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February 13, 2025

Mr. Walley Jemmings
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Montana Department of Environmental Quality
Waste Management Bureau
P.O. Box 200901
Helena, MT 59620-0901

RE: AOC-16 Interim Measure 4th Quarter 2024 Monitoring Report No. 12

Submitted via Montana File Transfer Service with Hard Copy to follow

Dear Mr. Jemmings,

Please find attached Calumet Montana Refining LLC's (CMR) AOC-16 Interim Measure (IM) 4th Quarter 2024 Monitoring Report (QMR) No. 12 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 October 2024 and December 2024. In addition, this report presents an evaluation of AOC-16 IM remediation system performance during this period and discusses continued system optimization and monitoring activities.

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

Sincerely,

Michael Gipson

Mike Gipson
Environmental Specialist

cc: Joe Dauner - CMR

Attachments: AOC-16 Interim Measure 4th Quarter 2024 Monitoring Report No. 12



**AOC-16 INTERIM MEASURE
4TH QUARTER 2024
MONITORING REPORT NO. 12**

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

February 13, 2025

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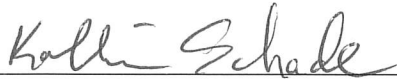
ACRONYMNS AND ABBREVIATIONS

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
µg/m ³	micrograms per cubic meter
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
VFD	Variable Frequency Drive
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:



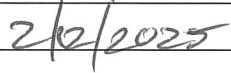
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Date:



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) 4th Quarter 2024 Monitoring Report (QMR) No. 12 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 4th Quarter of 2024, the DPE system operated approximately 73% of the available time. The DPE system extracted and discharged approximately 31,090 gallons of total fluids to CMR's wastewater treatment plant (WWTP). During this reporting period the DPE system also removed approximately 2.8 pounds of petroleum vapor. It also removed 0 pounds of volatile organic compounds (VOCs), 0 pounds of semi-volatile organic compounds (SVOCs), 0.76 pounds of volatile petroleum hydrocarbons (VPH), and 12.8 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 December 4 and 5, 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 of 574 µg/L exceeding the Montana Department of Environmental Quality-7 Human Health Standards – Groundwater (DEQ-7 HHS) and the Risk-Based Screening Levels (RBSLs) of 5 micrograms per liter (µg/L). Benzene was detected at a concentration of 27.6 µg/L, greater 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 22.9 µg/L exceeding the DEQ-7 HHS and RBSL of 5 µg/L. Within the trench (MW-106), VPH and C5-C8 Aliphatic were detected between the method detection limit and the reporting limit at a concentration of 194 µg/L and 135 µg/L, respectively. The C5-C8 Aliphatics concentration was below the RBSL of 650 µg/L. Downgradient of the PTT (MW-105), VPH was detected at a concentration of 634 µg/L with a C5-C8 Aliphatics concentration (adjusted) of 469 µg/L which does not exceed 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.

The IM has been operational for approximately three years. Based on the performance monitoring conducted through the third quarter of 2024 indicating that contaminant recovery is reaching asymptotic levels, CMR recommended revisions to the operational period of the DPE system and monitoring schedule as part of the *AOC-16 Interim Measure 3rd Quarter 2024 Monitoring Report No. 11*, dated December 17, 2024. Mass recovery results during the 4th quarter of 2024 remain consistent with the conclusions identified in the 3rd Quarter Monitoring Report. Montana Department of Environmental Quality (MDEQ) issued conditional approval of the modified operational and monitoring schedule on January 14, 2025. These changes include operating the DPE system in a pulsed manner for a period of 6.5 weeks followed by 6.5 weeks of shutdown time followed by 13 weeks operational/non-operational. Corresponding modifications to performance monitoring and maintenance frequency were also proposed.

OM&M of the IM will continue to document the performance of the IM on the proposed, modified schedule and will include semiannual performance reporting to the MDEQ to ensure the IM objectives are continuing to be met. Further investigation/evaluation at the AOC-16 Truck Rack Source Area is being 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 including during the pulsed operations will be evaluated in the Corrective Measures Study to determine if operational modifications are necessary or if a request to the MDEQ to cease operation 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. 12 for the Calumet Great Falls Montana Refining facility located at 1900 10th Street NE, Great Falls, Montana to summarize the 4th Quarter of operations in 2024 (October 1 through December 31, 2024) for the AOC-16 IM remedy selected to address petroleum releases at AOC-16.

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

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

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

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

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

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

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

This AOC-16 IM 4th Quarter 2024 Monitoring Report No. 12 summarizes the sampling results, operations, and performance monitoring data that were gathered for the AOC-16 IM from October 1, 2024 through December 31, 2024, and presents: 1) system runtime for the DPE System; 2) DPE system operational data; 3) identification of operational problems, the length of any shutdowns, and a summary of actions taken to rectify or prevent these problems; 4) influent vapor and liquid sampling results and estimated contaminant mass removal rates for the DPE system; and 5) groundwater concentrations of constituents of concern (COC) in the PTT point of compliance well (MW-105) and PTT well (MW-106). The activities outlined in this report were performed in accordance with the Operations, Maintenance, and Monitoring (OM&M) Plan (CMR, 2021b).

2. DPE SYSTEM OPERATIONS SUMMARY

2.1 System Runtime

During the period of October 1, 2024 through December 31, 2024, the DPE system was in operation approximately 73% of the time and extracted and discharged approximately 31,090 gallons of total fluids to CMR's wastewater treatment plan (WWTP). Table 1 provides a summary of operations during this reporting period. A summary of the routine and non-routine system shutdowns is discussed below.

2.1.1 Planned Shutdowns for Routine and Corrective Maintenance

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

2.1.2 Non-Routine/Unplanned Shutdowns

A summary of the non-routine system shutdowns for this reporting period is presented below:

- On October 12, 2024, the system was shut down due to a leak in a fitting at the knockout tank. The system stayed off while blower BL-3221 was cleaned. The cleaned blower was replaced, and the system was restarted on October 15, 2024.
- On November 3, 2024, the system was shut down due to fouling of level switches. Level switches were cleaned before the system restarted on November 5, 2024.
- On November 21, 2024, the system was shut down due to a blower variable frequency drive (VFD) fault likely caused by clogged blower screens. Blower screens were cleaned, but this repair led to a cracked fitting to the blower. The system remained shut down until the cracked fitting was replaced on December 5, 2024. On December 6, 2024, the system was shut down again due to clogging of blower BL-2332. The system was restarted on December 10, 2024, with a single blower in operation. The system was shut down on December 16, 2024, to clean both blowers, and the system was restarted the following day with both blowers running.

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 October, November, and December 2024 to evaluate mass removal.

The concentrations of volatile organic compound (VOCs) in the vapor phase were measured periodically on each DPE influent line (DPE-1 through DPE-8) using a photoionization detector (PID) to measure relative vapor concentrations from each DPE well. PID measurements from the DPE wells and influent sampling port SP-301 are summarized on Figures 2A and 2B. The highest PID reading during the reporting period was recorded at DPE-2 (399.3 parts per million [ppm]) on December 19, 2024. All DPE wells have shown increases in concentration from the 2nd quarter of 2024 in which all PID readings were less than 100 ppm; whereas all wells range from approximately 0 ppm to 400 ppm in the 4th quarter of 2024. However, all wells dropped from greater than 800 ppm upon startup in October 2021 to less than 400 ppm in the 4th Quarter of 2024.

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

Concentrations of benzene, toluene, ethylbenzene, and xylene (BTEX), n-hexane, and n-heptane in influent vapor over time are shown on Figure 3. These compounds were selected to evaluate vapor influent concentration trends as their concentrations were the highest as compared to other VOCs during the start-up sampling. Concentrations during the 4th 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 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) in October 2021 to 241 $\mu\text{g}/\text{m}^3$ in December 2024. Similarly, n-hexane concentrations have decreased from 7,840,000 $\mu\text{g}/\text{m}^3$ in October 2021 to 1,040 $\mu\text{g}/\text{m}^3$ in December 2024. In the 4th Quarter of 2024, n-hexane values varied between a high 7440 $\mu\text{g}/\text{m}^3$ in October 2024 and a low of 515 $\mu\text{g}/\text{m}^3$ in November 2024. Note that concentrations of BTEX, n-hexane, and n-heptane have generally rebounded from low concentrations (less than 20 $\mu\text{g}/\text{m}^3$ 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, 2023. Since then, the DPE wells have been gauged during each monthly sampling event as shown on Table 3.

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. For example, during the October 2024 sampling event, the water level was below the drop tube elevation and well screens were exposed at all but one well location (DPE-2). During the November 2024 sampling event, all fluid levels were above the drop tube elevation, and none of the DPE well screens were fully exposed. During the December 2024 sampling event, the water level was below the drop tube elevation and well screens were exposed at four well locations (DPE-5, DPE-6, DPE-7, DPE-8). In the 4th quarter of 2024, the highest concentrations of VOCs in the vapor phase were recorded in October 2024 when seven of the eight well screens were exposed, while the lowest concentrations of VOCs in the vapor phase were recorded in November 2024 when all eight well screens were submerged.

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 2.8 pounds of VOCs in the vapor phase as detailed on Table 2. As noted above, influent vapor concentrations (Appendix B and Figure 3) have dropped four to five orders of magnitude between the 4th quarter of 2022 and the 4th quarter of 2024. As seven out of the eight DPE well screens appeared to be fully exposed during October 2024 event, the reductions in contaminant recovery at that time are likely due to an overall reduction in volatile organic compound concentration and mass in the subsurface. Lesser amounts of contaminant mass removal were noted in November and December as compared to October; however, saturated well screens and non-optimal operation may have contributed to this lower mass removal amount. Continued frequent gauging of DPE fluid levels and flow balancing is recommended to continue to maximize mass removal.

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 8). 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 during this quarter, the SRCO post-catalyst outlet temperature remained at 640 degrees Fahrenheit (F°) while in operation. Even with seven of eight wells fully dewatered in October 2024, the post-catalyst process air temperature only reached a maximum value of 645 degrees F° on October 16, 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 predominantly 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. Based on the performance monitoring conducted through the third quarter of 2024 indicating that contaminant recovery is reaching asymptotic levels, CMR recommended revisions to the operational period of the DPE system and monitoring schedule as part of the *AOC-16 Interim Measure 3rd Quarter 2024 Monitoring Report No. 11*, dated December 17, 2024. Mass recovery results during the 4th quarter of 2024 remain consistent with the conclusions identified in the 3rd Quarter Monitoring Report. MDEQ issued conditional approval of the modified operational and monitoring schedule on January 14, 2025. These changes include operating the DPE system in a pulsed manner for a period of 6.5 weeks followed by 6.5 weeks of shutdown time followed by 13 weeks operational/non-operational. During the operational periods, 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 October, November, and December 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 pounds of VOCs, 0 pounds of SVOCs, 0.76 pounds of VPH, and 12.8 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 decreased.

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. Small amounts of LNAPL were 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 December 31, 2024, is calculated to be approximately 2,922 pounds, 14.2 pounds, 268 pounds, and 3,031 pounds, respectively.

2.2.2 Groundwater Elevations

Monitoring wells in AOC-16 area were gauged in October (MW-41S, MW-41D, MW-59S, MW-59D, MW-63, MW-104, MW-105, and MW-106) and December 2024 (MW-22, MW-41S, MW-41D, MW-53, MW-57, MW-59S, MW-59D, MW-63, MW-64, MW-104, MW-105, and MW-106)¹. Monitoring wells MW-102 and MW-103 were abandoned in 2023 during Phase I RFI activities but following well abandonment, gauging mistakenly occurred at a SVE pilot test well and an old air sparge, SVE-1 and AS-1 respectively, under the assumption that they were monitoring wells MW-102 and MW-103. Table 5 has been revised accordingly to reflect the well abandonment. 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 5A through 5C. In October 2024, groundwater elevations were generally at historical averages but were lower than historical averages in December 2024.

2.2.3 Sub-Surface Vacuum

Sub-surface vacuum measurements were recorded monthly at three monitoring wells (MW-22 located 26 feet from DPE-3, MW-64 located 21 feet from DPE-6, MW-104 located 13 feet from DPE-3, and 22 feet from DPE-4). These measurements are shown on Figure 6. Based on the measurements, vacuum was observed at MW-104 but not MW-22 or MW-64, so the current radius of influence (ROI) is estimated to be between 13 and 21 feet. Subsurface vacuum will continue to be monitored to document the estimated zone of influence of the DPE system. No vacuum was measured at DPE-7 in November and December and at DPE-8 in October, November, and December due to the flow valves

¹ Monitoring wells MW-102 and MW-103 were abandoned in 2023 as part of Phase 1 RFI activities.

being partially closed at these DPE wells. The valves were partially closed to increase vacuum and flow at DPE-5 and DPE-6.

2.2.4 Overall System Performance and Optimization

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

Liquid Extraction Rate

The average design flow rate for the DPE system is between 0.25 gallons per minute (gpm) during steady-state operation and 21 gpm during rainfall events. The combination of fluid recoveries and system run time was used to calculate liquid flow rate during the reporting period. The DPE system extracted fluids at an average rate of 0.28 gpm which is within the design flow rates. Average groundwater extraction rates during the reporting period were average compared to previous reporting periods.

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 9.7 in-Hg in October, 6.0 in-Hg in November and 5.9 in-Hg in December below the design vacuum of 17 in-Hg. Flows in October 2024 averaged 87 SCFM, flows in November 2024 averaged 100 SCFM and flows in December averaged 123 SCFM.

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 8. As shown on Figure 8, the pre-catalyst process air temperature was at least 650°F while the system was in operation.

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 9. Measurable LNAPL of less than 0.01 feet or sheens were observed at LNAPL-7 and LNAPL-8 in December 2024 but no other wells during the reporting period.

Passive skimmers are deployed in eight of the wells – LNAPL-2, LNAPL-4, LNAPL-5, LNAPL-6, LNAPL-7, LNAPL-8, LNAPL-10, and LNAPL-11. Measurable LNAPL was observed in the wells was little to none during the reporting period, and no LNAPL was recovered via the passive skimmers.

Measurable LNAPL thickness greater than 0.01 feet has not been recorded during any sampling event in 2024. As noted in the *AOC-16 Interim Measure 3rd Quarter 2024 Monitoring Report No. 11*, dated December 17, 2024, and approved by MDEQ on January 15, 2025, gauging for LNAPL will be reduced from bi-weekly to monthly in 2025. Passive recovery devices are recommended to remain in wells for the first half of 2025.

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 December 4, 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 December 4, 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 – December 2024

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

VOCs

Of the VOCs detected during the December 2024 groundwater sampling event at AOC-16, only benzene was detected above its respective groundwater screening standard.²

The monitoring well upgradient of the passive treatment trench (MW-41S) reported benzene at 447 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 27.2 µg/L exceeding the DEQ-7 HHS and RBSL. The monitoring well (MW-105) installed downgradient of the passive treatment trench reported benzene at 22.9 µg/L exceeding the DEQ-7 HHS and RBSL of 5 µg/L.

SVOCs

In December 2024, no SVOCs were detected at concentrations exceeding the DEQ-7 HHS or the RBSLs in wells MW-41S, MW-105 or MW-106.

VPH, and EPH

The upgradient monitoring well (MW-41S) had detectable concentrations of volatile petroleum hydrocarbons (VPH) via method MTDEQ VPH of 72,20 µg/L with a C5-C8 Aliphatic concentration (adjusted) of 1240 µg/L which exceeds the RBSL of 650 µg/L in December 2024. Within the trench (MW-106), VPH was detected between the method detection limit and reporting limit at a concentration of 194 µg/L and C5-C8 Aliphatics was detected at 135 µg/L, which are both less than the RBSL. Downgradient of the PTT (MW-105), VPH was detected at a concentration of 634 µg/L with a C5-C8 Aliphatics concentration (adjusted) of 469 µg/L less than the RBSL 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 10A through 10C 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.

² 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 December 2024:

- Benzene has ranged from a maximum concentration of 1,900 µg/L in October 2021 to a minimum value of 130 µg/L in March 2023.
- VPH has remained relatively consistent with some variability between sampling events prior to this quarter with a maximum value of 9,800 µg/L in June 2022 and a minimum value of 3,090 µg/L in March 2023. The concentration of VPH measured in December 2024 is a significant drop from historical concentrations of VPH, and this well will continue to be monitored to verify this decreasing trend.
- C5-C8 Aliphatics have remained relatively consistent between sampling events with a minimum value of 392 µg/L in March 2023 and a maximum value of 1,500 µg/L in October 2021. 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 December 2024:

- Benzene had not been detected during any sampling events until the June 2024 sampling event where benzene was detected at a concentration of 1.4 µg/L, in September 2024 at a concentration of 22.1 µg/L, and in December 2024 at a concentration of 27.6 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, 533 µg/L in September 2023, 67.1 µg/L in December 2023, 149 µg/L in September 2024, and 194 µg/L in December 2024. 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, in June 2024 at a concentration of 59.3 µg/L, in September 2024 at a concentration of 79.9 µg/L, and in December 2024 at a concentration of 135 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 December 2024:

- Benzene concentrations have varied from a maximum of 570 µg/L in August 2020 to a minimum 3.91 µg/L in February 2024. Trends are generally 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 fourth quarter between sampling events indicate a maximum concentration of 250 µg/L in October 2021 immediately following installation of the PTT. Concentrations after the installation of the PTT in the fourth quarter of each year have increased from 2.1 µg/L in December 2022, to 11.7 µg/L in December 2023 to 22.9 µg/L in December 2024.

- VPH appears variable with a maximum concentration of 1,900 µg/L in October 2021 to less than detection levels 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 less than detection levels 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. Results at well MW-106 within the PTT indicates some initial rebound within the trench itself. Note that the monitoring well is installed at the halfway point of the 5-foot-wide carbon amended material meaning that there is still approximately 2.5 feet of carbon amended material available for fully adsorbing contaminants. Additionally, as noted in the following section and in previous quarterly monitoring reports, available electron acceptor concentrations of nitrate and sulfate have reduced significantly in the trench indicating a slowing of the biodegradation reactions which may be contributing to the rebound. As such, it is recommended that monitoring the biodegradation indicators and groundwater quality within the PTT continue over time. If there are further indicators of significant rebound within the trench, additional measures to accelerate the rate of biodegradation may be considered. However, the timescale for consideration of these alternate measures is on the order of years.

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. A review of benzene data indicates decreasing concentration trends when considered for seasonal variability.

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 milligrams per liter [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 sampling event at all three wells, dissolved oxygen was close to zero, and during the last sampling six events at the PTT well (MW-106), ORP was negative and dissolved oxygen was close to zero indicating reducing conditions.

The groundwater analytical results for detected biodegradation parameters from December 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 Petrofix™ activated colloidal carbon. 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 December 2024 as follows:

- Nitrate concentrations initially decreased from 210,000 µg/L in October 2021 to non-detect in June and December 2024. Sulfate concentrations also decreased from 2,900,000 µg/L in October 2021 to 210,000 µg/L in June 2022 down to 80,800 µg/L in December 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 have increased since PTT installation. Dissolved iron has increased from 65 µg/L in October 2021 to 1,300 µg/L in June 2023 to 3,550 µg/L in June 2024. Dissolved manganese has increased from 1,400 µg/L in October 2021 to 1,970 µg/L in December 2024. Increased concentrations of dissolved iron and manganese in groundwater indicate that iron III and manganese IV reduction is occurring because the reduced forms of these compounds have greater solubility than the oxidized forms. The increased dissolved iron and manganese concentrations indicate that iron III and manganese IV 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 June 2024. These elevated concentrations serve as a positive indicator of ongoing biodegradation. Trends will continue to be monitored.
- Methane concentrations have been continuously increasing from 5.8 µg/L in October 2021 to 2,350 µg/L in December 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 pathway³.

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.

Recent sulfate, nitrate, dissolved iron, and methane concentrations at well MW-106 are indicative of a return towards ambient anaerobic conditions, subsequent to the September 2021 addition of PetroFix™ and the bio-stimulating electron acceptors nitrate and sulfate to the PTT. The contribution to natural attenuation by electron acceptors other than oxygen, i.e., nitrate, iron III, manganese IV, sulfate, and even carbon dioxide, has been the subject of considerable research in recent years. Kolhatkar et al. (2000), Wiedemeier et al. (1999), and Wilson et al. (2002) have shown that of these natural anaerobic processes, sulfate reduction accounts for most of the contaminant degradation. The use of these alternative electron acceptors has been shown to have multiple potential advantages over

³ 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.

the traditional approach of attempting to add dissolved oxygen to the contaminant plume. To replenish the bio-stimulating electron acceptors in the PTT and retain anaerobic conditions, the use of magnesium sulfate heptahydrate ($\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$) solution could be a practical option due to availability, low cost, high solubility, and the relative safety associated with handling. Calcium sulfate (gypsum) is also added based on its relatively low solubility, to provide a long-term source of sulfate electron acceptor. If future sampling continues to show further depletion of the available electron acceptors nitrate, sulfate, iron III, and manganese IV along with stabilized dissolved iron, dissolved manganese, carbon dioxide and methane concentrations, additional actions to augment the degradation capacity of the passive treatment trench may be considered. The supplemental action may include adding a slurry consisting of a 9:1 ratio of magnesium sulfate heptahydrate to calcium sulfate to the sand/PetroFix™ backfill within the PTT via hydraulic probe. The magnesium sulfate heptahydrate and calcium sulfate dosage would be designed to achieve a sulfate concentration of 5,000 mg/L to 10,000 mg/L within the saturated zone of the PTT.

4. CONCLUSION AND RECOMMENDATIONS

During this reporting period from October 1, 2024, through December 31, 2024, the DPE system operated approximately 73% of the available time. During this reporting period, the DPE system extracted and discharged approximately 31,090 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 2.8 pounds of VOCs in the vapor phase, and 0 pounds of VOCs, 0 pounds of SVOCs, 0.76 pounds of VPH, and 12.8 pounds of EPH in the liquid phase. Total VOC, SVOC, VPH, and EPH mass removed in the vapor and dissolved phase since DPE system startup in October 2021 and through December 31, 2024, is calculated to be approximately 2,922 pounds, 14.2 pounds, 268 pounds, and 3,031 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 most 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.

Based on the performance monitoring conducted through the third quarter of 2024 indicating that contaminant recovery is reaching asymptotic levels, CMR recommended revisions to the operational period of the DPE system and monitoring schedule as part of the *AOC-16 Interim Measure 3rd Quarter 2024 Monitoring Report No. 11*, dated December 17, 2024. Mass recovery results during the 4th quarter of 2024 remain consistent with the conclusions identified in the 3rd Quarter Monitoring Report. MDEQ issued conditional approval of the modified operational and monitoring schedule on January 14, 2025. These changes include operating the DPE system in a pulsed manner for a period of 6.5 weeks followed by 6.5 weeks of shutdown time followed by 13 weeks operational/non-operational.

The pre-catalyst SRCO temperature remained above its minimum operating temperature setpoint of 650°F while in operation, indicating at least 99% destruction efficiency of the extracted petroleum vapors prior to being discharged to the atmosphere.

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. Some rebound in the PTT well MW-106 has been observed requiring further monitoring. Concentration trends are decreasing at downgradient performance monitoring well MW-105 with some seasonable variability.

Based on the observed concentration trends to date at MW-41S, PTT well MW-106 and compliance well MW-105, no modifications to the groundwater sampling frequency is proposed. Quarterly sampling for VOCs, SVOCs, VPH and EPH will continue throughout 2025. Continued semi-annual sampling for biodegradation indicator parameters is also recommended.

No measurable LNAPL beyond trace levels have been observed throughout 2024 in the 17 LNAPL recovery wells. Therefore, it is recommended that gauging of the LNAPL recovery wells be reduced to once per month as stated in the *AOC-16 Interim Measure 3rd Quarter 2024 Monitoring Report No. 11*, dated December 17, 2024. If measurable LNAPL is recorded, the frequency may be modified as needed.

