
Tetrahydrofuran	109-99-9	1 U	0.00	1 U	0.00
Toluene	108-88-3	33	0.01	44	0.01
trans-1,2-Dichloroethene	156-60-5	1 U	0.00	1 U	0.00
trans-1,3-Dichloropropene	10061-02-6	1 U	0.00	1 U	0.00
Trichloroethene	79-01-6	1 U	0.00	1 U	0.00
Trichlorofluoromethane	75-69-4	1	0.00	1 U	0.00
Vinyl acetate	108-05-4	2 U	0.00	2 U	0.00
Vinyl chloride	75-01-4	1 U	0.00	1 U	0.00
Total VOCs	--	--	1.70	--	2.20
Period Total VOC Mass Removed (lbs)		1.7		2.2	
Cumulative Total VOC Mass Removed (lbs)		2,896		2,899	

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/m^3 : micrograms per cubic meter
Sample Calculation

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

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	SP200		SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-211015		CMR-SP200-211208		CMR-SP200-220216		CMR-SP200-220411	
	Sample Date	10/15/2021		12/8/2021		2/16/2022		4/11/2022	
	Effluent Volume (L)*	21,138		43,176		80,754		137,543	
	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	--	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	--
TRICHLOROFLUOROMETHANE	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	SP200		SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-211015		CMR-SP200-211208		CMR-SP200-220216		CMR-SP200-220411	
	Sample Date	10/15/2021		12/8/2021		2/16/2022		4/11/2022	
	Effluent Volume (L)*	21,138		43,176		80,754		137,543	
	Notes								
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	SP200		SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-211015		CMR-SP200-211208		CMR-SP200-220216		CMR-SP200-220411	
	Sample Date	10/15/2021		12/8/2021		2/16/2022		4/11/2022	
	Effluent Volume (L)*	21,138		43,176		80,754		137,543	
	Notes								
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	SP200			SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-220517			CMR-SP200-220617		CMR-SP200-220727		CMR-SP200-220830	
	Sample Date	5/17/2022			6/17/2022		7/27/2022		8/30/2022	
	Effluent Volume (L)*	0			126,978		76,011		31,926	
	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	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	SP200			SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-220517			CMR-SP200-220617		CMR-SP200-220727		CMR-SP200-220830	
	Sample Date	5/17/2022			6/17/2022		7/27/2022		8/30/2022	
	Effluent Volume (L)*	0			126,978		76,011		31,926	
	Notes									
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	SP200		SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-220517		CMR-SP200-220617		CMR-SP200-220727		CMR-SP200-220830	
	Sample Date	5/17/2022		6/17/2022		7/27/2022		8/30/2022	
	Effluent Volume (L)*	0		126,978		76,011		31,926	
	Notes								
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	SP200		SP200		SP200		SP200		SP200
	Ramboll Sample ID	CMR-SP200-220830		CMR-SP200-221214		CMR-SP200-221214		CMR-SP200-221214		CMR-DS2-
	Sample Date	9/30/2022		10/31/2022		11/30/2022		12/14/2022		12/14/2022
	Effluent Volume (L)*	39,179		4,319		17		159,877		--
	Notes									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	SP200		SP200		SP200		SP200		SP200
	Ramboll Sample ID	CMR-SP200-220830		CMR-SP200-221214		CMR-SP200-221214		CMR-SP200-221214		CMR-DS2-
	Sample Date	9/30/2022		10/31/2022		11/30/2022		12/14/2022		12/14/2022
	Effluent Volume (L)*	39,179		4,319		17		159,877		--
	Notes									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
2,3,4,6-TETRACHLOROPHENOL	58-90-2	--	--	--	--	--	--	--	--	--
2,4,5-TRICHLOROPHENOL	95-95-4	ND	--	ND	--	ND	--	ND	--	ND
2,4,6-TRICHLOROPHENOL	88-06-2	ND	--	ND	--	ND	--	ND	--	ND
2,4-DICHLOROPHENOL	120-83-2	ND	--	ND	--	ND	--	ND	--	ND
2,4-DIMETHYLPHENOL	105-67-9	ND	--	ND	--	ND	--	ND	--	ND
2,4-DINITROPHENOL	51-28-5	ND	--	ND	--	ND	--	ND	--	ND
2,4-DINITROTOLUENE	121-14-2	ND	--	ND	--	ND	--	ND	--	ND
2,6-DINITROTOLUENE	606-20-2	ND	--	ND	--	ND	--	ND	--	ND
2-CHLORONAPHTHALENE	91-58-7	ND	--	ND	--	ND	--	ND	--	ND
2-CHLOROPHENOL	95-57-8	ND	--	ND	--	ND	--	ND	--	ND
2-METHYLNAPHTHALENE	91-57-6	21,000	1.8138	2,000	0.0190	2,000	0.0001	2,000	0.7049	2,000
2-METHYLPHENOL	95-48-7	ND	--	ND	--	ND	--	ND	--	ND
2-NITROANILINE	88-74-4	ND	--	ND	--	ND	--	ND	--	ND
2-NITROPHENOL	88-75-5	ND	--	ND	--	ND	--	ND	--	ND
3,3'-DICHLOROBENZIDINE	91-94-1	ND	--	ND	--	ND	--	ND	--	ND
3-NITROANILINE	99-09-2	ND	--	ND	--	ND	--	ND	--	ND
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	--	ND	--	ND	--	ND	--	ND
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	--	ND	--	ND	--	ND	--	ND
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	--	ND	--	ND	--	ND	--	ND
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	--	ND	--	ND	--	ND	--	ND
4-METHYLPHENOL	106-44-5	ND	--	ND	--	ND	--	ND	--	ND
4-NITROANILINE	100-01-6	ND	--	ND	--	ND	--	ND	--	ND
4-NITROPHENOL	100-02-7	ND	--	ND	--	ND	--	ND	--	ND
ACENAPHTHENE	83-32-9	ND	--	51	0.0005	51	0.0000	51	0.0180	ND
ACENAPHTHYLENE	208-96-8	ND	--	ND	--	ND	--	ND	--	ND
ANTHRACENE	120-12-7	ND	--	ND	--	ND	--	ND	--	ND
BENZO(A)ANTHRACENE	56-55-3	ND	--	ND	--	ND	--	ND	--	ND
BENZO(A)PYRENE	50-32-8	ND	--	ND	--	ND	--	ND	--	ND
BENZO(B)FLUORANTHENE	205-99-2	ND	--	ND	--	ND	--	ND	--	ND
BENZO(G,H,I)PERYLENE	191-24-2	ND	--	ND	--	ND	--	ND	--	ND
BENZO(K)FLUORANTHENE	207-08-9	ND	--	ND	--	ND	--	ND	--	ND
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	--	ND	--	ND	--	ND	--	ND
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	--	ND	--	ND	--	ND	--	ND
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	--	ND	--	ND	--	ND	--	ND
BUTYLBENZYLPHTHALATE	85-68-7	ND	--	ND	--	ND	--	ND	--	ND
CARBAZOLE	86-74-8	ND	--	ND	--	ND	--	ND	--	ND
CHRYSENE	218-01-9	ND	--	ND	--	ND	--	ND	--	ND
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	--	ND	--	ND	--	ND	--	ND
DIBENZOFURAN	132-64-9	ND	--	ND	--	ND	--	ND	--	ND
DIETHYLPHTHALATE	84-66-2	ND	--	ND	--	ND	--	ND	--	ND
DIMETHYLPHTHALATE	131-11-3	ND	--	ND	--	ND	--	ND	--	ND
DI-N-BUTYLPHTHALATE	84-74-2	ND	--	ND	--	ND	--	ND	--	ND
DI-N-OCTYLPHTHALATE	117-84-0	ND	--	ND	--	ND	--	ND	--	ND
FLUORANTHENE	206-44-0	ND	--	ND	--	ND	--	ND	--	ND
FLUORENE	86-73-7	1,100	0.0950	170	0.0016	170	0.0000	170	0.0599	110
HEXACHLOROBENZENE	118-74-1	ND	--	ND	--	ND	--	ND	--	ND
HEXACHLOROBUTADIENE	87-68-3	ND	--	ND	--	ND	--	ND	--	ND
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	--	ND	--	ND	--	ND	--	ND
HEXACHLOROETHANE	67-72-1	ND	--	ND	--	ND	--	ND	--	ND
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	--	ND	--	ND	--	ND	--	ND
ISOPHORONE	78-59-1	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
NITROBENZENE	98-95-3	ND	--	ND	--	ND	--	ND	--	ND
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	--	ND	--	ND	--	ND	--	ND
N-NITROSODIPHENYLAMINE	86-30-6	ND	--	ND	--	ND	--	ND	--	ND
PENTACHLOROPHENOL	87-86-5	ND	--	ND	--	ND	--	ND	--	ND
PHENANTHRENE	85-01-8	2,000	0.1727	220	0.0021	220	0.0000	220	0.0775	210
PHENOL	108-95-2	ND	--	ND	--	ND	--	ND	--	ND
PYRENE	129-00-0	ND	--	34	0.0003	34	0.0000	34	0.0120	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	SP200		SP200		SP200		SP200		SP200
	Ramboll Sample ID	CMR-SP200-220830		CMR-SP200-221214		CMR-SP200-221214		CMR-SP200-221214		CMR-DS2-
	Sample Date	9/30/2022		10/31/2022		11/30/2022		12/14/2022		12/14/2022
	Effluent Volume (L)*	39,179		4,319		17		159,877		--
	Notes									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)**
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**		**--**