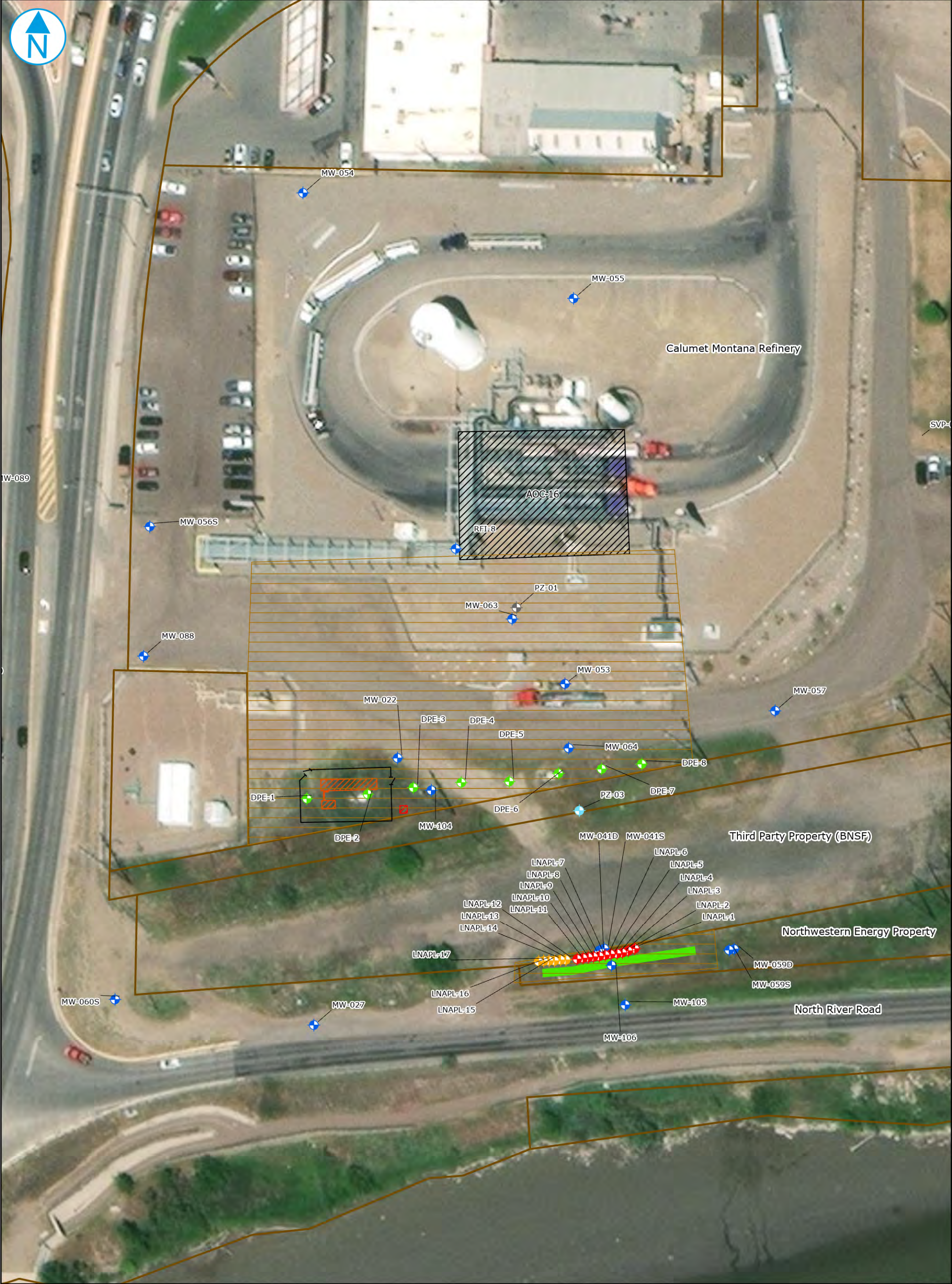
In 2025, system operations will be modified consistent with the request in the *AOC-16 Interim Measure 3rd Quarter 2024 Monitoring Reporting*, dated December 17, 2024, and conditionally approved by MDEQ on January 15, 2025. OM&M of the IM will continue to document the performance of the IM and will include 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 are being completed as part of the upcoming RCRA RFI activities.

5. REFERENCES

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FIGURES

- Figure 1: AOC-16 Site Layout
 - Figure 2A-B: DPE System Influent Vapor PID Readings
 - Figure 3: DPE System Influent Vapor Concentration Trend
 - Figure 4: Vapor and Liquid Effluent Mass Removal
 - Figure 5A-C: Groundwater Contours
 - Figure 6: Subsurface Vacuum Readings
 - Figure 7: SRCO Operational Parameters
 - Figure 8: DPE System Operational Parameters
 - Figure 9: Maximum LNAPL Thickness
 - Figure 10A-C: Groundwater Concentration Trend Graphs
-



- LNAPL Recovery Well - Installed 2022

LNAPL Recovery Well - Installed 2021

DPE Recovery Well - Installed 2021

Abandoned Well

Piezometer

Monitoring Well

DPE Fence
- Property Line

Corrective Action

Passive Recovery Trench

Primary Recovery Trench

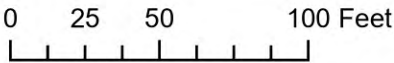
DPE - CATOX Unit

DPE Transformer

AOC

AOC 16 SITE LAYOUT

FIGURE 01

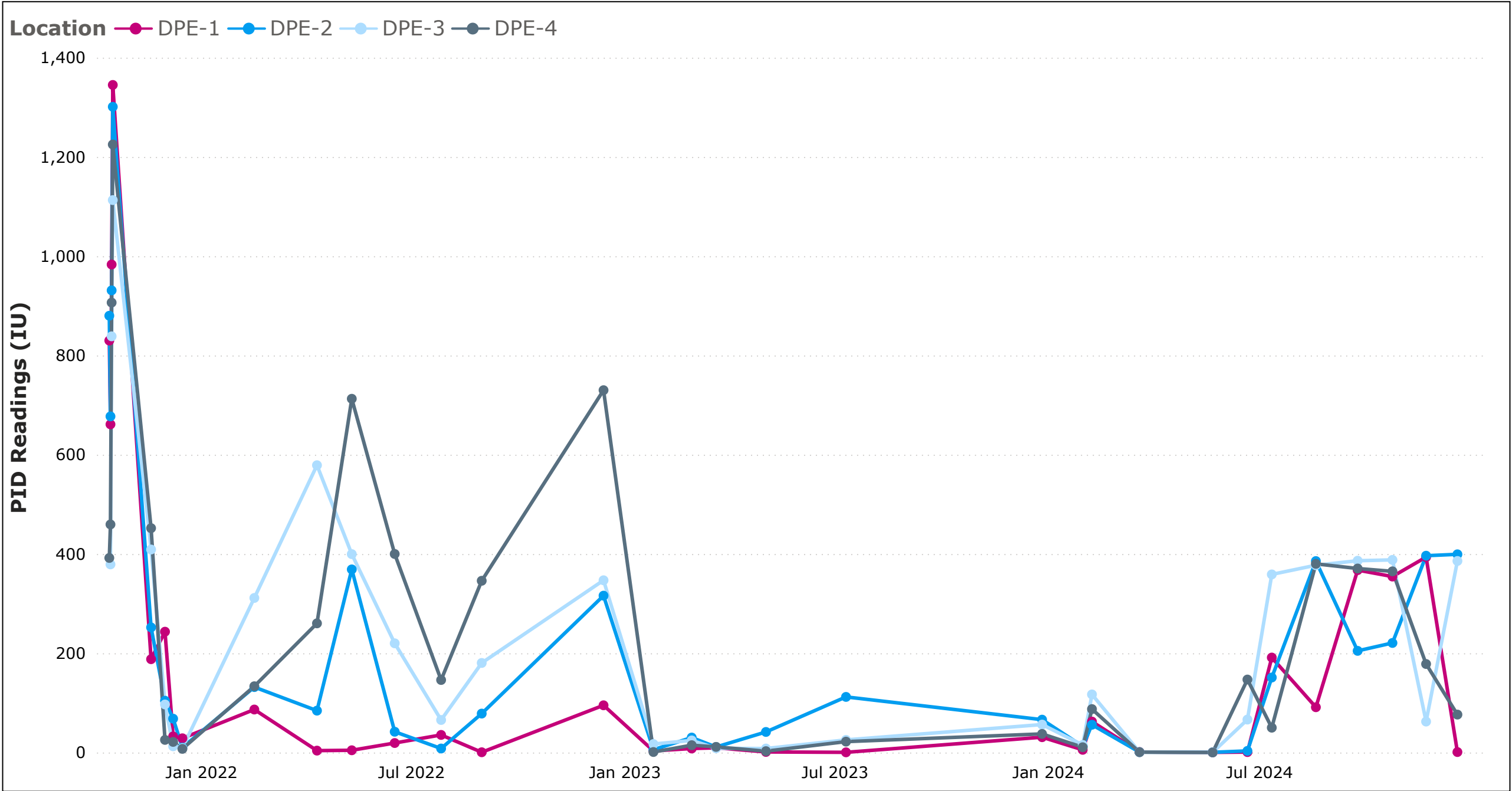


Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

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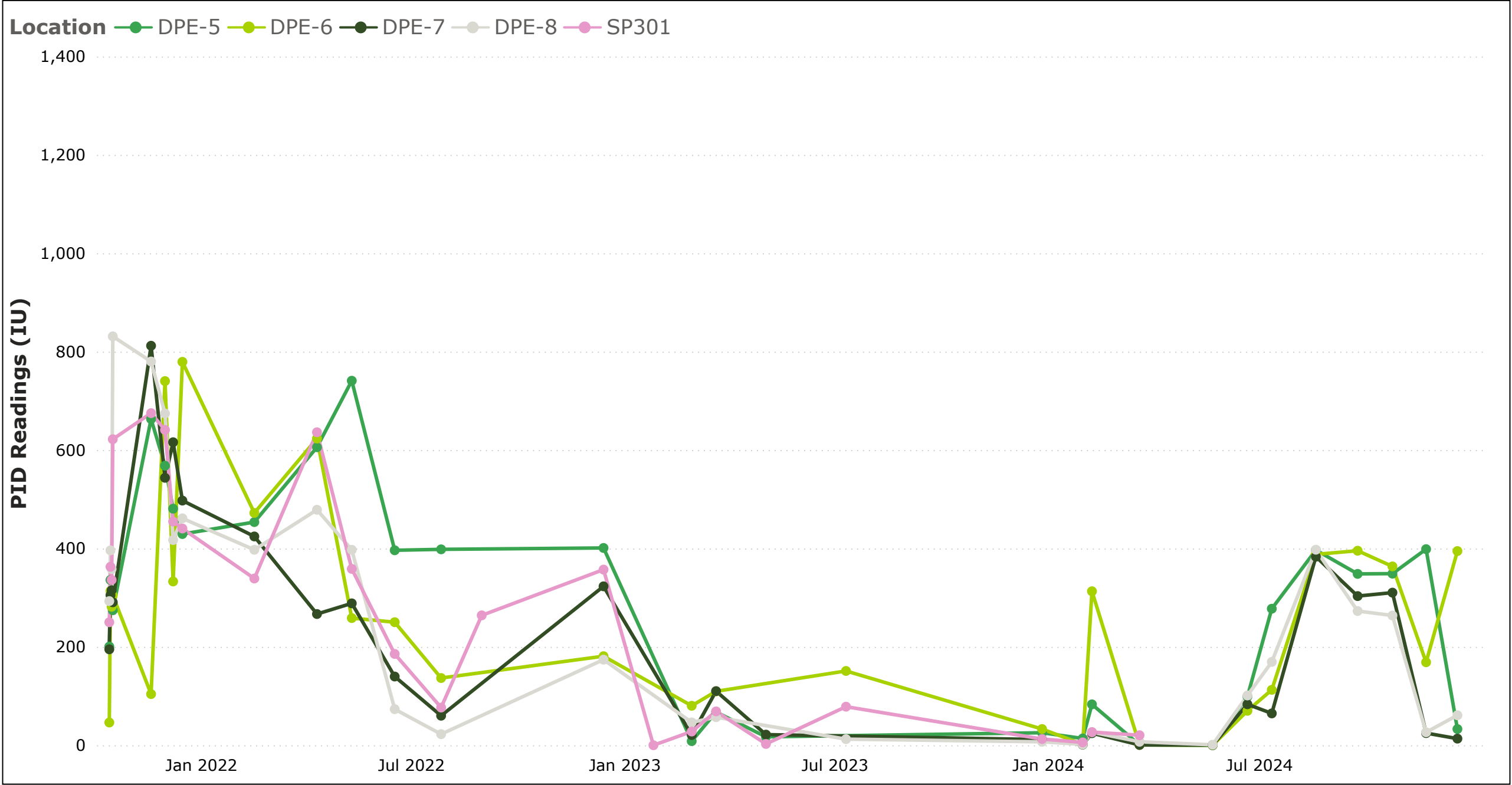


Figure 2A: DPE system Influent Vapor PID Readings
(DPE-1 through DPE-4)



Notes:
IU: Instrument Units
PID: photoionization detector

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



Notes:
IU: Instrument Units
PID: photoionization detector

Figure 3: DPE System Influent Vapor Concentration Trend

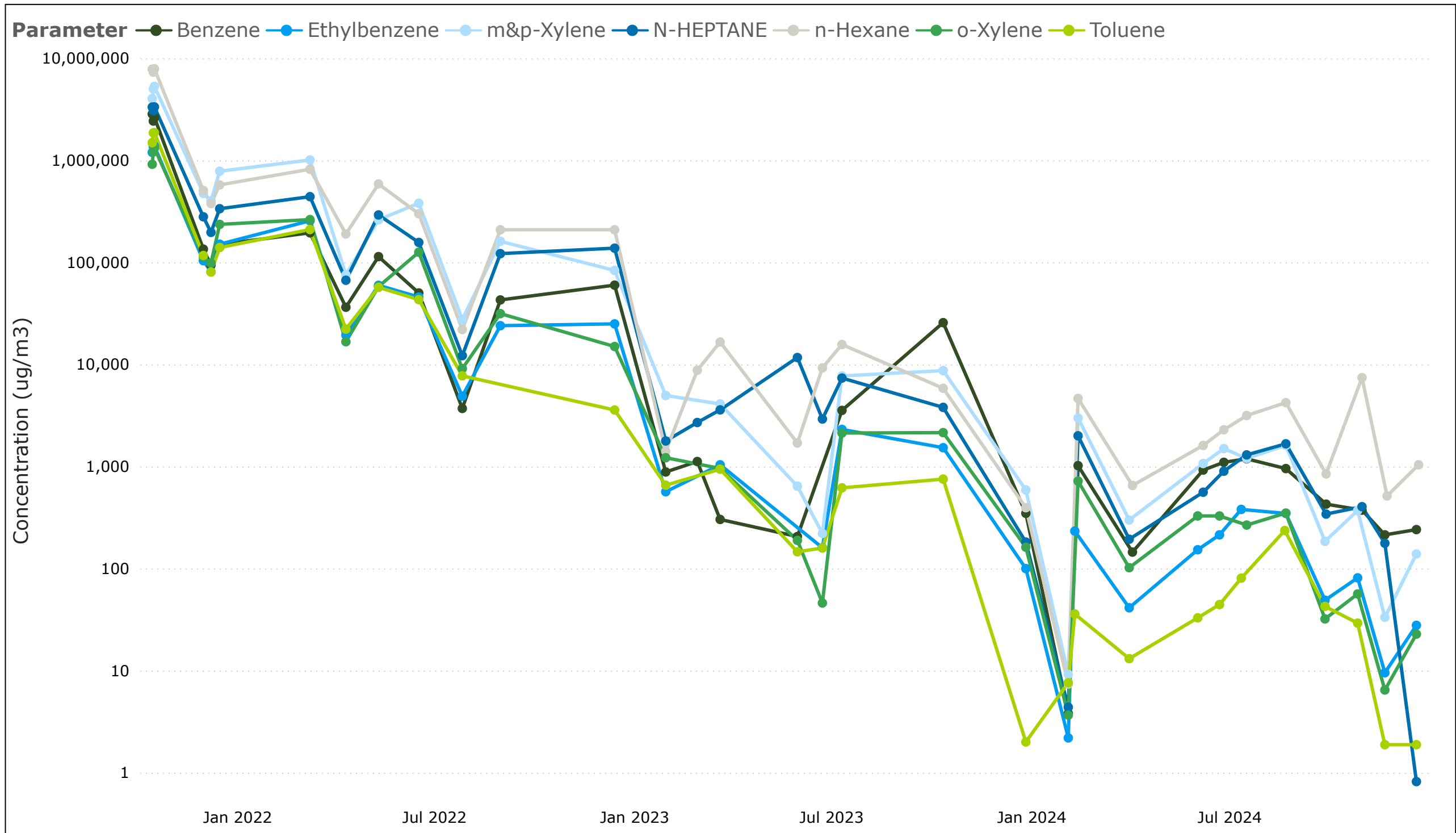
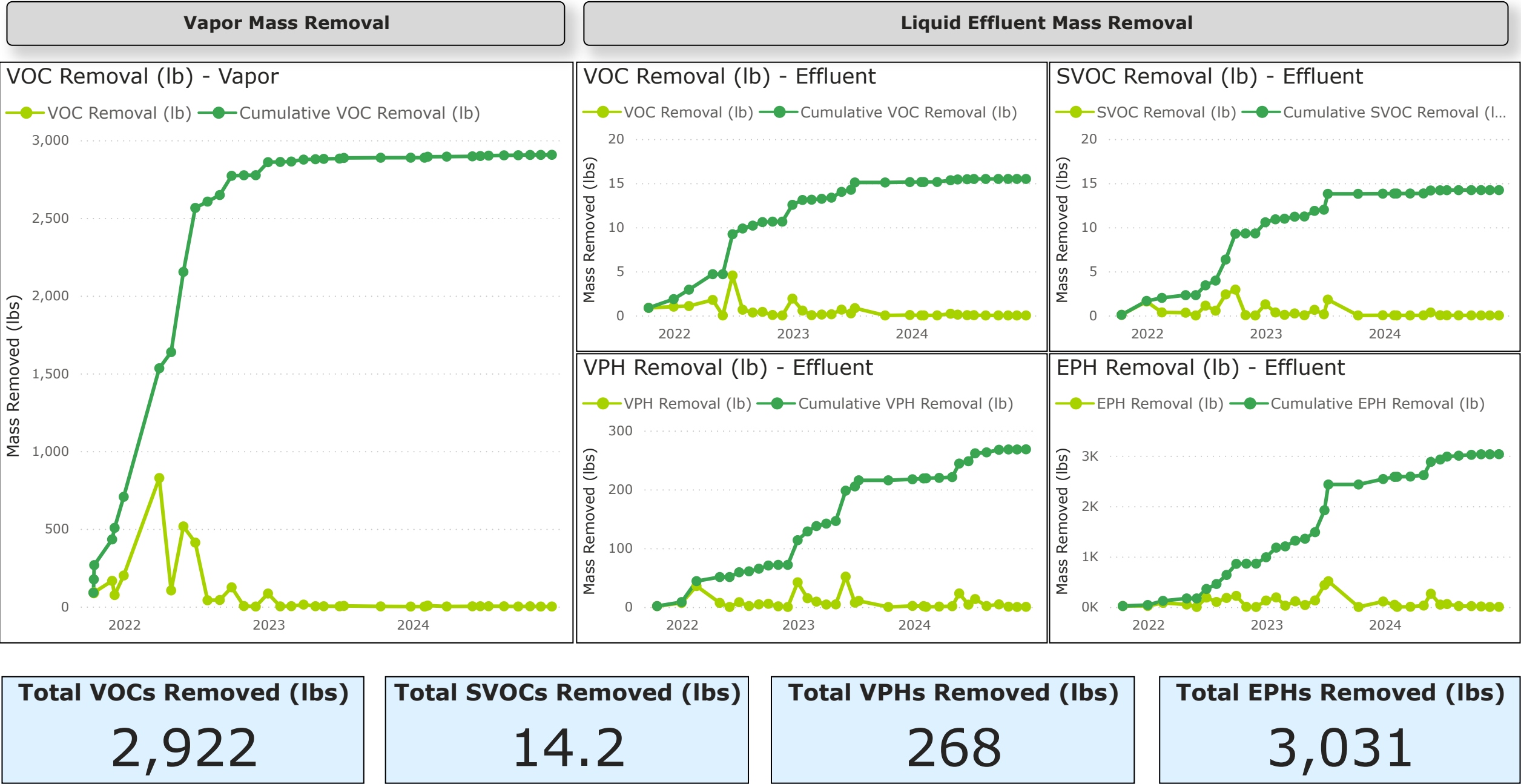


Figure 4: Vapor and Liquid Effluent Mass Removal



Notes:

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

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PROJECT: 1690015898 | DATED: 1/21/2025 | DESIGNER: CHURCHKE



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

Notes
1) Measurements collected on October 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 - OCTOBER 2024**

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

FIGURE 05a

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PROJECT: 1690015898 | DATED: 1/16/2025 | DESIGNER: CHURCHKE



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

Notes
1) Measurements collected on November 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 - NOVEMBER 2024**

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

FIGURE 05b

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GROUNDWATER
CONTOURS - DECEMBER 2024

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

FIGURE 05c



- Piezometer
- Recovery Well
- Monitoring Well

Notes
1) Sub-surface vacuum readings are in inches of Mercury (in-Hg).



**SUB-SURFACE
VACUUM READINGS**

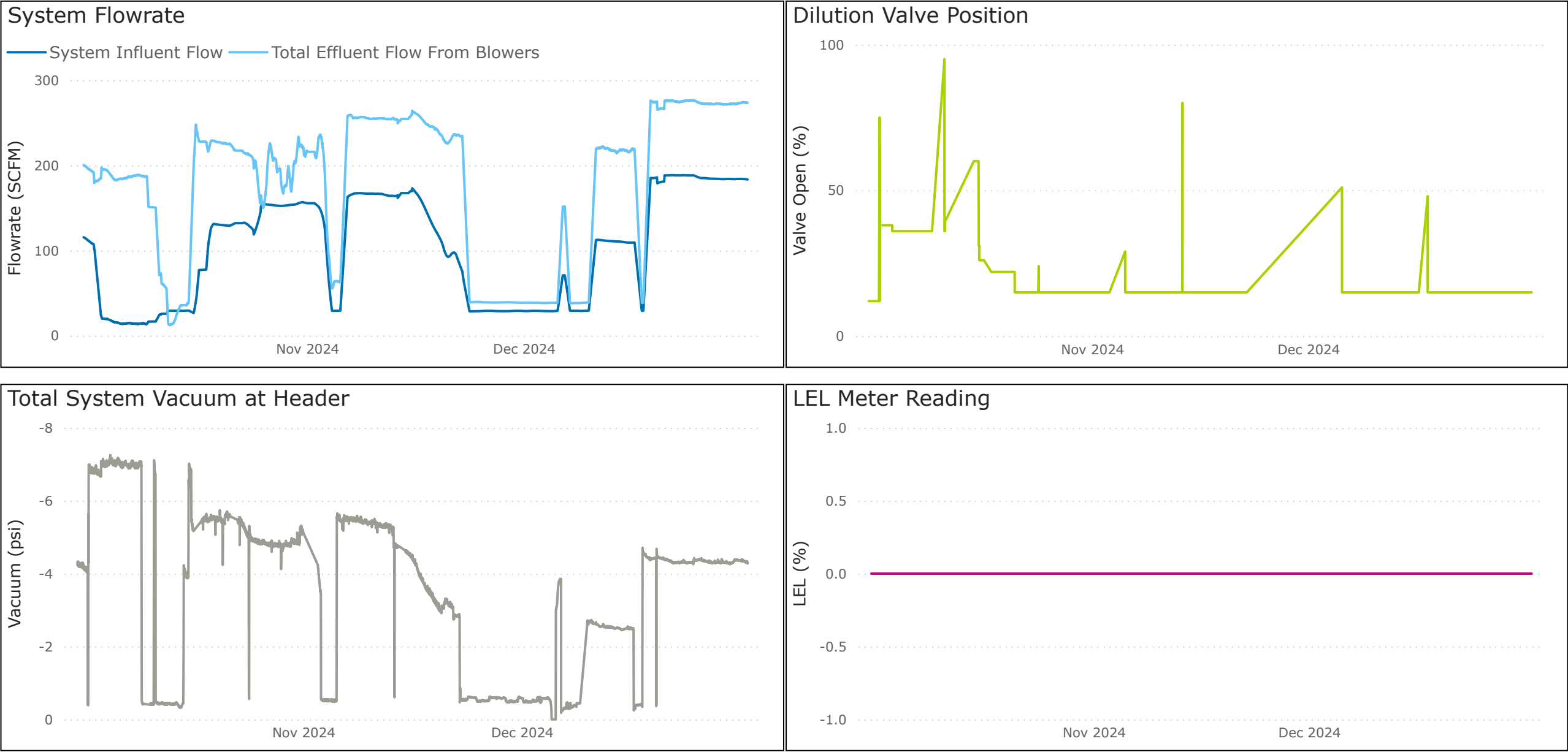
Calumet Montana Refining, LLC
1900 10th Street Northeast
Great Falls, Montana