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

	Location	SP200		SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-230126		CMR-SP200-230228		CMR-SP200-230321		CMR-SP200-230503	
	Sample Date	1/26/2023		2/28/2023		3/21/2023		5/3/2023	
	Effluent Volume (L)*	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	--	ND	--	ND	--
TOLUENE	108-88-3	15	0.00	ND	--	20	0.00	11	0.00
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	--
TRICHLOROFLUOROMETHANE	75-69-4	ND	--	ND	--	ND	--	ND	--
VINYL CHLORIDE	75-01-4	ND	--	ND	--	ND	--	ND	--
XYLENES (TOTAL)	1330-20-7	--	--	--	--	--	--	--	--
Total VOCs	--	**--**	**0.550**	**--**	**0.030**	**--**	**0.101**	**--**	**0.131**
Period Total VOC Mass Removed (lbs)		**0.550**		**0.030**		**0.101**		**0.131**	
Cumulative Total VOC Mass Removed (lbs)		**8.41**		**8.44**		**8.54**		**8.67**	

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

	Location	SP200		SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-230126		CMR-SP200-230228		CMR-SP200-230321		CMR-SP200-230503	
	Sample Date	1/26/2023		2/28/2023		3/21/2023		5/3/2023	
	Effluent Volume (L)*	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)**
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**	--	**0.02**
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	SP200		SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-230126		CMR-SP200-230228		CMR-SP200-230321		CMR-SP200-230503	
	Sample Date	1/26/2023		2/28/2023		3/21/2023		5/3/2023	
	Effluent Volume (L)*	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)**
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	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-230531		CMR-SP200-290623		CMR-SP200-110723	
	Sample Date	5/31/2023		6/23/2023		7/11/2023	
	Effluent Volume (L)*	151,878		306,490		125,244	
	Notes						
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	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-230531		CMR-SP200-290623		CMR-SP200-110723	
	Sample Date	5/31/2023		6/23/2023		7/11/2023	
	Effluent Volume (L)*	151,878		306,490		125,244	
	Notes						
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	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-230531		CMR-SP200-290623		CMR-SP200-110723	
	Sample Date	5/31/2023		6/23/2023		7/11/2023	
	Effluent Volume (L)*	151,878		306,490		125,244	
	Notes						
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	SP200		SP200	
	Ramboll Sample ID	CMQ-SP200-101223		CUR-SP200-122723	
	Sample Date	10/12/2023		12/27/2023	
	Effluent Volume (L)*	33,349		54,067	
	Notes				
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	SP200		SP200	
	Ramboll Sample ID	CMQ-SP200-101223		CUR-SP200-122723	
	Sample Date	10/12/2023		12/27/2023	
	Effluent Volume (L)*	33,349		54,067	
	Notes				
Analyte	**CAS No.**	**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	SP200		SP200	
	Ramboll Sample ID	CMQ-SP200-101223		CUR-SP200-122723	
	Sample Date	10/12/2023		12/27/2023	
	Effluent Volume (L)*	33,349		54,067	
	Notes				
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	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-013124		CMR-SP200-240208		CMR-SP200-240320	
	Sample Date	1/31/2024		2/8/2024		3/20/2024	
	Effluent Volume (L)*	19,177		32,365		36,438	
	Notes						
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	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-013124		CMR-SP200-240208		CMR-SP200-240320	
	Sample Date	1/31/2024		2/8/2024		3/20/2024	
	Effluent Volume (L)*	19,177		32,365		36,438	
	Notes						
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	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-013124		CMR-SP200-240208		CMR-SP200-240320	
	Sample Date	1/31/2024		2/8/2024		3/20/2024	
	Effluent Volume (L)*	19,177		32,365		36,438	
	Notes						
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

	Location	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-240430		CMR-SP200-240522		CMR-SP200-240620	
	Sample Date	4/30/2024		5/22/2024		6/20/2024	
	Effluent Volume (L)*	37,097		342,387		155,891	
	Notes						
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	--	ND	--
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	258	0.02	ND	--	ND	--
2-HEXANONE	591-78-6	ND	--	ND	--	ND	--
4-METHYL-2-PENTANONE	108-10-1	9.64	0.00	ND	--	ND	--
ACETONE	67-64-1	1820	0.15	ND	--	ND	--
BENZENE	71-43-2	250	0.0204	68.5	0.0517	11.1	0.0038
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	3.76	0.0003	ND	--	ND	--
CYCLOHEXANE	110-82-7	--	--	--	--	--	--
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--	ND	--
ETHYL BENZENE	100-41-4	25.9	0.0021	16.8	0.0127	ND	--
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	ND	--	33.9	0.0256	70.0	0.0241
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--
STYRENE	100-42-5	ND	--	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--
TOLUENE	108-88-3	3.29	0.00	ND	--	ND	--
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	--	**--**	**0.194**	**--**	**0.090**	**--**	**0.028**
Period Total VOC Mass Removed (lbs)		**0.194**		**0.090**		**0.028**	
Cumulative Total VOC Mass Removed (lbs)		**10.65**		**10.74**		**10.77**	

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

	Location	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-240430		CMR-SP200-240522		CMR-SP200-240620	
	Sample Date	4/30/2024		5/22/2024		6/20/2024	
	Effluent Volume (L)*	37,097		342,387		155,891	
	Notes						
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	--	ND	--	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	62	0.0051	280	0.2113	26.30	0.0090
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	--	17	0.0129	2	0.0008
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	ND	--	ND	--	4	0.0013
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	23	0.0019	119	0.0898	21	0.0071
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	8	0.0007	21	0.0160	3	0.0009
PHENOL	108-95-2	ND	--	ND	--	ND	--
PYRENE	129-00-0	6	0.0005	5	0.00	ND	--
Total SVOCs	--	**--**	**0.008**	**--**	**0.3339**	**--**	**0.019**
Period Total SVOC Mass Removed (lbs)		**0.008**		**0.3339**		**0.019**	
Cumulative Total VOC Mass Removed (lbs)		**13.83**		**14.17**		**14.19**	

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

	Location	SP200		SP200		SP200	
	Ramboll Sample ID	CMR-SP200-240430		CMR-SP200-240522		CMR-SP200-240620	
	Sample Date	4/30/2024		5/22/2024		6/20/2024	
	Effluent Volume (L)*	37,097		342,387		155,891	
	Notes						
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	75,800	6.20	79,600	60.08	34,100	11.72
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	62,000	5.07	44,800	33.82	22,300	7.66
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	205,000	16.77	224,000	169.08	80,600	27.70
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	343,000	28.05	348,000	262.68	137,000	47.08
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	343,000	28.05	348,000	262.68	137,000	47.08
Total EPHs	--	**--**	**28.05**	**--**	**262.68**	**--**	**47.08**
Period Total EPH Mass Removed (lbs)		**28.1**		**262.68**		**47.1**	
Cumulative Total EPH Mass Removed (lbs)		**2615.4**		**2878.0**		**2925.1**	
VPH							
BENZENE	71-43-2	--	--	--	--	--	--
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	1,010	0.08	1,750	1.32	ND	--
C9 THROUGH C10 AROMATIC HYDROCARBONS	C09-C10-AROM	3,230	0.26	7,670	5.79	4,170	1.43
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	11,400	0.93	20,600	15.55	7,240	2.49
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	16,100	1.32	30,500	23.02	11,500	3.95
Total VPHs	--	**--**	**1.32**	**--**	**23.02**	**--**	**3.95**
Period Total VPH Mass Removed (lbs)		**1.32**		**23.02**		**3.95**	
Cumulative Total VPH Mass Removed (lbs)		**220.8**		**243.9**		**247.8**	

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

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

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) - **6/6/2024**
Personnel - **Kyle Groves**
Weather - **Clear**
Sampling Device - **Geotech Peristaltic Pump**