FIGURE 06

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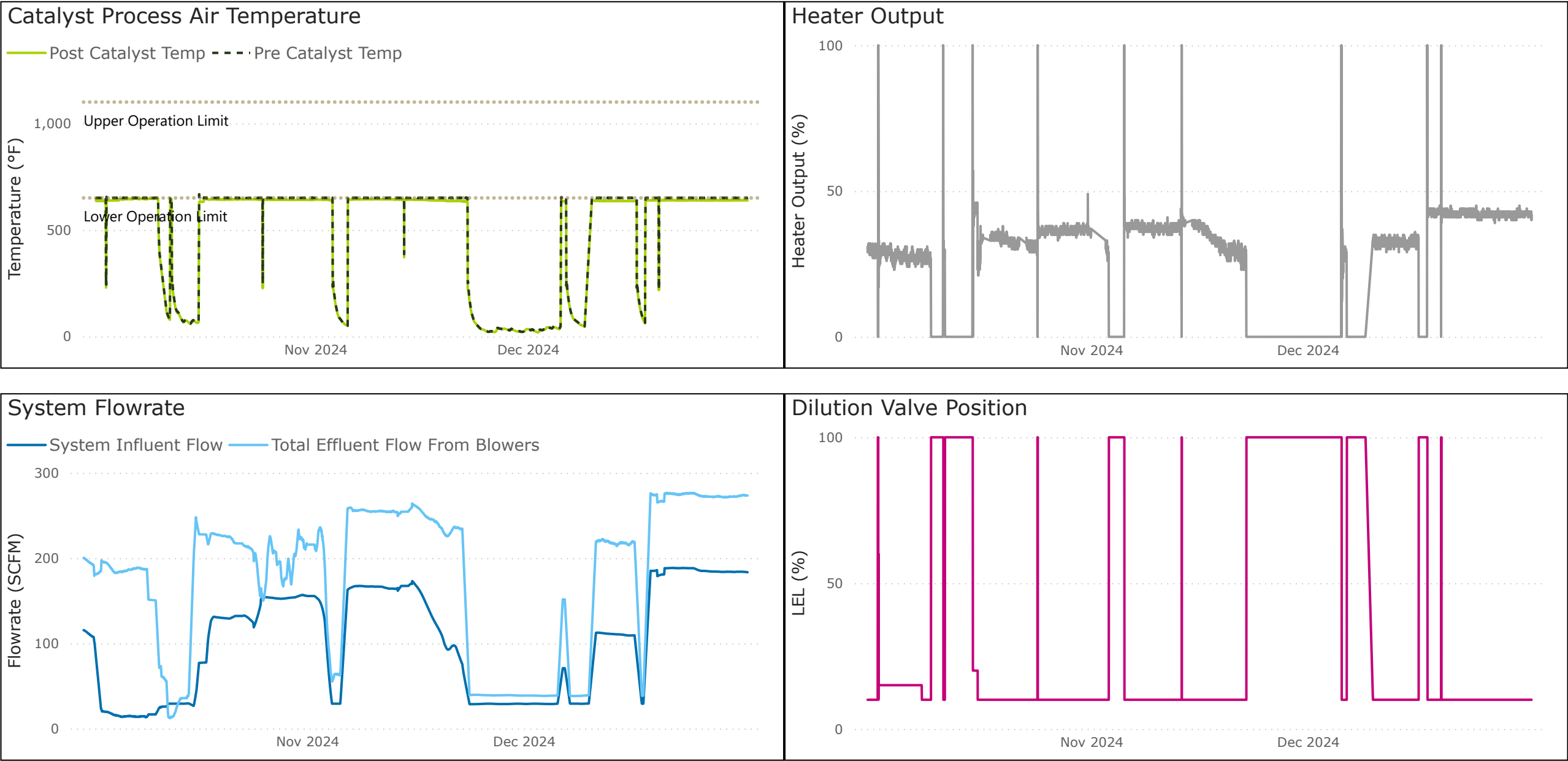
Figure 7: DPE System Operational Parameters



Notes:

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

Figure 8: 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).

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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
Q4 2024**



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

FIGURE 09

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PROJECT: 1690015898 | DATED: 1/16/2025 | DESIGNER: CHURCHKE

Figure 10A: Groundwater Concentration Trend Graph - Benzene

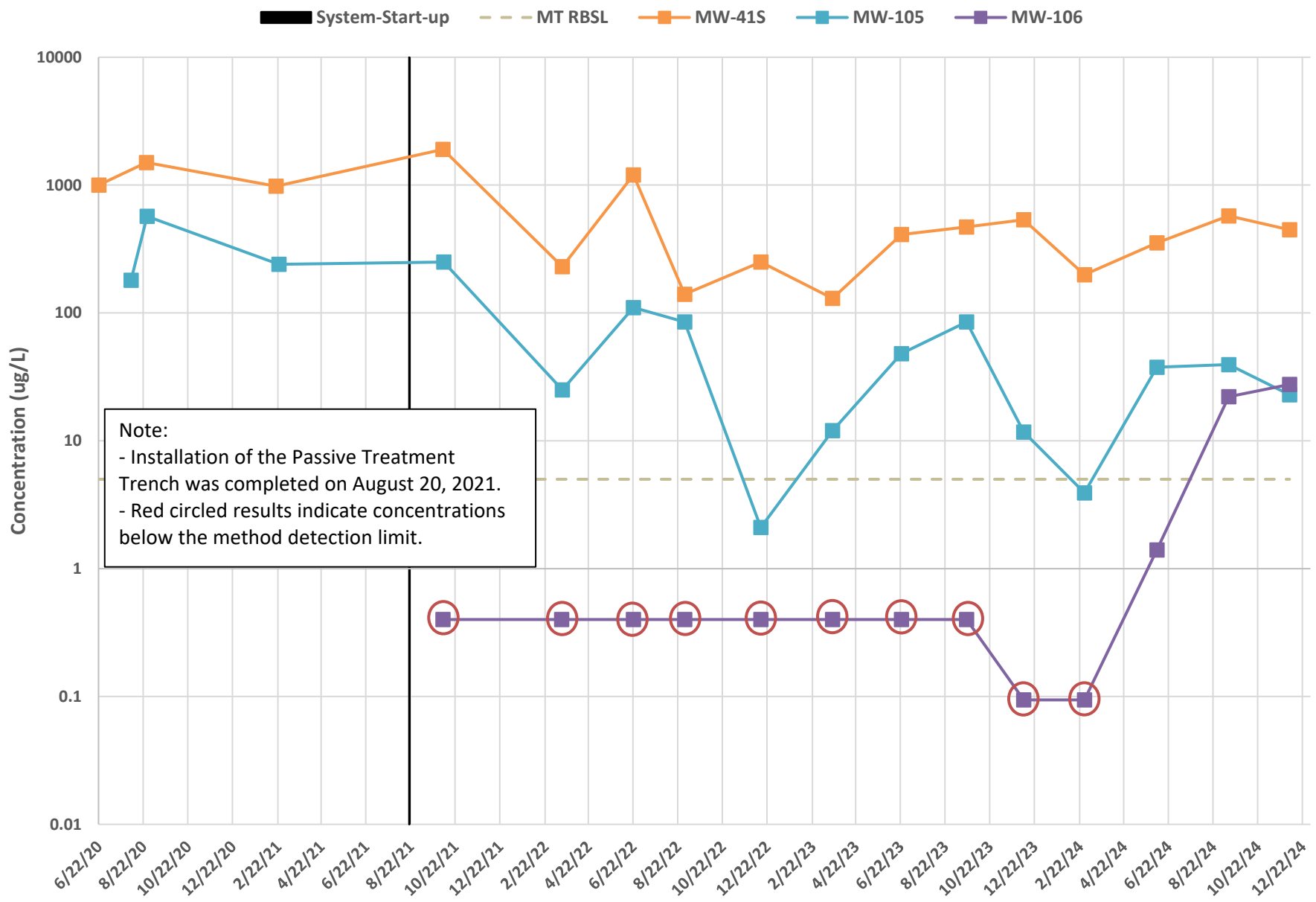


Figure 10B: Groundwater Concentration Trend Graph - C5-C8 Aliphatics

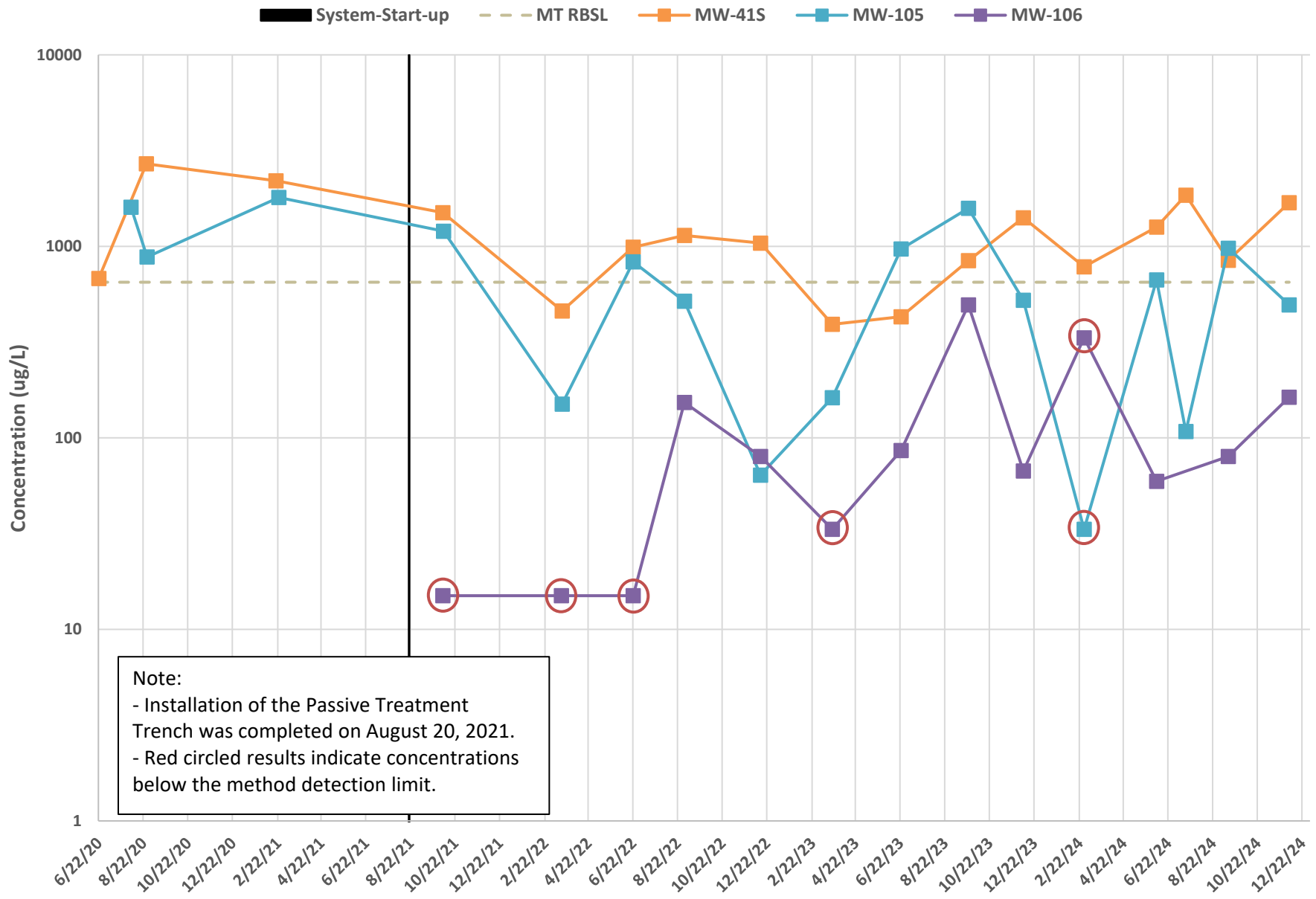
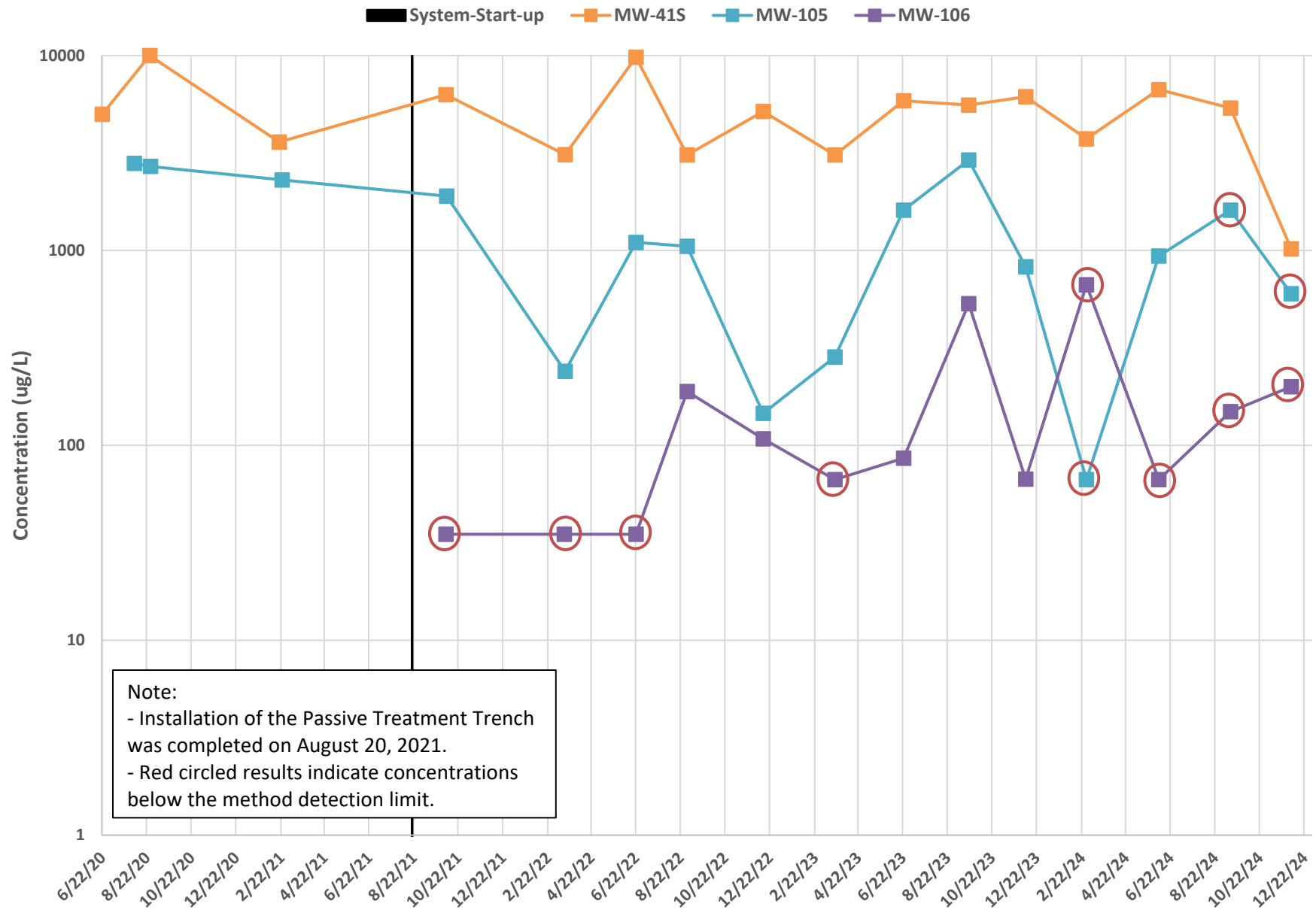


Figure 10C: Groundwater Concentration Trend Graph - Total Petroleum Hydrocarbons



TABLES

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Table 7:	Summary of Groundwater Analytical Results - Petroleum COCs
Table 8:	Summary of Groundwater Analytical Results – Field Parameters

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

Operational Period	Percent Operational ^a	System Flowrate ^b (SCFM)	Average System Vacuum at Header ^c (in-Hg)	Liquid Extraction Rate (gpm)	Total Fluids Discharged During the Operational Period (gallons)	Total Water Discharged Since Start-up ^d (gallons)	Average Post-Catalyst Process Air Temperature When System is Operational ^e (°F)
Design Values	--	200	17	0.25 to 21	--	--	--
October 1 - 31, 2024	81%	87	-9.7	0.42	15,123	715,942	642
November 1 - 30, 2024	69%	100	-6.0	0.02	4,773		618
December 1 - 31, 2024	70%	123	-5.9	0.36	11,194		638
October 1 - December 31, 2024	73 %	103	-7.1	0.28	31,090		634

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.
- f. FIT-23400 was not operating as intended during October and November 2024, so total discharge was manually adjusted to better reflect the discharge volume.

Abbreviations:

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

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

Location Ramboll Sample ID Sample Date Average Blower Flow (scfm) ¹ Period Operational Time (hrs) ² Notes	SP301		SP301		SP301		
	CMR-SP301-241024		CMR-SP301-241120		CMR-SP301-241218		
	10/24/2024		11/20/2024		12/18/2024		
	87		100		123		
	606		462		524		
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 ^{3,4}	0.00	5 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	29	0.01	3	0.00	29	0.01
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	32	0.01	5	0.00	45	0.01
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	7	0.00	4 U	0.00	9	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 U	0.00	3	0.00	5	0.00
4-Ethyltoluene	622-96-8	13	0.00	1	0.00	1 U	0.00
4-Methyl-2-pentanone (MIBK)	108-10-1	70	0.01	5 U	0.00	5 U	0.00
Acetone	67-64-1	3 U	0.00	3 U	0.00	55	0.01
Benzene	71-43-2	374	0.07	214	0.04	241	0.06
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	7 U	0.00	7 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	1 U	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 ^{3,4}	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	1	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	596	0.12	389	0.07	592	0.14
Dibromochloromethane	124-48-1	2 U	0.00	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	2	0.00	2	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	61	0.01	26	0.00	62	0.01
Ethyl acetate	141-78-6	--	--	--	--	--	--
Ethylbenzene	100-41-4	81	0.02	10	0.00	28	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	371	0.07	33	0.01	139	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	3 U	0.00	3 U	0.00	4	0.00
n-Heptane	142-82-5	404	0.08	177	0.03	1 U	0.00
n-Hexane	110-54-3	7,440	1.47	515	0.09	1,040	0.25
o-Xylene	95-47-6	56	0.01	6	0.00	23	0.01
Propylene	115-07-1	9	0.00	4	0.00	2 U	0.00
Styrene	100-42-5	2 U	0.00	2 U	0.00	2 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	29	0.01	2 U	0.00	2 U	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	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 U	0.00
Vinyl acetate	108-05-4	2 U	0.00	2 U	0.00	2 U ^{3,4}	0.00
Vinyl chloride	75-01-4	1 U	0.00	1 U	0.00	1 U	0.00
Total VOCs	--	--	1.91	--	0.25	--	0.57
Period Total VOC Mass Removed (lbs)		1.9		0.3		0.6	
Cumulative Total VOC Mass Removed (lbs) ⁴		2,896		2,895		2,897	

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/m³ : micrograms per cubic meter
Sample Calculation

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

Table 3
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	--
DPE-1	7/12/2024	--	11.02	12.08	10.58	--
DPE-2	7/12/2024	--	8.62	13.54	12.04	--
DPE-3	7/12/2024	--	10.22	11.25	9.75	--
DPE-4	7/12/2024	--	11.50	12.60	11.10	--
DPE-5	7/12/2024	--	10.22	11.38	9.88	--
DPE-6	7/12/2024	--	8.33	10.21	8.71	--
DPE-7	7/12/2024	--	8.60	11.79	10.29	--
DPE-8	7/12/2024	--	8.61	10.44	8.94	--
DPE-1	8/19/2024	--	11.19	12.08	10.58	--
DPE-2	8/19/2024	--	9.62	13.54	12.04	--
DPE-3	8/19/2024	--	10.42	11.25	9.75	--
DPE-4	8/19/2024	--	11.87	12.60	11.10	--
DPE-5	8/19/2024	--	10.53	11.38	9.88	--
DPE-6	8/19/2024	--	9.33	10.21	8.71	--
DPE-7	8/19/2024	--	9.82	11.79	10.29	--
DPE-8	8/19/2024	--	9.53	10.44	8.94	--

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	9/24/2024	--	10.45	12.08	10.58	--
DPE-2	9/24/2024	--	8.43	13.54	12.04	--
DPE-3	9/24/2024	--	8.81	11.25	9.75	--
DPE-4	9/24/2024	--	--	12.60	11.10	NW Energy pipe blocking
DPE-5	9/24/2024	--	9.75	11.38	9.88	--
DPE-6	9/24/2024	--	8.17	10.21	8.71	--
DPE-7	9/24/2024	--	8.04	11.79	10.29	--
DPE-8	9/24/2024	--	8.53	10.44	8.94	--
DPE-1	10/31/2024	--	11.20	12.08	10.58	--
DPE-2	10/31/2024	--	8.44	13.54	12.04	--
DPE-3	10/31/2024	--	10.46	11.25	9.75	--
DPE-4	10/31/2024	--	11.86	12.60	11.10	--
DPE-5	10/31/2024	--	NM	11.38	9.88	Not accessible
DPE-6	10/31/2024	--	9.37	10.21	8.71	--
DPE-7	10/31/2024	--	11.02	11.79	10.29	--
DPE-8	10/31/2024	--	9.62	10.44	8.94	--
DPE-1	11/22/2024	--	7.95	12.08	10.58	--
DPE-2	11/22/2024	--	8.12	13.54	12.04	--
DPE-3	11/22/2024	--	7.50	11.25	9.75	--
DPE-4	11/22/2024	--	7.75	12.60	11.10	--
DPE-5	11/22/2024	--	8.17	11.38	9.88	--
DPE-6	11/22/2024	--	8.41	10.21	8.71	--
DPE-7	11/22/2024	--	8.31	11.79	10.29	--
DPE-8	11/22/2024	--	8.29	10.44	8.94	--
DPE-1	12/19/2024	--	7.29	12.08	10.58	--
DPE-2	12/19/2024	--	7.81	13.54	12.04	--
DPE-3	12/19/2024	--	8.15	11.25	9.75	--
DPE-4	12/19/2024	--	7.81	12.60	11.10	--
DPE-5	12/19/2024	--	10.55	11.38	9.88	--
DPE-6	12/19/2024	--	9.44	10.21	8.71	--
DPE-7	12/19/2024	--	11.00	11.79	10.29	--
DPE-8	12/19/2024	--	9.64	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 Ramboll Sample ID Sample Date Effluent Volume (L) * Notes		SP200		SP200		SP200	
		CMR-SP200-241024		CMR-SP200-241120		CMR-SP200-241218	
		10/24/2024		11/20/2024		12/18/2024	
		57,247		1,616		42,374	
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	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	1.11	0.00	ND	--	ND	--
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	--	2.53	0.0000	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	--	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	ND	--	ND	--	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	--	ND	--	ND	--
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--
STYRENE	100-42-5	ND	--	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--
TOLUENE	108-88-3	ND	--	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	--	--	1.4E-04	--	9.0E-06	--	0.0E+00
Period Total VOC Mass Removed (lbs)			1.4E-04		9.0E-06		0.0E+00
Cumulative Total VOC Mass Removed (lbs)			10.45		10.45		10.45

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

Location Ramboll Sample ID Sample Date Effluent Volume (L) * Notes		SP200		SP200		SP200	
		CMR-SP200-241024		CMR-SP200-241120		CMR-SP200-241218	
		10/24/2024		11/20/2024		12/18/2024	
		57,247		1,616		42,374	
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	--	1.8	0.0000	6.9	0.0006
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	ND	--	ND	--	ND	--
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	ND	--	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	ND	--	ND	--	1.61	0.00
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	ND	--	ND	--	ND	--
PHENOL	108-95-2	ND	--	ND	--	ND	--
PYRENE	129-00-0	2	0.000	ND	--	ND	--
Total SVOCs	--	--	0.000	--	0.00	--	0.00
Period Total SVOC Mass Removed (lbs)		2.7E-04		6.3E-06		7.9E-04	
Cumulative Total VOC Mass Removed (lbs)		13.82		13.82		13.82	

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

Location Ramboll Sample ID Sample Date Effluent Volume (L) * Notes		SP200		SP200		SP200	
		CMR-SP200-241024		CMR-SP200-241120		CMR-SP200-241218	
		10/24/2024		11/20/2024		12/18/2024	
		57,247		1,616		42,374	
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	23,300	2.94	1,350	0.00	5,770	0.54
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	ALIPHATIC19-36U	16,400	2.07	1,170	0.00	5,270	0.49
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	44,500	5.62	2,630	0.01	12,300	1.15
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	TPH-U	84,200	10.63	5,150	0.02	23,300	2.18
TOTAL EXTRACTABLE HYDROCARBON	TPH	84,200	10.63	5,150	0.02	23,300	2.18
Total EPHs	--	--	10.6	--	0.0	--	2.2
Period Total EPH Mass Removed (lbs)		10.6		0.0		2.2	
Cumulative Total EPH Mass Removed (lbs)		2581.5		2581.5		2583.7	
VPH							
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	ND	--	ND	--	ND	--
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	2,980	0.38	745	0.00	2,100	0.20
C5-C8 ALIPHATICS (UNADJUSTED)	C05-C08-ALIP-U	ND	--	ND	--	ND	--
C9 THROUGH C10 AROMATIC HYDROCARBONS (UNADJUSTED)	C09-C10-AROM-U	982	0.12	ND	--	595	0.06
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (UNADJUSTED)	C09-C12-ALIP-U	2,990	0.38	745	0.00	2,100	0.20
TOTAL PETROLEUM HYDROCARBONS	VPH	3,970	0.50	1,050	0.00	2,700	0.25
Total VPHs	--	--	0.50	--	0.00	--	0.25
Period Total VPH Mass Removed (lbs)		0.5		0.0		0.3	
Cumulative Total VPH Mass Removed (lbs)		218.6		218.7		218.9	

Notes:

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

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

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

Sample Calculation

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

Abbreviations:

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

Table 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-22	7/12/2024	--	7.85	--
MW-22	8/22/2024	--	8.03	--
MW-22	9/24/2024	--	NM	--
MW-22	10/24/2024	--	NM	--
MW-22	12/19/2024	--	8.02	--
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	--

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-41D	6/21/2024	--	10.09	--
MW-41D	7/12/2024	--	10.14	--
MW-41D	8/22/2024	--	17.21	--
MW-41D	9/24/2024	--	14.23	--
MW-41D	10/24/2024	--	14.05	--
MW-41D	12/19/2024	--	11.41	--
MW-41S	8/27/2021	--	8.25	--
MW-41S	9/29/2021	7.85	7.89	0.04
MW-41S	10/5/2021	7.78	7.81	0.03
MW-41S	10/15/2021	--	8.06	--
MW-41S	12/2/2021	--	7.90	--
MW-41S	1/3/2022	--	7.97	--
MW-41S	2/8/2022	--	8.13	--
MW-41S	3/11/2022	--	8.18	--
MW-41S	4/11/2022	--	8.55	--
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-41S	7/12/2024	--	6.93	--
MW-41S	8/22/2024	--	7.27	--
MW-41S	9/24/2024	--	7.75	--
MW-41S	10/24/2024	--	7.90	--
MW-41S	12/19/2024	--	9.63	--
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

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	2/8/2022	9.31	9.32	0.00
MW-53	3/11/2022	9.43	9.44	0.01
MW-53	4/11/2022	--	9.38	--
MW-53	6/8/2022	9.08	10.03	0.95
MW-53	6/8/2022	9.08	10.03	0.95
MW-53	7/27/2022	--	10.23	--
MW-53	9/1/2022	--	9.59	--
MW-53	1/10/2023	--	8.53	--
MW-53	3/22/2023	--	9.00	--
MW-53	5/31/2023	9.36	9.41	0.05
MW-53	6/19/2023	7.99	8.10	0.11
MW-53	7/10/2023	8.50	8.52	0.02
MW-53	8/19/2023	9.20	9.22	0.02
MW-53	9/19/2023	--	7.85	--
MW-53	2/8/2024	--	8.59	--
MW-53	3/20/2024	--	8.14	--
MW-53	4/30/2024	--	7.39	--
MW-53	5/23/2024	--	7.77	--
MW-53	6/21/2024	--	7.52	--
MW-53	7/12/2024	--	7.60	--
MW-53	8/22/2024	--	8.18	--
MW-53	9/24/2024	--	NM	--
MW-53	10/24/2024	--	NM	--
MW-53	12/19/2024	9.10	9.15	0.05
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	--

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-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-57	7/12/2024	--	9.44	--
MW-57	8/22/2024	--	10.25	--
MW-57	9/24/2024	--	NM	--
MW-57	10/24/2024	--	NM	--
MW-57	12/19/2024	--	11.22	--
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	--	2.59	--
MW-59D	9/1/2022	--	12.59	--
MW-59D	1/10/2023	--	12.21	--
MW-59D	3/22/2023	--	12.48	--
MW-59D	5/31/2023	--	13.08	--
MW-59D	6/19/2023	--	12.80	--
MW-59D	7/10/2023	--	12.89	--
MW-59D	8/19/2023	--	13.23	--
MW-59D	9/19/2023	--	13.00	--
MW-59D	3/20/2024	--	13.15	--
MW-59D	4/30/2024	--	13.14	--
MW-59D	5/23/2024	--	13.01	--
MW-59D	6/21/2024	--	13.14	--
MW-59D	7/12/2024	--	13.21	--
MW-59D	8/22/2024	--	11.44	--
MW-59D	9/24/2024	--	11.23	--
MW-59D	10/24/2024	--	11.41	--
MW-59D	12/19/2024	--	12.17	--
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	--

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-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-59S	7/12/2024	--	6.09	--
MW-59S	8/22/2024	--	6.18	--
MW-59S	9/24/2024	--	5.25	--
MW-59S	10/24/2024	--	5.50	--
MW-59S	12/19/2024	--	6.27	--
MW-63	9/29/2021	--	6.30	--
MW-63	10/14/2021	--	6.40	--
MW-63	11/4/2021	--	6.60	--
MW-63	2/8/2022	--	7.13	--
MW-63	3/11/2022	--	7.23	--
MW-63	4/11/2022	--	7.30	--
MW-63	6/8/2022	--	7.06	--
MW-63	7/27/2022	--	6.68	--
MW-63	9/1/2022	--	6.64	--
MW-63	1/10/2023	--	6.34	--
MW-63	3/22/2023	--	6.48	--
MW-63	5/31/2023	--	5.50	--
MW-63	6/19/2023	--	4.99	--
MW-63	7/10/2023	--	5.09	--
MW-63	8/19/2023	--	5.70	--
MW-63	9/19/2023	--	5.01	--
MW-63	3/20/2024	--	5.82	--
MW-63	4/30/2024	--	5.54	--
MW-63	5/23/2024	--	5.11	--
MW-63	6/21/2024	--	5.42	--
MW-63	7/12/2024	--	5.56	--
MW-63	8/22/2024	--	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	9/24/2024	--	4.82	--
MW-63	10/24/2024	--	5.01	--
MW-63	12/19/2024	--	6.72	--
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	--	NM	--
MW-64	6/19/2023	--	NM	--
MW-64	7/10/2023	--	NM	--
MW-64	8/19/2023	--	NM	--
MW-64	9/19/2023	--	NM	--
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-64	7/12/2024	--	8.49	--
MW-64	8/22/2024	--	8.52	--
MW-64	9/24/2024	--	NM	--
MW-64	10/24/2024	--	NM	--
MW-64	12/19/2024	--	9.63	--
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	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	--

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	1/10/2023	--	8.82	--
MW-102	3/22/2023	9.95	9.96	0.01
MW-102	5/31/2023	--	8.42	--
MW-102	6/19/2023	--	8.00	--
MW-102	7/10/2023	--	8.15	--
Well abandoned in August 2023 during Phase I RFI activities				
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	--
Well abandoned in August 2023 during Phase I RFI activities				
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	--	0.00	--
MW-104	9/1/2022	7.72	7.82	0.10
MW-104	1/10/2023	--	7.31	--
MW-104	3/22/2023	--	6.89	--
MW-104	5/31/2023	--	6.61	--
MW-104	6/19/2023	--	5.79	--
MW-104	7/10/2023	--	5.80	--
MW-104	8/19/2023	--	6.22	--
MW-104	9/19/2023	--	5.96	--

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	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-104	7/12/2024	--	7.00	--
MW-104	8/22/2024	--	7.32	--
MW-104	9/24/2024	--	6.83	--
MW-104	10/24/2024	--	6.90	--
MW-104	12/19/2024	--	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	--	5.89	--
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	--

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-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-105	7/12/2024	--	1.23	--
MW-105	8/22/2024	--	6.73	--
MW-105	9/24/2024	--	6.32	--
MW-105	10/24/2024	--	6.44	--
MW-105	12/19/2024	--	8.50	--
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	--	5.92	--
MW-106	3/11/2022	--	5.80	--
MW-106	4/11/2022	--	5.70	--
MW-106	6/8/2022	--	5.03	--
MW-106	7/27/2022	--	5.40	--
MW-106	9/1/2022	--	5.83	--
MW-106	1/10/2023	--	4.62	--
MW-106	3/22/2023	--	4.60	--
MW-106	5/31/2023	--	3.51	--
MW-106	6/19/2023	--	2.95	--
MW-106	7/10/2023	--	4.81	--
MW-106	8/19/2023	--	4.40	--
MW-106	9/19/2023	--	4.59	--
MW-106	2/8/2024	--	4.45	--
MW-106	3/20/2024	--	4.12	--
MW-106	4/30/2024	--	2.91	--
MW-106	5/23/2024	--	3.09	--
MW-106	6/21/2024	--	3.86	--
MW-106	7/12/2024	--	4.08	--

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	8/22/2024	--	4.45	--
MW-106	9/24/2024	--	4.62	--
MW-106	10/24/2024	--	4.70	--
MW-106	12/19/2024	--	7.50	--

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-1	7/12/2024	--	4.82	--	--	
LNAPL-1	7/26/2024	--	5.14	--	--	
LNAPL-1	8/9/2024	--	5.39	--	--	
LNAPL-1	8/22/2024	--	5.33	--	--	
LNAPL-1	9/5/2024	--	5.68	--	--	
LNAPL-1	9/19/2024	--	5.56	--	--	
LNAPL-1	10/4/2024	--	5.60	--	--	
LNAPL-1	10/15/2024	--	5.82	--	--	
LNAPL-1	10/31/2024	--	5.92	--	--	
LNAPL-1	11/13/2024	--	6.06	--	--	
LNAPL-1	12/13/2024	--	6.30	--	--	
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	--	--	

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	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	
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-2	7/12/2024	--	4.68	--	--	
LNAPL-2	7/26/2024	--	4.99	--	--	
LNAPL-2	8/9/2024	--	5.18	--	--	
LNAPL-2	8/22/2024	--	5.30	--	--	
LNAPL-2	9/5/2024	--	5.54	--	--	
LNAPL-2	9/19/2024	--	5.48	--	--	
LNAPL-2	10/4/2024	--	5.45	--	--	
LNAPL-2	10/15/2024	--	5.61	--	--	
LNAPL-2	10/31/2024	--	5.79	--	--	
LNAPL-2	11/13/2024	--	5.91	--	--	
LNAPL-2	12/13/2024	--	6.20	--	--	
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	--	--	

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	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	10/2/2022	6.50	6.58	0.08	--	
LNAPL-3	10/9/2022	6.39	6.93	0.54	--	
LNAPL-3	11/14/2022	6.08	6.10	0.02	--	
LNAPL-3	12/6/2022	5.97	6.00	0.03	--	
LNAPL-3	12/11/2022	6.36	6.58	0.22	--	
LNAPL-3	12/18/2022	5.86	5.88	0.02	--	
LNAPL-3	2/26/2023	5.48	5.49	0.01	--	
LNAPL-3	3/23/2023	--	5.61	--	--	
LNAPL-3	4/2/2023	5.39	5.42	0.03	--	
LNAPL-3	5/31/2023	--	4.45	--	--	
LNAPL-3	6/19/2023	--	3.78	--	--	
LNAPL-3	7/10/2023	--	4.28	--	--	
LNAPL-3	8/19/2023	--	5.08	--	--	
LNAPL-3	9/19/2023	--	5.36	--	--	
LNAPL-3	2/7/2024	--	5.45	--	--	
LNAPL-3	2/23/2024	--	5.22	--	--	
LNAPL-3	3/7/2024	--	5.07	--	--	
LNAPL-3	3/20/2024	--	5.07	--	--	Sheen
LNAPL-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-3	7/12/2024	--	4.75	--	--	
LNAPL-3	7/26/2024	--	5.03	--	--	
LNAPL-3	8/9/2024	--	5.20	--	--	
LNAPL-3	8/22/2024	--	5.31	--	--	
LNAPL-3	9/5/2024	--	5.57	--	--	
LNAPL-3	9/19/2024	--	5.48	--	--	
LNAPL-3	10/4/2024	--	5.47	--	--	
LNAPL-3	10/15/2024	--	5.62	--	--	
LNAPL-3	10/31/2024	--	5.80	--	--	
LNAPL-3	11/13/2024	--	5.92	--	--	
LNAPL-3	12/13/2024	--	6.21	--	--	
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	

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-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	--	--	
LNAPL-4	7/12/2024	--	4.70	--	--	
LNAPL-4	7/26/2024	--	5.03	--	--	
LNAPL-4	8/9/2024	--	5.20	--	--	
LNAPL-4	8/22/2024	--	5.26	--	--	
LNAPL-4	9/5/2024	--	5.50	--	--	
LNAPL-4	9/19/2024	--	5.46	--	--	
LNAPL-4	10/4/2024	--	5.45	--	--	
LNAPL-4	10/15/2024	--	5.62	--	--	
LNAPL-4	10/31/2024	--	5.80	--	--	
LNAPL-4	11/13/2024	--	5.93	--	--	
LNAPL-4	12/13/2024	--	6.18	--	--	
LNAPL-5	8/27/2021	--	8.15	--	--	
LNAPL-5	9/30/2021	--	6.49	--	--	
LNAPL-5	10/5/2021	--	6.35	--	--	
LNAPL-5	10/12/2021	--	6.28	--	--	
LNAPL-5	10/19/2021	--	6.22	--	--	
LNAPL-5	11/9/2021	--	6.14	--	--	Sheen
LNAPL-5	11/18/2021	--	6.20	--	--	
LNAPL-5	12/2/2021	6.28	6.30	0.02	--	
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	6/5/2022	--	5.81	--	0.50	
LNAPL-5	6/12/2022	5.79	5.81	0.02	0.50	
LNAPL-5	6/19/2022	5.90	5.93	0.03	0.50	
LNAPL-5	6/26/2022	5.45	5.50	0.05	--	

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	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	8/14/2022	--	--	--	--	
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-5	7/12/2024	--	4.93	--	--	
LNAPL-5	7/26/2024	--	5.04	--	--	
LNAPL-5	8/9/2024	--	5.23	--	--	
LNAPL-5	8/22/2024	--	5.34	--	--	
LNAPL-5	9/5/2024	--	5.51	--	--	
LNAPL-5	9/19/2024	--	5.52	--	--	
LNAPL-5	10/4/2024	--	5.52	--	--	
LNAPL-5	10/15/2024	--	5.67	--	--	
LNAPL-5	10/31/2024	--	5.84	--	--	
LNAPL-5	11/13/2024	--	5.97	--	--	
LNAPL-5	12/13/2024	--	6.22	--	--	
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	12/15/2021	--	6.50	--	--	
LNAPL-6	1/3/2022	--	6.56	--	--	
LNAPL-6	2/8/2022	--	6.78	--	--	
LNAPL-6	5/15/2022	5.94	5.95	0.01	--	
LNAPL-6	5/22/2022	--	5.93	--	--	
LNAPL-6	5/29/2022	--	5.75	--	--	
LNAPL-6	6/5/2022	--	5.92	--	--	

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	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	7/17/2022	5.60	5.61	0.01	--	
LNAPL-6	7/31/2022	--	5.92	--	--	
LNAPL-6	8/7/2022	6.89	6.91	0.02	--	
LNAPL-6	8/14/2022	6.90	6.94	0.04	0.80	
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-6	7/12/2024	--	5.05	--	--	
LNAPL-6	7/26/2024	--	5.17	--	--	
LNAPL-6	8/9/2024	--	5.35	--	--	
LNAPL-6	8/22/2024	--	5.45	--	--	
LNAPL-6	9/5/2024	--	5.60	--	--	
LNAPL-6	9/19/2024	--	5.63	--	--	
LNAPL-6	10/4/2024	--	5.65	--	--	
LNAPL-6	10/15/2024	--	5.79	--	--	
LNAPL-6	10/31/2024	--	5.96	--	--	
LNAPL-6	11/13/2024	--	6.13	--	--	
LNAPL-6	12/13/2024	--	6.42	--	--	
LNAPL-7	8/27/2021	--	8.14	--	--	
LNAPL-7	9/30/2021	--	6.42	--	--	
LNAPL-7	10/5/2021	--	6.29	--	--	
LNAPL-7	10/12/2021	--	6.22	--	--	
LNAPL-7	10/19/2021	--	6.16	--	--	
LNAPL-7	11/9/2021	5.98	5.99	0.01	--	
LNAPL-7	11/18/2021	6.18	6.58	0.40	--	
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	2/8/2022	6.58	6.75	0.17	--	
LNAPL-7	3/7/2022	6.57	7.18	0.61	--	

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	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	
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-7	7/12/2024	--	4.72	--	--	
LNAPL-7	7/26/2024	--	5.02	--	--	
LNAPL-7	8/9/2024	--	5.17	--	--	
LNAPL-7	8/22/2024	--	5.31	--	--	
LNAPL-7	9/5/2024	--	5.48	--	--	
LNAPL-7	9/19/2024	--	5.44	--	--	
LNAPL-7	10/4/2024	--	5.47	--	--	
LNAPL-7	10/15/2024	--	5.61	--	--	
LNAPL-7	10/31/2024	--	5.76	--	--	
LNAPL-7	11/13/2024	--	5.91	--	--	
LNAPL-7	12/13/2024	6.18	6.18	0.00	--	Film on top
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	--	

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	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	
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-8	7/12/2024	--	4.77	--	--	
LNAPL-8	7/26/2024	--	4.95	--	--	
LNAPL-8	8/9/2024	--	5.10	--	--	
LNAPL-8	8/22/2024	--	5.20	--	--	
LNAPL-8	9/5/2024	--	5.35	--	--	
LNAPL-8	9/19/2024	--	5.32	--	--	
LNAPL-8	10/4/2024	--	5.39	--	--	
LNAPL-8	10/15/2024	--	5.53	--	--	
LNAPL-8	10/31/2024	--	5.69	--	--	
LNAPL-8	11/13/2024	--	5.81	--	--	
LNAPL-8	12/13/2024	6.02	6.03	0.01	--	
LNAPL-9	8/27/2021	--	8.09	--	--	
LNAPL-9	9/30/2021	--	6.33	--	--	

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	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	--	--	
LNAPL-9	2/5/2023	--	5.62	--	--	
LNAPL-9	2/26/2023	--	5.42	--	--	
LNAPL-9	3/5/2023	--	5.86	--	--	
LNAPL-9	3/23/2023	--	5.45	--	--	
LNAPL-9	4/2/2023	5.55	5.58	0.03	--	
LNAPL-9	5/31/2023	--	4.36	--	--	
LNAPL-9	6/19/2023	--	3.66	--	--	
LNAPL-9	7/10/2023	--	3.25	--	--	
LNAPL-9	8/19/2023	--	5.00	--	--	
LNAPL-9	9/19/2023	--	5.30	--	--	
LNAPL-9	2/7/2024	--	5.37	--	--	
LNAPL-9	2/23/2024	--	5.16	--	--	
LNAPL-9	3/7/2024	--	4.98	--	--	
LNAPL-9	3/20/2024	--	4.98	--	--	
LNAPL-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-9	7/12/2024	--	4.71	--	--	
LNAPL-9	7/26/2024	--	4.85	--	--	
LNAPL-9	8/9/2024	--	5.12	--	--	
LNAPL-9	8/22/2024	--	5.25	--	--	
LNAPL-9	9/5/2024	--	5.49	--	--	
LNAPL-9	9/19/2024	--	5.40	--	--	
LNAPL-9	10/4/2024	--	5.35	--	--	
LNAPL-9	10/15/2024	--	5.74	--	--	
LNAPL-9	10/31/2024	--	5.72	--	--	
LNAPL-9	11/13/2024	--	5.84	--	--	
LNAPL-9	12/13/2024	--	6.10	--	--	
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	--	

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	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	
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-10	7/12/2024	--	4.70	--	--	
LNAPL-10	7/26/2024	--	5.08	--	--	
LNAPL-10	8/9/2024	--	5.14	--	--	
LNAPL-10	8/22/2024	--	5.25	--	--	
LNAPL-10	9/5/2024	--	5.51	--	--	

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	9/19/2024	--	5.39	--	--	
LNAPL-10	10/4/2024	--	5.39	--	--	
LNAPL-10	10/15/2024	--	5.69	--	--	
LNAPL-10	10/31/2024	--	5.72	--	--	
LNAPL-10	11/13/2024	--	5.83	--	--	
LNAPL-10	12/13/2024	--	6.11	--	--	
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	--	--	
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	--	--	

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	4/18/2024	--	4.82	--	--	
LNAPL-11	4/30/2024	--	5.82	--	--	
LNAPL-11	5/15/2024	--	6.82	--	--	
LNAPL-11	5/31/2024	--	7.82	--	--	
LNAPL-11	6/12/2024	--	8.82	--	--	
LNAPL-11	6/28/2024	--	9.82	--	--	
LNAPL-11	7/12/2024	--	10.82	--	--	
LNAPL-11	7/26/2024	--	11.82	--	--	
LNAPL-11	8/9/2024	--	12.82	--	--	
LNAPL-11	8/22/2024	--	13.82	--	--	
LNAPL-11	9/5/2024	--	14.82	--	--	
LNAPL-11	9/19/2024	--	15.82	--	--	
LNAPL-11	10/4/2024	--	5.53	--	--	
LNAPL-11	10/15/2024	--	5.78	--	--	
LNAPL-11	10/31/2024	--	5.90	--	--	
LNAPL-11	11/13/2024	--	6.03	--	--	
LNAPL-11	12/13/2024	--	6.24	--	--	
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-12	7/12/2024	--	4.92	--	--	
LNAPL-12	7/26/2024	--	5.05	--	--	
LNAPL-12	8/9/2024	--	5.30	--	--	
LNAPL-12	8/22/2024	--	5.43	--	--	
LNAPL-12	9/5/2024	--	5.62	--	--	
LNAPL-12	9/19/2024	--	5.52	--	--	
LNAPL-12	10/4/2024	--	5.55	--	--	
LNAPL-12	10/15/2024	--	5.54	--	--	
LNAPL-12	10/31/2024	--	5.91	--	--	
LNAPL-12	11/13/2024	--	6.02	--	--	
LNAPL-12	12/13/2024	--	6.35	--	--	
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	--	--	

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	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	--	--	
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-13	7/12/2024	--	4.85	--	--	
LNAPL-13	7/26/2024	--	5.08	--	--	
LNAPL-13	8/9/2024	--	5.28	--	--	
LNAPL-13	8/22/2024	--	5.38	--	--	
LNAPL-13	9/5/2024	--	5.62	--	--	
LNAPL-13	9/19/2024	--	5.46	--	--	
LNAPL-13	10/4/2024	--	5.55	--	--	
LNAPL-13	10/15/2024	--	5.71	--	--	
LNAPL-13	10/31/2024	--	5.86	--	--	
LNAPL-13	11/13/2024	--	5.98	--	--	
LNAPL-13	12/13/2024	--	6.36	--	--	
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-14	7/12/2024	--	4.87	--	--	
LNAPL-14	7/26/2024	--	5.06	--	--	
LNAPL-14	8/9/2024	--	5.30	--	--	
LNAPL-14	8/22/2024	--	5.41	--	--	
LNAPL-14	9/5/2024	--	5.67	--	--	
LNAPL-14	9/19/2024	--	5.48	--	--	
LNAPL-14	10/4/2024	--	5.55	--	--	
LNAPL-14	10/15/2024	--	5.65	--	--	
LNAPL-14	10/31/2024	--	5.90	--	--	
LNAPL-14	11/13/2024	--	6.01	--	--	
LNAPL-14	12/13/2024	--	6.35	--	--	
LNAPL-15	8/14/2022	--	6.93	--	--	
LNAPL-15	8/20/2022	--	6.82	--	--	
LNAPL-15	9/4/2022	--	6.73	--	--	