Pump on - **1415**
Pump off - **1505**

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 - **6.61** 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**
1425	0.2	45	7.07	1.176	---	17.20	-151	1.22	7.91	
1430	0.2	45	7.06	1.174	---	17.50	-151	1.71	7.91	
1435	0.2	45	7.10	1.175	---	18.00	-152	1.55	7.90	

Notes / Sample Information

Appearance at Start - **Clear**
Appearance After Purging - **Clear**

Sample ID - **CMR-MW-41S-240606**
Sample Time - **1445**

Total Volume Purged - **1.1** L
Purge Rate - **45** ml/min

Additional Sample - **None**
Additional Sample ID -

Analysis - VOCs (8260);
VPH (Montana VPH);
Modified Skinner Metals (6020B/7471B);
SVOCs (8270);
EPH (Montana EPH)

Equipment Information

Multi-Gas Meter / PID # - **NA**
Water Quality Meter # - **43945**

Oil / Water Interface Probe # - **18K100281**
Peristaltic Pump # - **CAL-1**

Notes **Water meter did not record for 1st 10 mins; total purged was more as a result.**

Calumet Montana Refinery, LLC
Great Falls, Montana

Low Flow Groundwater Sampling Field Log

Monitoring Well - **MW-105**

Sampling Information

Date (MM/DD/YY) - **6/6/2024**
Personnel - **Kyle Groves**
Weather - **Cleaer**
Sampling Device - **Geotech Peristaltic Pump**

Pump on - **1635**
Pump off - **1710**

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 - **11.89** 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**
1640	0.4	70	7.08	1.965	---	15.20	-90	0.83	5.20	
1645	0.4	70	7.12	1.953	---	16.20	-83	0.70	5.30	
1650	0.4	70	7.19	1.955	---	16.50	-78	0.60	5.50	

Notes / Sample Information

Appearance at Start - **Clear**
Appearance After Purging - **Clear**

Sample ID - **CMW-MW105-240606**
Sample Time - **1700**

Total Volume Purged - **1.1** L
Purge Rate - **70** ml/min

Additional Sample - **None**
Additional Sample ID -

Analysis - VOCs (8260);
VPH (Montana VPH);
Modified Skinner Metals (6020B/7471B);
SVOCs (8270);
EPH (Montana EPH)

Equipment Information

Multi-Gas Meter / PID # - **NA**
Water Quality Meter # - **43945**

Oil / Water Interface Probe # - **Heron**
Peristaltic Pump # - **CAL-1**

Notes

Calumet Montana Refinery, LLC
Great Falls, Montana

Low Flow Groundwater Sampling Field Log

Monitoring Well - **MW-106**

Sampling Information

Date (MM/DD/YY) - **6/6/2014**
Personnel - **Kyle Groves**
Weather - **Clear**
Sampling Device - **Geotech Peristaltic Pump**

Pump on - **0:00**
Pump off - **1640**

Well Information

Well Casing PID - **--** ppm
Well Diameter - **#N/A** inch
Screened Zone - **#N/A** ft BGS

Measured Depth to Bottom - **12.37** ft BTOC
Depth to LNAPL - **---** ft BTOC
Depth to Water - **4.52** 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**
1525	0.4	85	6.85	0.004	---	17.60	-111	29.23	3.89	
1530	0.4	85	6.79	0.002	---	23.20	-195	13.08	4.55	
1535	0.4	85	6.73	0.001	---	25.80	-289	10.56	4.23	
1540	0.4	85	7.05	1.671	---	18.20	-107	2.03	4.00	
1545	0.4	85	7.14	1.637	---	17.50	-114	0.58	4.11	
1550	0.4	85	7.20	1.638	---	17.60	-118	1.00	4.15	

Notes / Sample Information

Appearance at Start - **Clear**
Appearance After Purging - **Clear**

Total Volume Purged - **2.6** L
Purge Rate - **85** ml/min

Sample ID - **CMR-MW106-240606**
Sample Time - **1620**

Additional Sample - **None**
Additional Sample ID -

Analysis - VOCs (8260);
VPH (Montana VPH);
Modified Skinner Metals (6020B/7471B);
SVOCs (8270);
EPH (Montana EPH)

Equipment Information

Multi-Gas Meter / PID # - **NA**
Water Quality Meter # - **43945**

Oil / Water Interface Probe # -
Peristaltic Pump # -

Notes