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-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-15	7/12/2024	--	4.86	--	--	
LNAPL-15	7/26/2024	--	5.03	--	--	
LNAPL-15	8/9/2024	--	5.32	--	--	
LNAPL-15	8/22/2024	--	5.41	--	--	
LNAPL-15	9/5/2024	--	5.65	--	--	
LNAPL-15	9/19/2024	--	5.47	--	--	
LNAPL-15	10/4/2024	--	5.57	--	--	
LNAPL-15	10/15/2024	--	5.66	--	--	
LNAPL-15	10/31/2024	--	5.88	--	--	
LNAPL-15	11/13/2024	--	6.00	--	--	
LNAPL-15	12/13/2024	--	6.48	--	--	
LNAPL-16	8/14/2022	--	6.92	--	--	
LNAPL-16	8/20/2022	--	6.83	--	--	
LNAPL-16	9/4/2022	--	6.72	--	--	
LNAPL-16	9/10/2022	--	6.72	--	--	
LNAPL-16	9/18/2022	--	6.91	--	--	
LNAPL-16	9/25/2022	--	6.83	--	--	
LNAPL-16	10/2/2022	--	6.66	--	--	
LNAPL-16	10/9/2022	--	6.52	--	--	
LNAPL-16	11/14/2022	--	6.12	--	--	
LNAPL-16	12/6/2022	--	5.97	--	--	
LNAPL-16	2/26/2023	--	5.60	--	--	
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-16	7/12/2024	--	4.85	--	--	
LNAPL-16	7/26/2024	--	5.05	--	--	
LNAPL-16	8/9/2024	--	5.29	--	--	
LNAPL-16	8/22/2024	--	5.41	--	--	

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	9/5/2024	--	5.68	--	--	
LNAPL-16	9/19/2024	--	5.46	--	--	
LNAPL-16	10/4/2024	--	5.52	--	--	
LNAPL-16	10/15/2024	--	5.63	--	--	
LNAPL-16	10/31/2024	--	5.87	--	--	
LNAPL-16	11/13/2024	--	5.99	--	--	
LNAPL-16	12/13/2024	--	6.30	--	--	
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	--	--	
LNAPL-17	7/12/2024	--	4.86	--	--	
LNAPL-17	7/26/2024	--	5.04	--	--	
LNAPL-17	8/9/2024	--	5.30	--	--	
LNAPL-17	8/22/2024	--	5.38	--	--	
LNAPL-17	9/5/2024	--	5.59	--	--	
LNAPL-17	9/19/2024	--	5.42	--	--	
LNAPL-17	10/4/2024	--	5.61	--	--	
LNAPL-17	10/15/2024	--	5.63	--	--	
LNAPL-17	10/31/2024	--	5.82	--	--	
LNAPL-17	11/13/2024	--	5.94	--	--	
LNAPL-17	12/13/2024	--	6.32	--	--	

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 Sampling Results
Calumet Montana Refining; Great Falls, MT

Location		Montana DEQ-7	Montana DEQ	USEPA Regional	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S
Field Sample ID	Lab Sample ID	Human Health	Tier 1	Screening Levels	CMR-MW41S-200622	CMR-MW41S-200826	CMR-MW41S-210219	CMR-MW41S-211005	CMR-MW141S-220317	MW41S-GW-220622	CMR-MW41S-220831
Sample Method	Sample Date	Standards -	Groundwater	- Resident	VF24007-001	VH28044-002	WB24062-035	WJ08015-001	XC21009-002	XF23073-001	L1533605-03
Sample Date	Sample Date	Groundwater	RBSLs	Tapwater	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	Sample Date	Groundwater	RBSLs	Tapwater	6/22/2020	8/26/2020	2/19/2021	10/5/2021	3/17/2022	6/22/2022	8/31/2022
Comments	Comments										
VOC											
m,p-xylene					550 (4)	370 (8)	220 (8)	640 (8)	580 (2)	2000 H (8)	---
Acetone				18000	220 (40)	U (80)	94 J (80)	U (80)	76 (20)	HU (80)	---
Benzene	5		5	0.46	1000 (4)	1500 (8)	980 (8)	1900 (8)	230 (2)	1200 H (8)	---
Bromoform	80			3.3	U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	---
2-Butanone				5600	89 J (20)	U (40)	U (40)	U (40)	28 J (10)	HU (40)	---
n-Butylbenzene				1000	---	---	---	---	---	---	---
sec-Butylbenzene				2000	---	---	---	---	---	---	---
tert-Butylbenzene				690	---	---	---	---	---	---	---
Carbon Disulfide				810	U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	---
Chloroform	70			0.22	4 J (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	---
Chloromethane	600			190	U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	---
Cumene				450	10 (4)	11 (8)	U (8)	14 (8)	U (2)	16 H (8)	---
Cyclohexane				13000	24 (4)	77 J (8)	97 (8)	110 (8)	15 (2)	22 H (8)	---
p-Cymene				21	---	---	---	---	---	---	---
1,1-Dichloroethane				2.8	U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	---
cis-1,2-Dichloroethene	70			25	U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	---
Ethyl Benzene	700		700	1.5	370 (4)	250 (8)	67 (8)	450 (8)	15 (2)	410 H (8)	---
n-Hexane				1500	---	---	---	---	---	---	---
Iodomethane				---	---	---	---	---	---	---	---
4-Methyl-2-pentanone				6300	U (20)	U (40)	U (40)	U (40)	U (10)	HU (40)	---
Methylcyclohexane				200	11 J (4)	34 J (8)	53 J (8)	57 J (8)	9.4 J (2)	12 (8)	---
Methylene Chloride	5			11	U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	---
Naphthalene	100		100	0.12	31 (4)	26 (8)	9.5 J (8)	35 (8)	31 (2)	77 H (8)	---
Diisopropyl ether				1500	---	---	---	---	---	---	---
n-Propylbenzene				660	---	---	---	---	---	---	---
Styrene	100			1200	U (4.1)	U (8.2)	U (8.2)	U (8.2)	U (2.1)	HU (8.2)	---
Toluene	1000		1000	1100	82 (4)	12 (8)	11 (8)	270 (8)	44 (2)	180 H (8)	---
1,1,2-Trichloroethane	3			0.28	U (4)	U (8)	U (8)	U (8)	U (2)	HU (8)	---
1,2,3-Trimethylbenzene				55	---	---	---	---	---	---	---
1,2,4-Trimethylbenzene				56	---	---	---	---	---	---	---
1,3,5-Trimethylbenzene				60	---	---	---	---	---	---	---
Vinyl Acetate				410	---	---	---	---	---	---	---
ortho-xylene	10000			190	67 (4)	16 (8)	10 (8)	200 (8)	300 (2)	750 H (8)	---
Xylenes (total)	10000		10000	190	620 (4)	390 (8)	230 (8)	840 (8)	870 (2)	2700 H (8)	---

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

Location Field Sample ID Lab Sample ID Sample Method Sample Date Comments	Montana DEQ-7 Human Health Standards - Groundwater	Montana DEQ Tier 1 Groundwater RBSLs	USEPA Regional Screening Levels - Resident Tapwater	MW-041S CMR-MW41S-200622 VF24007-001 Low Flow 6/22/2020	MW-041S CMR-MW41S-200826 VH28044-002 Low Flow 8/26/2020	MW-041S CMR-MW41S-210219 WB24062-035 Low Flow 2/19/2021	MW-041S CMR-MW41S-211005 WJ08015-001 Low Flow 10/5/2021	MW-041S CMR-MW141S-220317 XC21009-002 Low Flow 3/17/2022	MW-041S MW41S-GW-220622 XF23073-001 Low Flow 6/22/2022	MW-041S CMR-MW41S-220831 L1533605-03 Low Flow 8/31/2022
SVOC										
Acenaphthene	70	70	530	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	---
Acenaphthylene			120	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	---
Benzo(a)anthracene	0.5	0.5	0.03	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	---
Benzo(a)pyrene	0.05	0.05	0.025	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	0.25	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	---
Benzo(g,h,i)perylene			120	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	---
1,1-Biphenyl			0.83	---	---	---	---	---	---	---
bis(2-Ethylhexyl)phthalate	6		5.6	11 BJ (5)	U (5)	U (5)	U (5)	U (40)	U (100)	---
Chrysene	50	50	25	U (0.3)	U (0.3)	U (0.3)	U (0.15)	U (0.6)	U (1.5)	---
Dibenzofuran			7.9	U (5)	U (5)	U (5)	U (2.5)	U (10)	U (25)	---
Diethylphthalate	600		15000	U (5)	U (5)	U (5)	U (2.5)	U (10)	U (25)	---
2,4-Dimethylphenol	100		360	84 (4.8)	U (4.8)	24 (4.8)	U (2.4)	160 (9.6)	36 J (24)	---
Di-n-butylphthalate	20		900	6.1 BJ (5)	U (5)	U (5)	U (2.5)	U (10)	U (25)	---
Fluoranthene	20	20	800	U (1)	U (1)	U (1)	U (0.5)	U (2)	U (5)	---
Fluorene	50	50	290	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	0.25	U (0.4)	U (0.4)	U (0.4)	U (0.2)	U (0.8)	U (2)	---
1-Methylnaphthalene		11	0.0063	---	---	---	---	---	---	---
2-Methylnaphthalene		36	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			930	U (2.1)	U (2.1)	U (2.1)	U (1.1)	U (4.2)	U (11)	---
Naphthalene	100	100	0.12	24 B (0.5)	7.1 (0.5)	10 (0.5)	15 B (0.25)	18 (1)	60 (2.5)	---
Phenanthrene			120	U (0.6)	U (0.6)	U (0.6)	U (0.3)	U (1.2)	U (3)	---
Phenol	4000		5800	53 (5)	61 (5)	34 (5)	5.6 (2.5)	15 J (10)	U (25)	---
Pyrene	20	20	120	U (1)	U (1)	U (1)	U (0.5)	U (2)	U (5)	---
MTDEQ VPH										
C5-C8 Aliphatics (Unadjusted)		700		---	---	---	---	---	---	1460 (33.3)
C5-C8 Aliphatics		700		680 J (150)	2700 (300)	2200 (300)	1500 (150)	460 J (150)	990 (150)	1140 (33.3)
C9-C12 Aliphatics (Unadjusted)		3000		---	---	---	---	---	---	1200 (33.3)
C9-C12 Aliphatics		3000		1700 (150)	740 J (300)	510 J (300)	370 J (150)	730 J (150)	710 J (150)	625 (33.3)
C9-C10 Aromatics (Unadjusted)		980		---	---	---	---	---	---	530 (33.3)
C9-C10 Aromatics		980		1100 (50)	2400 (100)	730 (100)	990 (50)	810 (50)	3100 (50)	---
Gasoline Range Organics (C5-C12)				---	---	---	---	---	---	---
Volatile Petroleum Hydrocarbons				5000 (350)	10000 (700)	3600 (700)	6300 (350)	3100 (350)	9800 (350)	3190 (66.7)
Benzene	5	5	0.46	1100 (5.1)	3100 (10)	870 (10)	1500 (5.1)	210 (5.1)	1100 (5.1)	---
Ethyl Benzene	700	700	1.5	410 (6.2)	540 (12)	63 J (12)	370 (6.2)	11 J (6.2)	420 (6.2)	---
Toluene	1000	1000	1100	84 (5.3)	35 J (11)	U (11)	290 (5.3)	44 J (5.3)	170 (5.3)	---
Naphthalene	100	100	0.12	45 J (7)	53 J (14)	21 J (14)	39 (0.7)	26 J (7)	100 B (7)	---
m,p-xylene				610 (12)	770 (24)	200 (24)	580 (12)	490 (12)	1800 (12)	---
ortho-xylene	10000		190	79 (5.8)	39 J (12)	13 J (12)	170 (0.58)	260 (5.8)	710 (5.8)	---
Xylenes (total)	10000	10000	190	1332 (5.8)	809 (24)	213 (24)	1520 (5.8)	750 (5.8)	2510 (5.8)	---
MTDEQ EPH										
C9-C18 Aliphatic Hydrocarbons		3000		U (320)	U (100)	U (110)	---	---	990 (100)	---
C19-C36 Aliphatics (Unadjusted)		100000		---	---	---	---	---	---	---
C19-C36 Aliphatics		100000		U (320)	U (100)	U (110)	---	---	U (100)	---
C11 through C22 Aromatic Hydrocarbons (Unadjusted)		1100		---	---	---	---	---	---	---
C11-C22 Aromatics		1100		U (320)	100 (100)	3200 (110)	---	---	4000 (100)	---
EPH (Frac)				U (320)	120 J (100)	3300 (110)	---	---	5000 B (100)	---
Petroleum Hydrocarbons (Total)				---	---	---	---	---	---	---
Petroleum Hydrocarbons (Extractable)				4300 (650)	3100 (210)	4700 (210)	---	---	5700 (2000)	5560 (500)
Total Petroleum Hydrocarbons (GC/FID)				---	---	---	---	---	---	---
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS				---	---	---	---	---	---	---

Notes:

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

Abbreviations:

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

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

Location	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S
Field Sample ID	CMR-MW41S-220831	W-41S-221213-L1569525	W-41S-221213-L1569525	CMR-MW-415-230321	CMR-MW-415-230321	CMR-MW-41S-240623	CMR-MW-41S-240623	CMR-MW-41S-092023	CMR-MW-41S-092023	CMR-MW-41S-092023
Lab Sample ID	X101059-003	L1569525-03	XL14017-003	L1597587-03	YC22023-003	L1631460-03	YF29005-005	L1658629-03	Y121013-003	
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	8/31/2022	12/13/2022	12/13/2022	3/21/2023	3/21/2023	6/27/2023	6/27/2023	9/20/2023	9/20/2023	
Comments										
VOC										
m,p-xylene	150 (0.4)	---	730 (2)	---	320 (2)	---	470 (2)	---	590 (20)	
Acetone	88 (4)	---	35 J (20)	---	U (20)	---	40 H (4)	---	U (200)	
Benzene	140 (0.4)	---	250 (2)	---	130 (0.4)	---	410 (2)	---	470 (20)	
Bromoform	U (0.4)	---	U (2)	---	U (0.4)	---	U (2)	---	U (20)	
2-Butanone	16 (2)	---	14 J (10)	---	U (2)	---	18 H (2)	---	U (100)	
n-Butylbenzene	---	---	---	---	---	---	---	---	---	
sec-Butylbenzene	---	---	---	---	---	---	---	---	---	
tert-Butylbenzene	---	---	---	---	---	---	---	---	---	
Carbon Disulfide	4.2 (0.4)	---	U (2)	---	U (0.4)	---	U (2)	---	U (20)	
Chloroform	U (0.4)	---	U (2)	---	U (0.4)	---	U (2)	---	U (20)	
Chloromethane	U (0.4)	---	U (2)	---	U (0.4)	---	U (2)	---	U (20)	
Cumene	0.57 (0.4)	---	U (2)	---	0.55 (0.4)	---	5.6 (2)	---	U (20)	
Cyclohexane	27 (0.4)	---	33 (2)	---	18 (2)	---	17 (2)	---	45 (20)	
p-Cymene	---	---	---	---	---	---	---	---	---	
1,1-Dichloroethane	U (0.4)	---	U (2)	---	U (0.4)	---	U (2)	---	U (20)	
cis-1,2-Dichloroethene	0.48 J (0.4)	---	U (2)	---	U (0.4)	---	U (2)	---	U (20)	
Ethyl Benzene	21 (0.4)	---	50 (2)	---	16 (0.4)	---	150 (2)	---	170 (20)	
n-Hexane	---	---	---	---	---	---	---	---	---	
Iodomethane	---	---	---	---	---	---	---	---	---	
4-Methyl-2-pentanone	2.4 J (2)	---	U (10)	---	U (2)	---	U (10)	---	U (100)	
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)	
Naphthalene	3.4 (0.4)	---	27 (2)	---	18 (0.4)	---	35 (2)	---	30 (20)	
Diisopropyl ether	---	---	---	---	---	---	---	---	---	
n-Propylbenzene	---	---	---	---	---	---	---	---	---	
Styrene	U (0.41)	---	U (2.1)	---	U (0.41)	---	4.8 (2.1)	---	U (21)	
Toluene	11 (0.4)	---	9.5 (2)	---	2.2 (0.4)	---	3.4 (2)	---	U (20)	
1,1,2-Trichloroethane	U (0.4)	---	U (2)	---	U (0.4)	---	U (2)	---	U (20)	
1,2,3-Trimethylbenzene	---	---	---	---	---	---	---	---	---	
1,2,4-Trimethylbenzene	---	---	---	---	---	---	---	---	---	
1,3,5-Trimethylbenzene	---	---	---	---	---	---	---	---	---	
Vinyl Acetate	---	---	---	---	---	---	---	---	---	
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)	

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Location	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S
Field Sample ID	CMR-MW41S-220831	W-41S-221213-L1569525	W-41S-221213-L1569525	CMR-MW-415-230321	CMR-MW-415-230321	CMR-MW-41S-240623	CMR-MW-41S-240623	CMR-MW-41S-092023	CMR-MW-41S-092023	CMR-MW-41S-092023
Lab Sample ID	X101059-003	L1569525-03	XL14017-003	L1597587-03	YC22023-003	L1631460-03	YF29005-005	L1658629-03	Y121013-003	
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	8/31/2022	12/13/2022	12/13/2022	3/21/2023	3/21/2023	6/27/2023	6/27/2023	9/20/2023	9/20/2023	
Comments										
SVOC										
Acenaphthene	U (0.04)	---	U (0.8)	---	U (0.8)	---	0.34 J (0.2)	---	0.65 J (0.2)	
Acenaphthylene	U (0.04)	---	U (0.8)	---	U (0.8)	---	U (0.2)	---	U (0.2)	
Benzo(a)anthracene	U (0.04)	---	U (0.8)	---	U (0.8)	---	U (0.2)	---	U (0.2)	
Benzo(a)pyrene	U (0.04)	---	U (0.8)	---	U (0.8)	---	U (0.2)	---	U (0.2)	
Benzo(b)fluoranthene	U (0.04)	---	U (0.8)	---	U (0.8)	---	U (0.2)	---	U (0.2)	
Benzo(g,h,i)perylene	U (0.04)	---	U (0.8)	---	U (0.8)	---	U (0.2)	---	U (0.2)	
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)	
Chrysene	U (0.04)	---	U (0.8)	---	U (0.8)	---	U (0.2)	---	U (0.2)	
Dibenzofuran	U (0.16)	---	U (3.2)	---	U (3.2)	---	U (0.8)	---	U (0.8)	
Diethylphthalate	U (0.19)	---	U (3.8)	---	U (3.8)	---	U (0.95)	---	U (0.95)	
2,4-Dimethylphenol	U (0.15)	---	100 (3)	---	60 (3)	---	8.3 (0.75)	---	75 (0.75)	
Di-n-butylphthalate	U (0.42)	---	U (8.4)	---	U (8.4)	---	U (2.1)	---	U (2.1)	
Fluoranthene	U (0.04)	---	U (0.8)	---	U (0.8)	---	U (0.2)	---	U (0.2)	
Fluorene	U (0.04)	---	U (0.8)	---	1.2 J (0.8)	---	0.67 J (0.2)	---	1.4 (0.2)	
Indeno(1,2,3-cd)pyrene	U (0.04)	---	U (0.8)	---	U (0.8)	---	U (0.2)	---	U (0.2)	
1-Methylnaphthalene	0.065 J (0.04)	---	12 (0.8)	---	14 (0.8)	---	10 (0.2)	---	7.3 (0.2)	
2-Methylnaphthalene	0.11 J (0.04)	---	6.7 (0.8)	---	11 (0.8)	---	12 (0.2)	---	0.74 J (0.2)	
2-Methylphenol	U (0.21)	---	U (4.2)	---	U (4.2)	---	U (1.1)	---	U (1.1)	
Naphthalene	U (0.04)	---	19 (0.8)	---	11 (0.8)	---	15 (0.2)	---	6.9 (0.2)	
Phenanthrene	U (0.04)	---	U (0.8)	---	U (0.8)	---	0.42 J (0.2)	---	U (0.2)	
Phenol	U (0.19)	---	9.1 J (3.8)	---	U (3.8)	---	U (0.95)	---	15 (0.95)	
Pyrene	U (0.04)	---	U (0.8)	---	U (0.8)	---	U (0.2)	---	U (0.2)	
MTDEQ VPH										
C5-C8 Aliphatics (Unadjusted)	---	1050 (33.3)	---	516 (33.3)	---	850 (167)	---	1310 (33.3)	---	
C5-C8 Aliphatics	---	1040 (33.3)	---	392 (33.3)	---	429 J (167)	---	842 (33.3)	---	
C9-C12 Aliphatics (Unadjusted)	---	2060 (33.3)	---	1330 (33.3)	---	3100 (167)	---	2510 (33.3)	---	
C9-C12 Aliphatics	---	405 (33.3)	---	456 (33.3)	---	U (167)	---	844 (33.3)	---	
C9-C10 Aromatics (Unadjusted)	---	1570 (33.3)	---	1240 (167)	---	1910 (167)	---	1750 (33.3)	---	
C9-C10 Aromatics	---	---	---	---	---	---	---	---	---	
Gasoline Range Organics (C5-C12)	---	---	---	3360 (66.7)	---	6400 (333)	---	6010 (66.7)	---	
Volatile Petroleum Hydrocarbons	---	5170 (66.7)	---	3090 (333)	---	5860 (333)	---	5570 (66.7)	---	
Benzene	---	---	---	---	---	---	---	---	---	
Ethyl Benzene	---	---	---	---	---	---	---	---	---	
Toluene	---	---	---	---	---	---	---	---	---	
Naphthalene	---	---	---	---	---	---	---	---	---	
m,p-xylene	---	---	---	---	---	---	---	---	---	
ortho-xylene	---	---	---	---	---	---	---	---	---	
Xylenes (total)	---	---	---	---	---	---	---	---	---	
MTDEQ EPH										
C9-C18 Aliphatic Hydrocarbons	---	---	---	---	---	---	---	---	---	
C19-C36 Aliphatics (Unadjusted)	---	UQ (200)	---	U (222)	---	U (200)	---	U (200)	---	
C19-C36 Aliphatics	---	---	---	---	---	---	---	---	---	
C11 through C22 Aromatic Hydrocarbons (Unadjusted)	---	375 JQ (200)	---	506 J (222)	---	425 JJ3 (200)	---	397 J (200)	---	
C11-C22 Aromatics	---	375 JQ (200)	---	506 J (222)	---	425 J (200)	---	397 J (200)	---	
EPH (Frac)	---	4460 Q (100)	---	---	---	---	---	---	---	
Petroleum Hydrocarbons (Total)	---	375 JQ (200)	---	506 J (222)	---	425 J (200)	---	397 J (200)	---	
Petroleum Hydrocarbons (Extractable)	---	---	---	5640 (111)	---	5490 (100)	---	5660 (100)	---	
Total Petroleum Hydrocarbons (GC/FID)	---	---	---	---	---	---	---	---	---	
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS	---	375 JQ (200)	---	506 J (222)	---	425 J (200)	---	397 J (200)	---	

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Abbreviations:
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Location	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-041S	MW-105	MW-105	MW-105
Field Sample ID	CMR-MW-415-231207	CMR-MW-41S-240228	CMR-MW-41S-240606	CMR-MW041S-240716	CMR-MW-41S-240912	CMR-MW-415-241204	CMR-MW105-08052020	CMR-MW105-200827	CMR-MW105-210223	CMR-MW105-210223
Lab Sample ID	L1685777-03	L1710780-01	L1744765-01	L1757374-06	L1777686-01	L1806484-02	VH07016-001	VH28044-018	WB25040-009	WB25040-009
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	12/7/2023	2/28/2024	6/6/2024	7/16/2024	9/12/2024	12/4/2024	8/5/2020	8/27/2020	2/23/2021	2/23/2021
Comments										
VOC										
m,p-xylene	---	---	---	---	---	---	---	250 (2)	260 (4)	55 (4)
Acetone	23.2 J (11.3)	UJ3 (11.3)	U (11.3)	U (113)	U (282)	U (282)	110 (4)	43 J (40)	65 J (40)	240 (4)
Benzene	535 (1.88)	199 (0.0941)	353 (2.35)	406 (0.941)	574 (2.35)	447 (2.35)	180 (0.4)	570 (4)		
Bromoform	U (0.129)	U (0.129)	U (0.129)	U (1.29)	U (3.22)	U (3.22)	U (0.4)	U (4)	U (4)	
2-Butanone	U (1.19)	U (1.19)	U (1.19)	U (11.9)	U (29.8)	U (29.8)	15 (2)	U (20)	U (20)	
n-Butylbenzene	6.9 (0.157)	U (0.157)	U (0.157)	---	7.25 J (3.93)	U (3.93)	---	---	---	
sec-Butylbenzene	8.12 (0.125)	0.801 (0.125)	8.79 (0.125)	---	U (3.13)	U (3.13)	---	---	---	
tert-Butylbenzene	U (0.127)	0.149 J (0.127)	U (0.127)	---	7.72 B J (3.18)	U (3.18)	---	---	---	
Carbon Disulfide	0.363 J (0.0962)	U (0.0962)	0.171 J (0.0962)	U (0.962)	U (2.41)	U (2.41)	0.56 (0.4)	U (4)	U (4)	
Chloroform	U (0.111)	U (0.111)	U (0.111)	U (1.11)	U (2.78)	U (2.78)	U (0.4)	U (4)	U (4)	
Chloromethane	U (0.96)	U (0.96)	U (0.96)	U (9.6)	U (24)	U (24)	29 (0.4)	U (4)	U (4)	
Cumene	8.52 (0.105)	0.975 (0.105)	8.31 (0.105)	4.31 J (1.05)	5.73 J (2.63)	3.13 J (2.63)	4.6 (0.4)	5.4 (4)	5.5 (4)	
Cyclohexane	---	---	---	22 (1.88)	---	---	59 (0.4)	55 J (4)	70 (4)	
p-Cymene	6.35 (0.12)	2.96 (0.12)	8.72 (0.12)	---	6.17 J (3)	4.2 J (3)	---	---	---	
1,1-Dichloroethane	U (0.1)	U (0.1)	U (0.1)	U (1)	U (2.5)	U (2.5)	U (0.4)	U (4)	U (4)	
cis-1,2-Dichloroethene	U (0.126)	U (0.126)	U (0.126)	U (1.26)	U (3.15)	U (3.15)	U (0.4)	U (4)	U (4)	
Ethyl Benzene	191 (2.74)	21.9 (0.137)	147 (3.43)	112 (1.37)	219 (3.43)	101 (3.43)	240 (2)	320 (4)	160 (4)	
n-Hexane	U (0.749)	U (0.749)	11.5 (0.749)	---	U (18.7)	U (18.7)	---	---	---	
Iodomethane	2.19 B J (0.554)	U (0.554)	U (0.554)	---	U (13.9)	U (13.9)	---	---	---	
4-Methyl-2-pentanone	2.78 J (0.478)	1.94 J (0.478)	2.6 J (0.478)	U (4.78)	U (12)	U (12)	U (2)	U (20)	U (20)	
Methylcyclohexane	---	---	---	17.8 (6.6)	---	---	26 (0.4)	17 J (4)	37 J (4)	
Methylene Chloride	U (0.43)	U (0.43)	U (0.43)	U (4.3)	U (10.7)	U (10.7)	U (0.4)	U (4)	U (4)	
Naphthalene	---	28.4 (0.174)	67.8 (0.174)	---	45.9 J (4.35)	30.8 J (4.35)	9.4 (0.4)	9.1 (4)	12 (4)	
Diisopropyl ether	U (0.105)	U (0.105)	U (0.105)	---	U (2.63)	U (2.63)	---	---	---	
n-Propylbenzene	21.1 (0.0993)	2.81 (0.0993)	23.5 (0.0993)	---	16.9 (2.48)	6.98 J (2.48)	---	---	---	
Styrene	U (0.118)	U (0.118)	U (0.118)	U (1.18)	U (2.95)	U (2.95)	U (0.41)	U (4.1)	U (4.1)	
Toluene	6.45 (0.278)	1.5 (0.278)	4.04 (0.278)	U (2.78)	U (6.95)	U (6.95)	25 (0.4)	42 (4)	15 (4)	
1,1,2-Trichloroethane	U (0.158)	U (0.158)	U (0.158)	U (1.58)	U (3.95)	U (3.95)	U (0.4)	U (4)	U (4)	
1,2,3-Trimethylbenzene	248 (2.08)	199 (0.104)	261 (2.6)	---	207 (2.6)	158 (2.6)	---	---	---	
1,2,4-Trimethylbenzene	613 (6.44)	266 (3.22)	656 (8.05)	---	500 (8.05)	383 (8.05)	---	---	---	
1,3,5-Trimethylbenzene	83.3 (0.104)	26.5 (0.104)	91.5 (0.104)	---	26.1 (2.6)	24.6 (2.6)	---	---	---	
Vinyl Acetate	U (0.692)	U (0.692)	U (0.692)	---	U (17.3)	U (17.3)	---	---	---	
ortho-xylene	---	---	---	---	---	---	16 (0.4)	20 (4)	5.7 (4)	
Xylenes (total)	987 (3.48)	535 (0.174)	987 (4.35)	488 (1.74)	754 (4.35)	603 (4.35)	290 (0.4)	280 (4)	61 (4)	

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

Location Field Sample ID Lab Sample ID Sample Method Sample Date Comments	MW-041S CMR-MW-415-231207 L1685777-03 Low Flow 12/7/2023	MW-041S CMR-MW-41S-240228 L1710780-01 Low Flow 2/28/2024	MW-041S CMR-MW-41S-240606 L1744765-01 Low Flow 6/6/2024	MW-041S CMR-MW041S-240716 L1757374-06 Low Flow 7/16/2024	MW-041S CMR-MW-41S-240912 L1777686-01 Low Flow 9/12/2024	MW-041S CMR-MW-415-241204 L1806484-02 Low Flow 12/4/2024	MW-105 CMR-MW105-08052020 VH07016-001 Low Flow 8/5/2020	MW-105 CMR-MW105-200827 VH28044-018 Low Flow 8/27/2020	MW-105 CMR-MW105-210223 WB25040-009 Low Flow 2/23/2021
SVOC									
Acenaphthene	1.07 (0.019)	0.347 J (0.0886)	0.554 J (0.0886)	0.834 (0.019)	0.504 J (0.0886)	0.374 J (0.0886)	---	U (0.2)	0.065 J (0.04)
Acenaphthylene	U (0.0171)	U (0.0921)	U (0.0921)	U (0.0171)	U (0.0921)	U (0.0921)	---	U (0.2)	U (0.04)
Benzo(a)anthracene	U (0.0203)	U (0.199)	U (0.199)	U (0.0203)	U (0.199)	U (0.199)	---	U (0.2)	U (0.04)
Benzo(a)pyrene	U (0.0184)	U (0.0381)	U (0.0381)	U (0.0184)	U (0.0381)	U (0.0381)	---	U (0.35)	U (0.07)
Benzo(b)fluoranthene	U (0.0168)	U (0.13)	U (0.13)	U (0.0168)	U (0.13)	U (0.13)	---	U (0.2)	U (0.04)
Benzo(g,h,i)perylene	U (0.0184)	U (0.121)	U (0.121)	U (0.0184)	U (0.121)	U (0.121)	---	U (0.2)	U (0.04)
1,1-Biphenyl	---	---	---	---	---	---	---	---	---
bis(2-Ethylhexyl)phthalate	U (0.895)	U (0.895)	U (0.895)	U (0.895)	U (0.895)	U (0.895)	---	U (2.5)	U (0.5)
Chrysene	U (0.0179)	U (0.13)	U (0.13)	U (0.0179)	U (0.13)	U (0.13)	---	U (0.15)	U (0.03)
Dibenzofuran	0.55 J (0.097)	0.193 J (0.097)	U (0.097)	U (0.097)	0.31 J (0.097)	U (0.097)	---	U (2.5)	U (0.5)
Diethylphthalate	U (0.287)	U (0.287)	U (0.287)	U (0.287)	2.61 J (0.287)	2.13 J (0.287)	---	U (2.5)	U (0.5)
2,4-Dimethylphenol	15.8 (0.0636)	16 J3 (0.0636)	8.34 J (0.0636)	5.03 J (0.0636)	6.19 J (0.0636)	6.17 J (0.0636)	---	U (2.4)	1.1 (0.48)
Di-n-butylphthalate	U (0.453)	U (0.453)	U (0.453)	U (0.453)	0.462 (0.453)	U (0.453)	---	U (2.5)	U (0.5)
Fluoranthene	U (0.027)	U (0.102)	U (0.102)	U (0.027)	U (0.102)	U (0.102)	---	U (0.5)	U (0.1)
Fluorene	1.45 (0.0169)	0.511 J (0.0844)	0.82 J (0.0844)	1.06 (0.0169)	0.761 J (0.0844)	0.531 J (0.0844)	---	U (0.15)	0.15 J (0.03)
Indeno(1,2,3-cd)pyrene	U (0.0158)	U (0.279)	U (0.279)	U (0.0158)	U (0.279)	U (0.279)	---	U (0.2)	U (0.04)
1-Methylnaphthalene	31 (0.0687)	---	---	18 (0.0687)	---	---	---	---	---
2-Methylnaphthalene	28.4 (0.0674)	7.41 (0.117)	16.2 (0.117)	5.38 (0.0674)	15.3 (0.117)	11.7 (0.117)	---	0.77 J (0.2)	2.4 (0.04)
2-Methylphenol	U (0.0929)	UJ3 (0.0929)	U (0.0929)	U (0.0929)	U (0.0929)	U (0.0929)	---	U (1.1)	0.24 J (0.21)
Naphthalene	50.6 (0.0917)	13 (0.159)	24.4 (0.159)	22.8 (0.0917)	25.3 (0.159)	20.1 (0.159)	---	6.6 (0.25)	6.1 (0.05)
Phenanthrene	0.592 (0.018)	0.257 J (0.112)	0.582 J (0.112)	0.542 (0.018)	0.527 J (0.112)	0.283 J (0.112)	---	U (0.3)	0.088 J (0.06)
Phenol	4.95 J (4.33)	U (4.33)	4.65 J (4.33)	U (4.33)	5.72 J (4.33)	U (4.33)	---	U (2.5)	3.4 (0.5)
Pyrene	0.0504 (0.0169)	U (0.107)	U (0.107)	U (0.0169)	U (0.107)	U (0.107)	---	U (0.5)	U (0.1)
MTDEQ VPH									
C5-C8 Aliphatics (Unadjusted)	<u>1410 (33.3)</u>	<u>782 (33.3)</u>	<u>1260 (33.3)</u>	<u>1850 (33.3)</u>	<u>1420 (33.3)</u>	<u>1690 (33.3)</u>	---	---	---
C5-C8 Aliphatics	<u>869 (33.3)</u>	582 (33.3)	<u>903 (33.3)</u>	<u>1440 (33.3)</u>	<u>846 (33.3)</u>	<u>1240 (33.3)</u>	<u>1600 (15)</u>	<u>880 (75)</u>	<u>1800 (75)</u>
C9-C12 Aliphatics (Unadjusted)	<u>3560 (33.3)</u>	2240 (33.3)	<u>4050 (33.3)</u>	2760 (33.3)	<u>3040 (33.3)</u>	2450 (33.3)	---	---	---
C9-C12 Aliphatics	2380 (33.3)	1680 (33.3)	2920 (33.3)	2160 (33.3)	2070 (33.3)	1750 (33.3)	180 (15)	200 J (75)	210 J (75)
C9-C10 Aromatics (Unadjusted)	<u>1180 (33.3)</u>	720 (33.3)	<u>1380 (33.3)</u>	<u>1940 (33.3)</u>	922 (33.3)	<u>1450 (33.3)</u>	---	---	---
C9-C10 Aromatics	---	---	---	---	---	---	530 (5)	650 (25)	350 (25)
Gasoline Range Organics (C5-C12)	---	---	---	6550 (66.7)	---	---	---	---	---
Volatile Petroleum Hydrocarbons	6150 (66.7)	3740 (66.7)	6690 (66.7)	---	5380 (66.7)	7220 (66.7)	2800 (35)	2700 (180)	2300 (180)
Benzene	---	---	---	---	---	---	180 (2.6)	300 (2.6)	250 (2.6)
Ethyl Benzene	---	---	---	---	---	---	230 (3.1)	380 (3.1)	150 (3.1)
Toluene	---	---	---	---	---	---	30 (0.53)	35 (2.7)	14 J (2.7)
Naphthalene	---	---	---	---	---	---	9.2 (0.7)	15 J (3.5)	15 J (3.5)
m,p-xylene	---	---	---	---	---	---	240 (1.2)	330 (6)	45 (6)
ortho-xylene	---	---	---	---	---	---	19 (0.58)	17 J (2.9)	4.2 J (2.9)
Xylenes (total)	---	---	---	---	---	---	504 (6)	347 (6)	49.2 (6)
MTDEQ EPH									
C9-C18 Aliphatic Hydrocarbons	U (200)	U (200)	U (200)	---	314 J (200)	336 J (209)	---	U (480)	---
C19-C36 Aliphatics (Unadjusted)	U (200)	U (200)	U (200)	UJ (200)	U (200)	U (176)	---	---	---
C19-C36 Aliphatics	---	---	---	---	---	---	---	740 (480)	---
C11 through C22 Aromatic Hydrocarbons (Unadjusted)	813 (200)	569 J (200)	405 J (200)	389 J (200)	453 J (200)	720 J (148)	---	---	---
C11-C22 Aromatics	700 (200)	548 J (200)	363 J (200)	341 J (200)	411 J (200)	687 J (600)	---	U (480)	---
EPH (Frac)	---	---	---	---	---	---	---	880 J (480)	---
Petroleum Hydrocarbons (Total)	700 (200)	548 J (200)	363 J (200)	341 J (200)	725 (200)	1020 J (600)	---	---	---
Petroleum Hydrocarbons (Extractable)	6840 (100)	---	---	5500 (100)	---	---	---	1900 (950)	470 (240)
Total Petroleum Hydrocarbons (GC/FID)	---	---	363 J (200)	---	---	1020 J (600)	---	---	---
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS	813 (200)	569 J (200)	405 J (200)	389 J (200)	767 (200)	1060 J (600)	---	---	---

Notes:

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

Abbreviations:

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

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

Location Field Sample ID Lab Sample ID Sample Method Sample Date Comments	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105
	CMR-MW105S-211006	CMR-MW105-220317	MW105-GW-220622	CMR-MW105-220831	CMR-MW105-220831	CMR-MW-105-221213-L1569525	CMR-MW-105-221213-L1569525	CMR-MW-105-221213-L1569525	CMR-MW-105-230321	CMR-MW-105-230321	CMR-MW-105-230321
	WJ08015-002	XC21009-003	XF23073-003	L1533605-01	XI01059-001	L1569525-01	XL14017-001	XL14017-001	L1597587-01	YC22023-001	YC22023-001
	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow
	10/6/2021	3/17/2022	6/22/2022	8/31/2022	8/31/2022	12/13/2022	12/13/2022	12/13/2022	3/21/2023	3/21/2023	3/21/2023
VOC											
m,p-xylene	41 (0.4)	6.7 (0.4)	28 (0.4)	---	12 (0.4)	---	0.57 (0.4)	---	---	3.6 (0.4)	---
Acetone	58 H (20)	6.8 J (4)	U (4)	---	77 (4)	---	8 J (4)	---	---	U (4)	---
Benzene	250 H (2)	25 (0.4)	110 (0.4)	---	85 (0.4)	---	2.1 (0.4)	---	---	12 (0.4)	---
Bromoform	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)	---	---	U (0.4)	---
2-Butanone	17 (2)	U (2)	3 J (2)	---	U (2)	---	U (2)	---	---	U (2)	---
n-Butylbenzene	---	---	---	---	---	---	---	---	---	---	---
sec-Butylbenzene	---	---	---	---	---	---	---	---	---	---	---
tert-Butylbenzene	---	---	---	---	---	---	---	---	---	---	---
Carbon Disulfide	HU (2)	U (0.4)	1.4 (0.4)	---	0.55 (0.4)	---	5.8 (0.4)	---	---	U (0.4)	---
Chloroform	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)	---	---	U (0.4)	---
Chloromethane	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)	---	---	U (0.4)	---
Cumene	2.4 (0.4)	U (0.4)	2.9 (0.4)	---	0.67 (0.4)	---	U (0.4)	---	---	U (0.4)	---
Cyclohexane	59 (0.4)	3 (0.4)	50 (0.4)	---	26 (0.4)	---	3.4 (0.4)	---	---	6.6 (0.4)	---
p-Cymene	---	---	---	---	---	---	---	---	---	---	---
1,1-Dichloroethane	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)	---	---	U (0.4)	---
cis-1,2-Dichloroethene	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)	---	---	U (0.4)	---
Ethyl Benzene	150 (0.4)	20 (0.4)	200 (0.4)	---	120 (0.4)	---	7.9 (0.4)	---	---	21 (0.4)	---
n-Hexane	---	---	---	---	---	---	---	---	---	---	---
Iodomethane	---	---	---	---	---	---	---	---	---	---	---
4-Methyl-2-pentanone	U (2)	U (2)	U (2)	---	U (2)	---	U (2)	---	---	U (2)	---
Methylcyclohexane	25 (0.4)	0.85 J (0.4)	14 (0.4)	---	8.1 (0.4)	---	0.91 J (0.4)	---	---	1.7 J (0.4)	---
Methylene Chloride	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)	---	---	U (0.4)	---
Naphthalene	8.5 (0.4)	0.86 (0.4)	4.9 (0.4)	---	4.9 (0.4)	---	U (0.4)	---	---	0.57 (0.4)	---
Diisopropyl ether	---	---	---	---	---	---	---	---	---	---	---
n-Propylbenzene	---	---	---	---	---	---	---	---	---	---	---
Styrene	U (0.41)	U (0.41)	U (0.41)	---	U (0.41)	---	U (0.41)	---	---	U (0.41)	---
Toluene	14 (0.4)	2 (0.4)	12 (0.4)	---	9.9 (0.4)	---	U (0.4)	---	---	1.5 (0.4)	---
1,1,2-Trichloroethane	U (0.4)	U (0.4)	U (0.4)	---	0.51 (0.4)	---	U (0.4)	---	---	U (0.4)	---
1,2,3-Trimethylbenzene	---	---	---	---	---	---	---	---	---	---	---
1,2,4-Trimethylbenzene	---	---	---	---	---	---	---	---	---	---	---
1,3,5-Trimethylbenzene	---	---	---	---	---	---	---	---	---	---	---
Vinyl Acetate	---	---	---	---	---	---	---	---	---	---	---
ortho-xylene	3.8 (0.4)	2.3 (0.4)	3.9 (0.4)	---	3.9 (0.4)	---	0.44 J (0.4)	---	---	0.57 (0.4)	---
Xylenes (total)	45 (0.4)	9 (0.4)	31 (0.4)	---	16 (0.4)	---	1 (0.4)	---	---	4.1 (0.4)	---

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

Location Field Sample ID Lab Sample ID Sample Method Sample Date Comments	MW-105 CMR-MW105S-211006 WJ08015-002 Low Flow 10/6/2021	MW-105 CMR-MW105-220317 XC21009-003 Low Flow 3/17/2022	MW-105 MW105-GW-220622 XF23073-003 Low Flow 6/22/2022	MW-105 CMR-MW105-220831 L1533605-01 Low Flow 8/31/2022	MW-105 CMR-MW105-220831 XI01059-001 Low Flow 8/31/2022	MW-105 CMR-MW-105-221213-L1569525 L1569525-01 Low Flow 12/13/2022	MW-105 CMR-MW-105-221213-L1569525 XL14017-001 Low Flow 12/13/2022	MW-105 CMR-MW-105-230321 L1597587-01 Low Flow 3/21/2023	MW-105 CMR-MW-105-230321 YC22023-001 Low Flow 3/21/2023
SVOC									
Acenaphthene	U (0.4)	U (0.04)	U (0.25)	---	U (0.8)	---	U (0.2)	---	U (0.2)
Acenaphthylene	U (0.4)	U (0.04)	U (0.25)	---	U (0.8)	---	U (0.2)	---	U (0.2)
Benzo(a)anthracene	U (0.4)	U (0.04)	U (0.25)	---	U (0.8)	---	U (0.2)	---	U (0.2)
Benzo(a)pyrene	U (0.7)	U (0.07)	U (0.44)	---	U (0.8)	---	U (0.2)	---	U (0.2)
Benzo(b)fluoranthene	U (0.4)	U (0.04)	U (0.25)	---	U (0.8)	---	U (0.2)	---	U (0.2)
Benzo(g,h,i)perylene	U (0.4)	U (0.04)	U (0.25)	---	U (0.8)	---	U (0.2)	---	U (0.2)
1,1-Biphenyl	---	---	---	---	U (4.2)	---	U (1.1)	---	U (1.1)
bis(2-Ethylhexyl)phthalate	U (20)	U (2)	U (13)	---	U (30)	---	U (7.5)	---	U (7.5)
Chrysene	U (0.3)	U (0.03)	U (0.19)	---	U (0.19)	---	U (0.2)	---	U (0.2)
Dibenzofuran	U (5)	U (0.5)	U (3.1)	---	U (3.2)	---	U (0.8)	---	U (0.8)
Diethylphthalate	U (5)	U (0.5)	U (3.1)	---	U (3.8)	---	U (0.95)	---	U (0.95)
2,4-Dimethylphenol	U (4.8)	0.63 J (0.48)	U (3)	---	37 (3)	---	U (0.75)	---	U (0.75)
Di-n-butylphthalate	U (5)	U (0.5)	U (3.1)	---	U (8.4)	---	U (2.1)	---	U (2.1)
Fluoranthene	U (1)	U (0.1)	U (0.63)	---	U (0.8)	---	U (0.2)	---	U (0.2)
Fluorene	U (0.3)	U (0.03)	U (0.19)	---	U (0.8)	---	U (0.2)	---	U (0.2)
Indeno(1,2,3-cd)pyrene	U (0.4)	U (0.04)	U (0.25)	---	U (0.8)	---	U (0.2)	---	U (0.2)
1-Methylnaphthalene	---	---	---	---	1.3 J (0.8)	---	U (0.2)	---	U (0.2)
2-Methylnaphthalene	U (0.4)	U (0.04)	U (0.25)	---	1.9 J (0.8)	---	U (0.2)	---	U (0.2)
2-Methylphenol	U (2.1)	U (0.21)	U (1.3)	---	U (4.2)	---	U (1.1)	---	U (1.1)
Naphthalene	3.1 (0.5)	0.42 (0.05)	2.1 (0.31)	---	1.5 J (0.8)	---	U (0.2)	---	0.23 J (0.2)
Phenanthrene	U (0.6)	U (0.06)	U (0.38)	---	U (0.8)	---	U (0.2)	---	U (0.2)
Phenol	U (5)	U (0.5)	U (3.1)	---	U (3.8)	---	U (0.95)	---	U (0.95)
Pyrene	U (1)	U (0.1)	U (0.63)	---	U (0.8)	---	U (0.2)	---	U (0.2)
MTDEQ VPH									
C5-C8 Aliphatics (Unadjusted)	---	---	---	650 (33.3)	---	63.9 J (33.3)	---	178 (33.3)	---
C5-C8 Aliphatics	1200 (75)	150 (15)	830 (15)	517 (33.3)	---	63.9 J (33.3)	---	162 (33.3)	---
C9-C12 Aliphatics (Unadjusted)	---	---	---	240 B (33.3)	---	U (33.3)	---	106 (33.3)	---
C9-C12 Aliphatics	130 (15)	21 J (15)	37 J (15)	140 B (33.3)	---	U (33.3)	---	67.5 J (33.3)	---
C9-C10 Aromatics (Unadjusted)	---	---	---	158 (33.3)	---	51 J (33.3)	---	U (33.3)	---
C9-C10 Aromatics	300 (5)	52 (5)	150 (5)	---	---	---	---	---	---
Gasoline Range Organics (C5-C12)	---	---	---	---	---	---	---	280 (66.7)	---
Volatile Petroleum Hydrocarbons	1900 (180)	240 (35)	1100 (35)	1050 (66.7)	---	146 J (66.7)	---	284 (66.7)	---
Benzene	220 (2.6)	20 (0.51)	86 (0.51)	---	---	---	---	---	---
Ethyl Benzene	160 (0.62)	21 (0.62)	100 (0.62)	---	---	---	---	---	---
Toluene	14 (0.53)	1.8 J (0.53)	8.2 (0.53)	---	---	---	---	---	---
Naphthalene	11 (0.7)	0.99 J (0.7)	3.3 BJ (0.7)	---	---	---	---	---	---
m,p-xylene	44 (1.2)	7.9 (1.2)	21 (1.2)	---	---	---	---	---	---
ortho-xylene	4.9 J (0.58)	2.5 J (0.58)	4 J (0.58)	---	---	---	---	---	---
Xylenes (total)	93.1 (6)	10.4 (1.2)	25 (1.2)	---	---	---	---	---	---
MTDEQ EPH									
C9-C18 Aliphatic Hydrocarbons	---	---	---	---	---	---	---	---	---
C19-C36 Aliphatics (Unadjusted)	---	---	---	---	---	---	---	U (200)	---
C19-C36 Aliphatics	---	---	---	---	---	---	---	---	---
C11 through C22 Aromatic Hydrocarbons (Unadjusted)	---	---	---	---	---	---	---	U (200)	---
C11-C22 Aromatics	---	---	---	---	---	---	---	U (200)	---
EPH (Frac)	---	---	---	---	---	---	---	---	---
Petroleum Hydrocarbons (Total)	---	---	---	---	---	---	---	U (200)	---
Petroleum Hydrocarbons (Extractable)	---	---	---	---	---	---	---	374 (100)	---
Total Petroleum Hydrocarbons (GC/FID)	---	---	---	---	---	---	---	---	---
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS	---	---	---	---	---	---	---	U (200)	---

Notes:

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Abbreviations:

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

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

Location	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105	MW-105
Field Sample ID	CMR-MW-105-240623	CMR-MW-105-240623	CMR-MW-105-280623	CMR-MW-105-092023	CMR-MW-105-092023	CMR-MW-105-231207	CMR-MW-105-240228	CMR-MW-105-240606	CMR-MW105-240716	
Lab Sample ID	L1631460-02	YF29005-003	YF29005-002	L1658629-01	YI21013-001	L1685777-01	L1710780-02	L1744765-03	L1757374-16	
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	
Sample Date	6/27/2023	6/27/2023	6/28/2023	9/20/2023	9/20/2023	12/7/2023	2/28/2024	6/6/2024	7/16/2024	
Comments										
VOC										
m,p-xylene	---	4.7 (0.4)	---	---	U (20)	---	---	---	---	
Acetone	---	21 H (4)	---	---	U (200)	U (11.3)	UJ3 (11.3)	U (11.3)	U (11.3)	
Benzene	---	48 (0.4)	---	---	85 (20)	11.7 (0.0941)	3.91 (0.0941)	37.6 (0.0941)	8.4 (0.0941)	
Bromoform	---	U (0.4)	---	---	U (20)	U (0.129)	U (0.129)	U (0.129)	U (0.129)	
2-Butanone	---	3.2 J (2)	---	---	U (100)	U (1.19)	U (1.19)	U (1.19)	U (1.19)	
n-Butylbenzene	---	---	---	---	---	0.247 J (0.157)	U (0.157)	0.569 (0.157)	---	
sec-Butylbenzene	---	---	---	---	---	0.191 J (0.125)	U (0.125)	0.439 J (0.125)	---	
tert-Butylbenzene	---	---	---	---	---	U (0.127)	U (0.127)	U (0.127)	---	
Carbon Disulfide	---	U (0.4)	---	---	U (20)	0.197 J (0.0962)	U (0.0962)	U (0.0962)	U (0.0962)	
Chloroform	---	U (0.4)	---	---	U (20)	U (0.111)	U (0.111)	U (0.111)	U (0.111)	
Chloromethane	---	1.5 (0.4)	---	---	U (20)	U (0.96)	U (0.96)	U (0.96)	U (0.96)	
Cumene	---	0.72 (0.4)	---	---	U (20)	1.73 (0.105)	0.184 J (0.105)	2.52 (0.105)	0.518 (0.105)	
Cyclohexane	---	9.4 H (0.4)	---	---	96 (20)	---	---	---	3.68 (0.188)	
p-Cymene	---	---	---	---	---	0.165 J (0.12)	U (0.12)	0.366 J (0.12)	---	
1,1-Dichloroethane	---	U (0.4)	---	---	U (20)	U (0.1)	U (0.1)	U (0.1)	U (0.1)	
cis-1,2-Dichloroethene	---	U (0.4)	---	---	U (20)	U (0.126)	U (0.126)	U (0.126)	U (0.126)	
Ethyl Benzene	---	15 (0.4)	---	---	570 (20)	75 (0.137)	2.41 (0.137)	84.8 (0.137)	8.32 (0.137)	
n-Hexane	---	---	---	---	---	1.41 J (0.749)	U (0.749)	10.4 (0.749)	---	
Iodomethane	---	---	---	---	---	U (0.554)	U (0.554)	U (0.554)	---	
4-Methyl-2-pentanone	---	U (2)	---	---	U (100)	U (0.478)	U (0.478)	U (0.478)	U (0.478)	
Methylcyclohexane	---	3.8 J (0.4)	---	---	28 J (20)	---	---	---	1.3 (0.66)	
Methylene Chloride	---	U (0.4)	---	---	U (20)	U (0.43)	U (0.43)	U (0.43)	U (0.43)	
Naphthalene	---	1.5 (0.4)	---	---	U (20)	0.374 J (0.174)	U (0.174)	3.38 (0.174)	---	
Diisopropyl ether	---	---	---	---	---	U (0.105)	U (0.105)	U (0.105)	---	
n-Propylbenzene	---	---	---	---	---	5.33 (0.0993)	0.397 J (0.0993)	10.7 (0.0993)	---	
Styrene	---	U (0.41)	---	---	U (21)	U (0.118)	U (0.118)	U (0.118)	U (0.118)	
Toluene	---	2.2 (0.4)	---	---	20 J (20)	1.78 (0.278)	0.431 J (0.278)	3.83 (0.278)	1.05 (0.278)	
1,1,2-Trichloroethane	---	U (0.4)	---	---	U (20)	U (0.158)	U (0.158)	U (0.158)	U (0.158)	
1,2,3-Trimethylbenzene	---	---	---	---	---	1.1 (0.104)	0.198 J (0.104)	2.6 (0.104)	---	
1,2,4-Trimethylbenzene	---	---	---	---	---	2.33 (0.322)	0.351 J (0.322)	3.22 (0.322)	---	
1,3,5-Trimethylbenzene	---	---	---	---	---	U (0.104)	0.117 J (0.104)	0.332 J (0.104)	---	
Vinyl Acetate	---	---	---	---	---	U (0.692)	U (0.692)	U (0.692)	---	
ortho-xylene	---	1.2 (0.4)	---	---	U (20)	---	---	---	---	
Xylenes (total)	---	5.9 (0.4)	---	---	U (20)	2.43 (0.174)	0.59 J (0.174)	5.09 (0.174)	1.16 J (0.174)	

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

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-MW-105-240623	CMR-MW-105-240623	CMR-MW-105-280623	CMR-MW-105-092023	CMR-MW-105-092023	CMR-MW-105-092023	CMR-MW-105-231207	CMR-MW-105-240228	CMR-MW-105-240606	CMR-MW105-240716	CMR-MW105-240716
Lab Sample ID	L1631460-02	YF29005-003	YF29005-002	L1658629-01	YI21013-001	YI21013-001	L1685777-01	L1710780-02	L1744765-03	L1757374-16	L1757374-16
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	6 / 27 / 2023	6 / 27 / 2023	6 / 28 / 2023	9 / 20 / 2023	9 / 20 / 2023	9 / 20 / 2023	12 / 7 / 2023	2 / 28 / 2024	6 / 6 / 2024	7 / 16 / 2024	7 / 16 / 2024
Comments											
SVOC											
Acenaphthene	---	U (0.2)	---	---	U (0.2)	0.102 J (0.0886)	U (0.0886)	U (0.0886)	U (0.0886)	U (0.0886)	U (0.0886)
Acenaphthylene	---	U (0.2)	---	---	U (0.2)	U (0.0921)	U (0.0921)	U (0.0921)	U (0.0921)	U (0.0921)	U (0.0921)
Benzo(a)anthracene	---	U (0.2)	---	---	U (0.2)	U (0.199)	U (0.199)	U (0.199)	U (0.199)	U (0.199)	U (0.199)
Benzo(a)pyrene	---	U (0.2)	---	---	U (0.2)	U (0.0381)	U (0.0381)	U (0.0381)	U (0.0381)	U (0.0381)	U (0.0381)
Benzo(b)fluoranthene	---	U (0.2)	---	---	U (0.2)	U (0.13)	U (0.13)	U (0.13)	U (0.13)	U (0.13)	U (0.13)
Benzo(g,h,i)perylene	---	U (0.2)	---	---	U (0.2)	U (0.121)	U (0.121)	U (0.121)	U (0.121)	U (0.121)	U (0.121)
1,1-Biphenyl	---	U (1.1)	---	---	U (1.1)	---	---	---	---	---	---
bis(2-Ethylhexyl)phthalate	---	U (7.5)	---	---	U (7.5)	U (0.895)	1.87 B J (0.895)	U (0.895)	U (0.895)	U (0.895)	U (0.895)
Chrysene	---	U (0.2)	---	---	U (0.2)	U (0.13)	U (0.13)	U (0.13)	U (0.13)	U (0.13)	U (0.13)
Dibenzofuran	---	U (0.8)	---	---	U (0.8)	U (0.097)	U (0.097)	U (0.097)	U (0.097)	U (0.097)	U (0.097)
Diethylphthalate	---	U (0.95)	---	---	U (0.95)	0.309 J (0.287)	U (0.287)	U (0.287)	U (0.287)	U (0.287)	U (0.287)
2,4-Dimethylphenol	---	U (0.75)	---	---	31 (0.75)	3.08 J (0.0636)	UJ3 (0.0636)	U (0.0636)	U (0.0636)	U (0.0636)	U (0.0636)
Di-n-butylphthalate	---	U (2.1)	---	---	U (2.1)	U (0.453)	U (0.453)	U (0.453)	U (0.453)	U (0.453)	U (0.453)
Fluoranthene	---	U (0.2)	---	---	U (0.2)	U (0.102)	U (0.102)	U (0.102)	U (0.102)	U (0.102)	U (0.102)
Fluorene	---	U (0.2)	---	---	U (0.2)	U (0.0844)	U (0.0844)	U (0.0844)	U (0.0844)	U (0.0844)	U (0.0844)
Indeno(1,2,3-cd)pyrene	---	U (0.2)	---	---	U (0.2)	U (0.279)	U (0.279)	U (0.279)	U (0.279)	U (0.279)	U (0.279)
1-Methylnaphthalene	---	0.73 J (0.2)	---	---	4 (0.2)	---	---	---	---	---	---
2-Methylnaphthalene	---	0.31 J (0.2)	---	---	0.29 J (0.2)	U (0.117)	U (0.117)	0.299 J (0.117)	U (0.117)	U (0.117)	U (0.117)
2-Methylphenol	---	U (1.1)	---	---	U (1.1)	U (0.0929)	UJ3 (0.0929)	U (0.0929)	U (0.0929)	U (0.0929)	U (0.0929)
Naphthalene	---	0.91 (0.2)	---	---	4 (0.2)	0.293 J (0.159)	0.27 J (0.159)	2.15 (0.159)	U (0.159)	U (0.159)	U (0.159)
Phenanthrene	---	U (0.2)	---	---	U (0.2)	U (0.112)	U (0.112)	U (0.112)	U (0.112)	U (0.112)	U (0.112)
Phenol	---	1.2 J (0.95)	---	---	3.3 J (0.95)	U (4.33)	U (4.33)	U (4.33)	U (4.33)	U (4.33)	U (4.33)
Pyrene	---	U (0.2)	---	---	U (0.2)	U (0.107)	U (0.107)	U (0.107)	U (0.107)	U (0.107)	U (0.107)
MTDEQ VPH											
C5-C8 Aliphatics (Unadjusted)	1050 (33.3)	---	---	1580 (33.3)	---	523 (33.3)	U (33.3)	668 (33.3)	117 (33.3)	117 (33.3)	117 (33.3)
C5-C8 Aliphatics	969 (33.3)	---	---	1490 (33.3)	---	510 (33.3)	U (33.3)	664 (33.3)	108 (33.3)	108 (33.3)	108 (33.3)
C9-C12 Aliphatics (Unadjusted)	377 (33.3)	---	---	955 (33.3)	---	231 (33.3)	U (33.3)	211 (33.3)	49.7 J (33.3)	49.7 J (33.3)	49.7 J (33.3)
C9-C12 Aliphatics	117 (33.3)	---	---	396 (33.3)	---	154 (33.3)	U (33.3)	205 (33.3)	40.2 J (33.3)	40.2 J (33.3)	40.2 J (33.3)
C9-C10 Aromatics (Unadjusted)	185 (33.3)	---	---	375 (33.3)	---	70.6 J (33.3)	U (33.3)	56.5 J (33.3)	U (33.3)	U (33.3)	U (33.3)
C9-C10 Aromatics	---	---	---	---	---	---	---	---	---	---	---
Gasoline Range Organics (C5-C12)	1520 (66.7)	---	---	2880 (66.7)	---	---	---	---	---	---	167 J (66.7)
Volatile Petroleum Hydrocarbons	1610 (66.7)	---	---	2910 (66.7)	---	825 (66.7)	U (66.7)	936 (66.7)	---	---	---
Benzene	---	---	---	---	---	---	---	---	---	---	---
Ethyl Benzene	---	---	---	---	---	---	---	---	---	---	---
Toluene	---	---	---	---	---	---	---	---	---	---	---
Naphthalene	---	---	---	---	---	---	---	---	---	---	---
m,p-xylene	---	---	---	---	---	---	---	---	---	---	---
ortho-xylene	---	---	---	---	---	---	---	---	---	---	---
Xylenes (total)	---	---	---	---	---	---	---	---	---	---	---
MTDEQ EPH											
C9-C18 Aliphatic Hydrocarbons	---	---	---	---	---	---	---	U (200)	U (200)	---	---
C19-C36 Aliphatics (Unadjusted)	U (200)	---	---	U (200)	---	---	411 J (200)	U (200)	U (200)	---	---
C19-C36 Aliphatics	---	---	---	---	---	---	---	---	---	---	---
C11 through C22 Aromatic Hydrocarbons (Unadjusted)	UJ3 (200)	---	---	U (200)	---	---	---	U (200)	U (200)	---	---
C11-C22 Aromatics	U (200)	---	---	U (200)	---	---	---	U (200)	U (200)	---	---
EPH (Frac)	---	---	---	---	---	---	---	---	---	---	---
Petroleum Hydrocarbons (Total)	U (200)	---	---	U (200)	---	---	411 J (200)	U (200)	U (200)	---	---
Petroleum Hydrocarbons (Extractable)	638 (100)	---	---	843 (100)	---	---	---	---	---	332 (100)	---
Total Petroleum Hydrocarbons (GC/FID)	---	---	---	---	---	---	---	---	U (200)	---	---
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS	U (200)	---	---	U (200)	---	---	411 J (200)	U (200)	U (200)	---	---

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() -- Reporting Detection Limit.
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Calumet Montana Refining; Great Falls, MT

Location	MW-105	MW-105	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106
Field Sample ID	CMR-MW-105-240912	CMR-MW-105-241205	CMR-MW106-211005	CMR-MW106-220316	MW106-GW-220622	CMR-MW106-220831	CMR-MW106-220831	CMR-MW106-220831	CMR-MW-106-221213-L1569525	CMR-MW-106-221213-L1569525	
Lab Sample ID	L1777686-03	L1806680-01	WJ08009-001	XC21009-001	XF23073-002	L1533605-02	XI01059-002	L1569525-02	L1569525-02	XL14017-002	
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	Low Flow	
Sample Date	9/12/2024	12/5/2024	10/5/2021	3/16/2022	6/22/2022	8/31/2022	8/31/2022	8/31/2022	12/13/2022	12/13/2022	
Comments											
VOC											
m,p-xylene	---	---	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
Acetone	UJ4 (11.3)	31.6 (11.3)	6.9 J (4)	U (4)	U (4)	---	U (4)	---	14 (4)		
Benzene	39.4 (0.0941)	22.9 (0.0941)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
Bromoform	U (0.129)	U (0.129)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	0.96 (0.4)		
2-Butanone	U (1.19)	U (1.19)	U (2)	U (2)	U (2)	---	U (2)	---	U (2)		
n-Butylbenzene	U (0.157)	0.269 J (0.157)	---	---	---	---	---	---	---		
sec-Butylbenzene	0.733 (0.125)	0.311 J (0.125)	---	---	---	---	---	---	---		
tert-Butylbenzene	U (0.127)	U (0.127)	---	---	---	---	---	---	---		
Carbon Disulfide	U (0.0962)	U (0.0962)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	4.2 (0.4)		
Chloroform	U (0.111)	U (0.111)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
Chloromethane	U (0.96)	3.13 (0.96)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
Cumene	7.53 (0.105)	1.31 (0.105)	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)		
p-Cymene	1 (0.12)	0.226 J (0.12)	---	---	---	---	---	---	---		
1,1-Dichloroethane	0.873 (0.1)	U (0.1)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
cis-1,2-Dichloroethene	U (0.126)	U (0.126)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
Ethyl Benzene	406 (1.37)	32.5 (0.137)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
n-Hexane	U (0.749)	9.32 (0.749)	---	---	---	---	---	---	---		
Iodomethane	U (0.554)	U (0.554)	---	---	---	---	---	---	---		
4-Methyl-2-pentanone	0.811 J (0.478)	U (0.478)	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)		
Methylene Chloride	U (0.43)	U (0.43)	0.47 J (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
Naphthalene	2.18 J (0.174)	1.76 J (0.174)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
Diisopropyl ether	U (0.105)	U (0.105)	---	---	---	---	---	---	---		
n-Propylbenzene	29.7 (0.0993)	3.91 (0.0993)	---	---	---	---	---	---	---		
Styrene	U (0.118)	U (0.118)	U (0.41)	U (0.41)	U (0.41)	---	U (0.41)	---	U (0.41)		
Toluene	8 (0.278)	2.65 (0.278)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
1,1,2-Trichloroethane	0.223 J (0.158)	U (0.158)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
1,2,3-Trimethylbenzene	5.19 (0.104)	1.12 (0.104)	---	---	---	---	---	---	---		
1,2,4-Trimethylbenzene	4.9 (0.322)	2.67 (0.322)	---	---	---	---	---	---	---		
1,3,5-Trimethylbenzene	0.198 J (0.104)	U (0.104)	---	---	---	---	---	---	---		
Vinyl Acetate	U (0.692)	3.23 J (0.692)	---	---	---	---	---	---	---		
ortho-xylene	---	---	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		
Xylenes (total)	9.85 (0.174)	4.09 (0.174)	U (0.4)	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)		

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

Location	MW-105	MW-105	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106
Field Sample ID	CMR-MW-105-240912	CMR-MW-105-241205	CMR-MW106-211005	CMR-MW106-220316	MW106-GW-220622	CMR-MW106-220831	CMR-MW106-220831	CMR-MW106-220831	CMR-MW-106-221213-L1569525	CMR-MW-106-221213-L1569525	MW-106
Lab Sample ID	L1777686-03	L1806680-01	WJ08009-001	XC21009-001	XF23073-002	L1533605-02	X101059-002	L1569525-02	L1569525-02	XL14017-002	MW-106
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	9/12/2024	12/5/2024	10/5/2021	3/16/2022	6/22/2022	8/31/2022	8/31/2022	8/31/2022	12/13/2022	12/13/2022	Low Flow
Comments											Low Flow
SVOC											
Acenaphthene	U (0.0886)	U (0.0886)	U (0.04)	U (0.04)	U (0.2)	---	U (0.04)	---	U (0.2)		
Acenaphthylene	U (0.0921)	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 (0.199)	U (0.04)	0.084 J (0.04)	U (0.2)	---	U (0.04)	---	U (0.2)		
Benzo(a)pyrene	U (0.0381)	U (0.0381)	U (0.07)	0.17 J (0.07)	U (0.35)	---	U (0.04)	---	U (0.2)		
Benzo(b)fluoranthene	U (0.13)	U (0.13)	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 (0.121)	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 (0.895)	U (1)	U (2)	U (10)	---	2 BJ (1.5)	---	U (7.5)		
Chrysene	U (0.13)	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 (0.097)	U (0.5)	U (0.5)	U (2.5)	---	U (0.16)	---	U (0.8)		
Diethylphthalate	U (0.287)	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 (0.0636)	U (0.48)	U (0.48)	U (2.4)	---	U (0.15)	---	U (0.75)		
Di-n-butylphthalate	U (0.453)	U (0.453)	U (0.5)	U (0.5)	U (2.5)	---	U (0.42)	---	U (2.1)		
Fluoranthene	U (0.102)	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 (0.0844)	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 (0.279)	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	0.278 J (0.117)	U (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 (0.0929)	U (0.21)	U (0.21)	U (1.1)	---	U (0.21)	---	U (1.1)		
Naphthalene	1.75 (0.159)	0.226 J (0.159)	U (0.05)	U (0.05)	U (0.25)	---	0.045 J (0.04)	---	U (0.2)		
Phenanthrene	U (0.112)	U (0.112)	U (0.06)	U (0.06)	U (0.3)	---	U (0.04)	---	U (0.2)		
Phenol	U (4.33)	U (4.33)	U (0.5)	U (0.5)	U (2.5)	---	U (0.19)	---	U (0.95)		
Pyrene	U (0.107)	U (0.107)	U (0.1)	U (0.1)	U (0.5)	---	U (0.04)	---	U (0.2)		
MTDEQ VPH											
C5-C8 Aliphatics (Unadjusted)	986 (33.3)	495 (33.3)	---	---	---	153 (33.3)	---	80 J (33.3)	---		
C5-C8 Aliphatics	978 (33.3)	469 (33.3)	U (15)	U (15)	U (15)	153 (33.3)	---	80 J (33.3)	---		
C9-C12 Aliphatics (Unadjusted)	513 (33.3)	98.5 J (33.3)	---	---	---	36 B J (33.3)	---	U (33.3)	---		
C9-C12 Aliphatics	97.2 (33.3)	61.9 J (33.3)	U (15)	U (15)	U (15)	36 B J (33.3)	---	U (33.3)	---		
C9-C10 Aromatics (Unadjusted)	106 (33.3)	40.5 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	1610 (66.7)	634 (66.7)	U (35)	U (35)	U (35)	189 J (66.7)	---	108 J (66.7)	---		
Benzene	---	---	U (0.51)	U (0.51)	U (0.51)	---	---	---	---		
Ethyl Benzene	---	---	U (0.62)	U (0.62)	U (0.62)	---	---	---	---		
Toluene	---	---	U (0.53)	U (0.53)	U (0.53)	---	---	---	---		
Naphthalene	---	---	U (0.7)	U (0.7)	U (0.7)	---	---	---	---		
m,p-xylene	---	---	U (1.2)	U (1.2)	U (1.2)	---	---	---	---		
ortho-xylene	---	---	U (0.58)	U (0.58)	U (0.58)	---	---	---	---		
Xylenes (total)	---	---	U (1.2)	U (1.2)	U (1.2)	---	---	---	---		
MTDEQ EPH											
C9-C18 Aliphatic Hydrocarbons	U (200)	U (209)	---	---	U (100)	---	---	---	---		
C19-C36 Aliphatics (Unadjusted)	U (200)	253 J (176)	---	---	---	---	---	UQ (200)	---		
C19-C36 Aliphatics	---	---	---	---	U (100)	---	---	---	---		
C11 through C22 Aromatic Hydrocarbons (Unadjusted)	U (200)	U (148)	---	---	---	---	---	UQ (200)	---		
C11-C22 Aromatics	U (200)	U (600)	---	---	U (100)	---	---	UQ (200)	---		
EPH (Frac)	---	---	---	---	U (100)	---	---	UQ (100)	---		
Petroleum Hydrocarbons (Total)	U (200)	U (600)	---	---	---	---	---	UQ (200)	---		
Petroleum Hydrocarbons (Extractable)	---	---	U (200)	U (200)	U (200)	U (100)	---	---	---		
Total Petroleum Hydrocarbons (GC/FID)	---	---	---	---	---	---	---	---	---		
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS	U (200)	U (600)	---	---	---	---	---	UQ (200)	---		

Notes:

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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.
5 Concentrations that exceed the USEPA Regional Screening Levels - Resident Tapwater are grey shaded.

Abbreviations:

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

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

	Location	MW-106	MW-106
	Field Sample ID	CMR-DS1-221213	CMR-MW-106-230321
	Lab Sample ID	XL14017-004	L1597587-02
	Sample Method	Low Flow	Low Flow
	Sample Date	12 / 13 / 2022	3 / 21 / 2023
	Comments	Field Duplicate	
VOC			
	m,p-xylene	U (0.4)	---
	Acetone	12 (4)	---
	Benzene	U (0.4)	---
	Bromoform	U (0.4)	---
	2-Butanone	U (2)	---
	n-Butylbenzene	---	---
	sec-Butylbenzene	---	---
	tert-Butylbenzene	---	---
	Carbon Disulfide	3.2 (0.4)	---
	Chloroform	U (0.4)	---
	Chloromethane	U (0.4)	---
	Cumene	U (0.4)	---
	Cyclohexane	2.6 (0.4)	---
	p-Cymene	---	---
	1,1-Dichloroethane	U (0.4)	---
	cis-1,2-Dichloroethene	U (0.4)	---
	Ethyl Benzene	U (0.4)	---
	n-Hexane	---	---
	Iodomethane	---	---
	4-Methyl-2-pentanone	U (2)	---
	Methylcyclohexane	1.1 J (0.4)	---
	Methylene Chloride	0.49 J (0.4)	---
	Naphthalene	U (0.4)	---
	Diisopropyl ether	---	---
	n-Propylbenzene	---	---
	Styrene	U (0.41)	---
	Toluene	U (0.4)	---
	1,1,2-Trichloroethane	U (0.4)	---
	1,2,3-Trimethylbenzene	---	---
	1,2,4-Trimethylbenzene	---	---
	1,3,5-Trimethylbenzene	---	---
	Vinyl Acetate	---	---
	ortho-xylene	U (0.4)	---
	Xylenes (total)	U (0.4)	---

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

Location		MW-106	MW-106
Field Sample ID		CMR-DS1-221213	CMR-MW-106-230321
Lab Sample ID		XL14017-004	L1597587-02
Sample Method		Low Flow	Low Flow
Sample Date		12 / 13 / 2022	3 / 21 / 2023
Comments		Field Duplicate	
SVOC			
	Acenaphthene	---	---
	Acenaphthylene	---	---
	Benzo(a)anthracene	---	---
	Benzo(a)pyrene	---	---
	Benzo(b)fluoranthene	---	---
	Benzo(g,h,i)perylene	---	---
	1,1-Biphenyl	---	---
	bis(2-Ethylhexyl)phthalate	---	---
	Chrysene	---	---
	Dibenzofuran	---	---
	Diethylphthalate	---	---
	2,4-Dimethylphenol	---	---
	Di-n-butylphthalate	---	---
	Fluoranthene	---	---
	Fluorene	---	---
	Indeno(1,2,3-cd)pyrene	---	---
	1-Methylnaphthalene	---	---
	2-Methylnaphthalene	---	---
	2-Methylphenol	---	---
	Naphthalene	---	---
	Phenanthrene	---	---
	Phenol	---	---
	Pyrene	---	---
MTDEQ VPH			
	C5-C8 Aliphatics (Unadjusted)	---	U (33.3)
	C5-C8 Aliphatics	---	U (33.3)
	C9-C12 Aliphatics (Unadjusted)	---	U (33.3)
	C9-C12 Aliphatics	---	U (33.3)
	C9-C10 Aromatics (Unadjusted)	---	U (33.3)
	C9-C10 Aromatics	---	---
	Gasoline Range Organics (C5-C12)	---	U (66.7)
	Volatile Petroleum Hydrocarbons	---	U (66.7)
	Benzene	---	---
	Ethyl Benzene	---	---
	Toluene	---	---
	Naphthalene	---	---
	m,p-xylene	---	---
	ortho-xylene	---	---
	Xylenes (total)	---	---
MTDEQ EPH			
	C9-C18 Aliphatic Hydrocarbons	---	---
	C19-C36 Aliphatics (Unadjusted)	---	U (222)
	C19-C36 Aliphatics	---	---
	C11 through C22 Aromatic Hydrocarbons (Unadjusted)	---	U (222)
	C11-C22 Aromatics	---	U (222)
	EPH (Frac)	---	---
	Petroleum Hydrocarbons (Total)	---	U (222)
	Petroleum Hydrocarbons (Extractable)	---	U (111)
	Total Petroleum Hydrocarbons (GC/FID)	---	---
	UNADJUSTED TOTAL PETROLEUM HYDROCARBONS	---	U (222)

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TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

Location	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106	MW-106
Field Sample ID	CMR-MW-106-230321	CMR-DUP-1-230321	CMR-MW-106-280623	CMR-MW-106-280623	CMR-MW-106-092023	CMR-MW-106-092023	CMR-MW-106-092023	CMR-MW-106-231207	CMR-MW-106-240228	CMR-MW-106-240606
Lab Sample ID	YC22023-002	YC22023-004	L1631460-01	YF29005-001	L1658629-02	YI21013-002	L1685777-02	L1710780-03	L1744765-04	
Sample Method	Low Flow	Low Flow	Low Flow	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	6/28/2023	9/20/2023	9/20/2023	12/7/2023	2/28/2024	6/6/2024	
Comments	Field Duplicate									
VOC										
m,p-xylene	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)	---	---	---	---
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)	
1,1-Dichloroethane	U (0.4)	U (0.4)	---	U (0.4)	---	U (0.4)	U (0.1)	U (0.1)	U (0.1)	
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)	---	U (0.174)	0.354 J (0.174)	
Diisopropyl ether	---	---	---	---	---	---	U (0.105)	U (0.105)	U (0.105)	
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)	
Vinyl Acetate	---	---	---	---	---	---	U (0.692)	U (0.692)	U (0.692)	
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)	

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

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-MW-106-230321	CMR-DUP-1-230321	CMR-MW-106-280623	CMR-MW-106-280623	CMR-MW-106-092023	CMR-MW-106-092023	CMR-MW-106-092023	CMR-MW-106-231207	CMR-MW-106-240228	CMR-MW-106-240606	CMR-MW-106-240606
Lab Sample ID	YC22023-002	YC22023-004	L1631460-01	YF29005-001	L1658629-02	YI21013-002	L1685777-02	L1710780-03	L1744765-04		
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	3 / 21 / 2023	3 / 21 / 2023	6 / 28 / 2023	6 / 28 / 2023	9 / 20 / 2023	9 / 20 / 2023	12 / 7 / 2023	2 / 28 / 2024	6 / 6 / 2024		
Comments		Field Duplicate									
SVOC											
Acenaphthene	U (0.2)	---	---	U (0.2)	---	U (0.2)	U (0.019)	U (0.0886)	U (0.0886)		
Acenaphthylene	U (0.2)	---	---	U (0.2)	---	U (0.2)	0.133 (0.0171)	U (0.0921)	U (0.0921)		
Benzo(a)anthracene	U (0.2)	---	---	U (0.2)	---	U (0.2)	U (0.0203)	U (0.199)	U (0.199)		
Benzo(a)pyrene	U (0.2)	---	---	U (0.2)	---	U (0.2)	U (0.0184)	U (0.0381)	U (0.0381)		
Benzo(b)fluoranthene	U (0.2)	---	---	U (0.2)	---	U (0.2)	U (0.0168)	U (0.13)	U (0.13)		
Benzo(g,h,i)perylene	U (0.2)	---	---	U (0.2)	---	U (0.2)	U (0.0184)	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 (0.0179)	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 (0.027)	U (0.102)	U (0.102)		
Fluorene	U (0.2)	---	---	U (0.2)	---	U (0.2)	U (0.0169)	U (0.0844)	U (0.0844)		
Indeno(1,2,3-cd)pyrene	U (0.2)	---	---	U (0.2)	---	U (0.2)	U (0.0158)	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)	0.0866 J (0.0674)	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)	0.129 J (0.0917)	U (0.159)	U (0.159)		
Phenanthrene	U (0.2)	---	---	U (0.2)	---	U (0.2)	U (0.018)	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 (0.0169)	U (0.107)	U (0.107)		
MTDEQ VPH											
C5-C8 Aliphatics (Unadjusted)	---	---	85.9 J (33.3)	---	495 (33.3)	---	67.1 J (33.3)	U (333)	59.3 J (33.3)		
C5-C8 Aliphatics	---	---	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 (333)	U (33.3)		
C9-C12 Aliphatics	---	---	U (33.3)	---	U (33.3)	---	U (33.3)	U (333)	U (33.3)		
C9-C10 Aromatics (Unadjusted)	---	---	U (33.3)	---	38.4 J (33.3)	---	U (33.3)	U (333)	U (33.3)		
C9-C10 Aromatics	---	---	---	---	---	---	---	---	---		
Gasoline Range Organics (C5-C12)	---	---	108 J (66.7)	---	533 (66.7)	---	---	---	---		
Volatile Petroleum Hydrocarbons	---	---	85.9 J (66.7)	---	533 (66.7)	---	67.1 J (66.7)	U (667)	U (66.7)		
Benzene	---	---	---	---	---	---	---	---	---		
Ethyl Benzene	---	---	---	---	---	---	---	---	---		
Toluene	---	---	---	---	---	---	---	---	---		
Naphthalene	---	---	---	---	---	---	---	---	---		
m,p-xylene	---	---	---	---	---	---	---	---	---		
ortho-xylene	---	---	---	---	---	---	---	---	---		
Xylenes (total)	---	---	---	---	---	---	---	---	---		
MTDEQ EPH											
C9-C18 Aliphatic Hydrocarbons	---	---	---	---	---	---	U (200)	U (200)	U (200)		
C19-C36 Aliphatics (Unadjusted)	---	---	U (200)	---	U (200)	---	U (200)	U (200)	U (200)		
C19-C36 Aliphatics	---	---	---	---	---	---	---	---	---		
C11 through C22 Aromatic Hydrocarbons (Unadjusted)	---	---	UJ3 (200)	---	U (200)	---	U (200)	U (200)	U (200)		
C11-C22 Aromatics	---	---	U (200)	---	U (200)	---	U (200)	U (200)	U (200)		
EPH (Frac)	---	---	---	---	---	---	---	---	---		
Petroleum Hydrocarbons (Total)	---	---	U (200)	---	U (200)	---	U (200)	U (200)	U (200)		
Petroleum Hydrocarbons (Extractable)	---	---	1650 (100)	---	17000 (100)	---	5630 (100)	---	---		
Total Petroleum Hydrocarbons (GC/FID)	---	---	---	---	---	---	---	---	---		
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS	---	---	U (200)	---	U (200)	---	U (200)	U (200)	U (200)		

Notes:

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

Abbreviations:

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

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

	Location	MW-106	MW-106
	Field Sample ID	CMR-MW-106-240912	CMR-MW-106-241204
	Lab Sample ID	L1777686-02	L1806484-01
	Sample Method	Low Flow	Low Flow
	Sample Date	9 / 12 / 2024	12 / 4 / 2024
	Comments		
VOC			
	m,p-xylene	---	---
	Acetone	UJ4 (11.3)	U (11.3)
	Benzene	22.1 (0.0941)	27.6 (0.0941)
	Bromoform	U (0.129)	U (0.129)
	2-Butanone	U (1.19)	U (1.19)
	n-Butylbenzene	U (0.157)	U (0.157)
	sec-Butylbenzene	U (0.125)	U (0.125)
	tert-Butylbenzene	U (0.127)	U (0.127)
	Carbon Disulfide	U (0.0962)	U (0.0962)
	Chloroform	U (0.111)	U (0.111)
	Chloromethane	U (0.96)	U (0.96)
	Cumene	U (0.105)	U (0.105)
	Cyclohexane	---	---
	p-Cymene	U (0.12)	U (0.12)
	1,1-Dichloroethane	U (0.1)	U (0.1)
	cis-1,2-Dichloroethene	U (0.126)	U (0.126)
	Ethyl Benzene	U (0.137)	U (0.137)
	n-Hexane	U (0.749)	U (0.749)
	Iodomethane	U (0.554)	U (0.554)
	4-Methyl-2-pentanone	0.509 J (0.478)	U (0.478)
	Methylcyclohexane	---	---
	Methylene Chloride	U (0.43)	U (0.43)
	Naphthalene	U (0.174)	U (0.174)
	Diisopropyl ether	0.205 J (0.105)	U (0.105)
	n-Propylbenzene	U (0.0993)	U (0.0993)
	Styrene	U (0.118)	U (0.118)
	Toluene	U (0.278)	U (0.278)
	1,1,2-Trichloroethane	U (0.158)	U (0.158)
	1,2,3-Trimethylbenzene	U (0.104)	U (0.104)
	1,2,4-Trimethylbenzene	U (0.322)	U (0.322)
	1,3,5-Trimethylbenzene	U (0.104)	U (0.104)
	Vinyl Acetate	U (0.692)	U (0.692)
	ortho-xylene	---	---
	Xylenes (total)	U (0.174)	U (0.174)

TABLE 7
Summary of Groundwater Sampling Results
Calumet Montana Refining; Great Falls, MT

Location Field Sample ID Lab Sample ID Sample Method Sample Date Comments	MW-106 CMR-MW-106-240912 L1777686-02 Low Flow 9/12/2024	MW-106 CMR-MW-106-241204 L1806484-01 Low Flow 12/4/2024
SVOC		
Acenaphthene	U (0.0886)	U (0.0886)
Acenaphthylene	U (0.0921)	U (0.0921)
Benzo(a)anthracene	U (0.199)	U (0.199)
Benzo(a)pyrene	U (0.0381)	U (0.0381)
Benzo(b)fluoranthene	U (0.13)	U (0.13)
Benzo(g,h,i)perylene	U (0.121)	U (0.121)
1,1-Biphenyl	---	---
bis(2-Ethylhexyl)phthalate	U (0.895)	U (0.895)
Chrysene	U (0.13)	U (0.13)
Dibenzofuran	U (0.097)	U (0.097)
Diethylphthalate	U (0.287)	U (0.287)
2,4-Dimethylphenol	U (0.0636)	U (0.0636)
Di-n-butylphthalate	U (0.453)	U (0.453)
Fluoranthene	U (0.102)	U (0.102)
Fluorene	U (0.0844)	U (0.0844)
Indeno(1,2,3-cd)pyrene	U (0.279)	U (0.279)
1-Methylnaphthalene	---	---
2-Methylnaphthalene	U (0.117)	U (0.117)
2-Methylphenol	U (0.0929)	U (0.0929)
Naphthalene	0.177 J (0.159)	U (0.159)
Phenanthrene	U (0.112)	U (0.112)
Phenol	U (4.33)	U (4.33)
Pyrene	U (0.107)	U (0.107)
MTDEQ VPH		
C5-C8 Aliphatics (Unadjusted)	102 (33.3)	163 (33.3)
C5-C8 Aliphatics	79.9 (33.3)	135 (33.3)
C9-C12 Aliphatics (Unadjusted)	47 J (33.3)	U (33.3)
C9-C12 Aliphatics	47 J (33.3)	U (33.3)
C9-C10 Aromatics (Unadjusted)	U (33.3)	U (33.3)
C9-C10 Aromatics	---	---
Gasoline Range Organics (C5-C12)	---	---
Volatile Petroleum Hydrocarbons	149 J (66.7)	194 J (66.7)
Benzene	---	---
Ethyl Benzene	---	---
Toluene	---	---
Naphthalene	---	---
m,p-xylene	---	---
ortho-xylene	---	---
Xylenes (total)	---	---
MTDEQ EPH		
C9-C18 Aliphatic Hydrocarbons	U (200)	U (69.6)
C19-C36 Aliphatics (Unadjusted)	U (200)	U (58.5)
C19-C36 Aliphatics	---	---
C11 through C22 Aromatic Hydrocarbons (Unadjusted)	U (200)	U (49.2)
C11-C22 Aromatics	U (200)	U (200)
EPH (Frac)	---	---
Petroleum Hydrocarbons (Total)	U (200)	U (200)
Petroleum Hydrocarbons (Extractable)	---	---
Total Petroleum Hydrocarbons (GC/FID)	---	U (200)
UNADJUSTED TOTAL PETROLEUM HYDROCARBONS	U (200)	U (200)

Notes:
1 All concentrations are presented in ug/L.
2 Only compounds with at least one detection are shown.
3 Concentrations that exceed the Montana DEQ-7 Human Health Standards - Groundwater are **boldfaced**.
4 Concentrations that exceed the Montana DEQ Tier 1 Groundwater RBSLs are underlined.
5 Concentrations that exceed the USEPA Regional Screening Levels - Resident Tapwater are grey shaded.
Abbreviations:
B -- Blank Contamination.
H -- Compound analyzed outside holding time
J -- Estimated Concentration.
Q -- Sample prepared past holding time, concentrations should be considered minimum values.
U -- Not Detected.
() -- 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	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	CMR-MW-41S-240912	CMR-MW-41S-241204	
Sample Method	Low Flow	Low Flow	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	9/12/2024	12/4/2024	

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	1.37	1.31
Dissolved Oxygen	0.00	5.65	2.99	0.00	8.56	0.76	8.16	0.00	0.00	0.13	1.55	0.46	0.20
Oxidation Reduction Potential	-93	-40	-123	-127	-139	-149	-26	-147	-78	-93.2	152.2	-110.7	-84.2
pH (Field Analysis)	7.22	5.32	7	6.34	7.17	7.24	6.22	7.18	7.99	6.97	7.1	6.85	7.02
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	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	CMR-MW-105-240912	CMR-MW-105-241204
Sample Method	Low Flow	Low Flow	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	9/12/2024	12/4/2024

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	1.57	1.68
Dissolved Oxygen	0.00	0.00	1.81	0.00	0.00	4.20	8.25	6.31	0.00	2.84	0.6	0.69	0.64
Oxidation Reduction Potential	-107	-81	-113	-53	49	121	144	98	-44	96.7	-78.3	-27.5	39.5
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	7.18	7.20
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	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	CMR-MW-106-240912	CMR-MW-106-241204
Sample Method	Low Flow	Low Flow	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	9/12/2024	12/4/2024

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	1.7	1.56
Dissolved Oxygen	0.00	0.02	0.85	0.00	8.16	2.90	9.03	0.00	0.00	0.41	1.00	0.1	0.15
Oxidation Reduction Potential	13	14	17	34	31	39	47	-127	-79	-96.2	-117.6	-118.5	-97.2
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	7.07	7.28
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 - Natural Attenuation Parameters
Calumet Montana Refining; Great Falls, MT

Location	Montana DEQ-7 Human Health Standards - Groundwater	Montana DEQ Tier 1 Groundwater RBSLs	USEPA Regional Screening Levels - Resident Tapwater	MW-041S CMR-MW-41S-240606 L1744765-01 Low Flow 6/6/2024	MW-041S CMR-MW-415-241204 L1806484-02 Low Flow 12/4/2024
Field Sample ID					
Lab Sample ID					
Sample Method					
Sample Date					
Comments					
Attenuation Parameters					
Alkalinity [mg CaCO3 / L]				---	---
BIOCHEMICAL OXYGEN DEMAND, FIVE DAY				---	---
Biological Oxygen Demand				41100 (33300)	17300 (10000)
Carbon Dioxide				87900 T8 (6670)	135000 T8 (6670)
Methane				5180 (2.91)	6080 (5.1)
Iron (total)			14000	3670 (18)	3840 (22.6)
Iron (dissolved)			14000	4110 (18)	4080 (22.6)
Manganese (total)			430	1860 (0.934)	1730 (0.7)
Manganese (dissolved)			430	2250 (0.934)	1810 (7)
Nitrate	10000		32000	229 Q (48)	U (88.4)
Nitrate (as N)				---	---
Sulfate				19500 (594)	U (637)

- Notes:**
- 1 All concentrations are presented in ug/L except where indicated.
 - 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.
 - 5 Concentrations that exceed the USEPA Regional Screening Levels - Resident Tapwater are grey shaded.

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

TABLE 9
Summary of Groundwater Analytical Results - Natural Attenuation Parameters
Calumet Montana Refining; Great Falls, MT

Location	MW-105	MW-105	MW-105	MW-105
Field Sample ID	MW105-GW-220622	CMR-MW-105-280623	CMR-MW-105-240606	CMR-MW-105-241205
Lab Sample ID	XF23073-003	YF29005-002	L1744765-03	L1806680-01
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	6/22/2022	6/28/2023	6/6/2024	12/5/2024
Comments				
Attenuation Parameters				
Alkalinity [mg CaCO3 / L]	---	---	---	---
BIOCHEMICAL OXYGEN DEMAND, FIVE DAY	---	---	---	---
Biological Oxygen Demand	---	---	U (3330)	U (3330)
Carbon Dioxide	---	---	81000 T8 (6670)	87600 (6670)
Methane	55 B (2.5)	56 (2.5)	371 (2.91)	374 (5.1)
Iron (total)	---	---	135 B (18)	---
Iron (dissolved)	---	---	99.4 J (18)	978 (22.6)
Manganese (total)	---	---	562 (0.934)	---
Manganese (dissolved)	---	---	422 (0.934)	525 (0.7)
Nitrate	---	---	204 Q (48)	368 (88.4)
Nitrate (as N)	---	U (25)	---	---
Sulfate	---	100000 (250)	70800 J6 (594)	73800 (637)

- Notes:**
- 1 All concentrations are presented in ug/L except where indicated.
 - 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.
 - 5 Concentrations that exceed the USEPA Regional Screening Levels - Resident Tapwater are grey shaded.

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

TABLE 9
Summary of Groundwater Analytical Results - Natural Attenuation Parameters
Calumet Montana Refining; Great Falls, MT

Location	MW-106	MW-106	MW-106	MW-106
Field Sample ID	CMR-MW106-211005	MW106-GW-220622	CMR-MW-106-221213-L1569525	CMR-MW-106-280623
Lab Sample ID	WJ08009-001	XF23073-002	XL14017-002	YF29005-001
Sample Method	Low Flow	Low Flow	Low Flow	Low Flow
Sample Date	10/5/2021	6/22/2022	12/13/2022	6/28/2023
Comments				
Attenuation Parameters				
Alkalinity [mg CaCO3 / L]	500 (20)	830 (20)	120 (20)	1000 (20)
BIOCHEMICAL OXYGEN DEMAND, FIVE DAY	13000 (180)	26000 7 (180)	U (180)	2800 (180)
Biological Oxygen Demand	---	---	---	---
Carbon Dioxide	470000 (27000)	810000 (27000)	110000 (27000)	960000 (27000)
Methane	5.8 J (2.5)	62 B (2.5)	110 (2.5)	71 (2.5)
Iron (total)	65 B (13)	15 J (13)	130 (13)	1300 B (130)
Iron (dissolved)	36 J (13)	130 J (130)	U (13)	1200 (130)
Manganese (total)	1400 (13)	880 (1.3)	1700 (13)	2700 (13)
Manganese (dissolved)	1400 (13)	890 (13)	1500 (13)	2800 (13)
Nitrate	---	---	---	---
Nitrate (as N)	210000 (500)	4700 B (5)	750 H (50)	12000 H (25)
Sulfate	2900000 (25000)	210000 (13000)	140000 (250)	410000 (1300)

- Notes:**
- 1 All concentrations are presented in ug/L except where indicated.
 - 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.
 - 5 Concentrations that exceed the USEPA Regional Screening Levels - Resident Tapwater are grey shaded.

Abbreviations:

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

TABLE 9
Summary of Groundwater Analytical Results - Natural Attenuation Parameters
Calumet Montana Refining; Great Falls, MT

Location	MW-106	MW-106	MW-106
Field Sample ID	CMR-MW-106-231207	CMR-MW-106-240606	CMR-MW-106-241204
Lab Sample ID	L1685777-02	L1744765-04	L1806484-01
Sample Method	Low Flow	Low Flow	Low Flow
Sample Date	12/7/2023	6/6/2024	12/4/2024
Comments			
Attenuation Parameters			
Alkalinity [mg CaCO3 / L]	---	---	---
BIOCHEMICAL OXYGEN DEMAND, FIVE DAY	---	---	---
Biological Oxygen Demand	9610 (3330)	U (3330)	8890 (3330)
Carbon Dioxide	126000 BT8 (6670)	87000 T8 (6670)	90200 (6670)
Methane	252 (2.91)	818 (2.91)	2350 (5.1)
Iron (total)	3030 (28.1)	4040 (18)	3420 (22.6)
Iron (dissolved)	3180 (28.1)	4070 (18)	3550 (22.6)
Manganese (total)	2490 (0.704)	2210 (0.934)	1920 (0.7)
Manganese (dissolved)	2700 (0.704)	2290 (0.934)	1970 (7)
Nitrate	480 (48)	U (48)	U (88.4)
Nitrate (as N)	---	---	---
Sulfate	129000 (594)	62900 (594)	80800 (637)

- Notes:**
- 1 All concentrations are presented in ug/L except where indicated.
 - 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.
 - 5 Concentrations that exceed the USEPA Regional Screening Levels - Resident Tapwater are grey shaded.

Abbreviations:

B -- Blank Contamination.
H -- Compound analyzed outside holding time
J -- Estimated Concentration.
Q -- Sample prepared past holding time, concentrations should be considered minimum values.
T8 -- Samples received past holding time.
U -- Not Detected.
() -- 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 A1

DUAL-PHASE EXTRACTION VAPOR ANALYTICAL RESULTS

Pace Project Numbers:

L1792745, L1802448, L1811174

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1792745
Samples Received: 10/25/2024
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 National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 mydata.pacelabs.com

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

SAMPLE SUMMARY

CMR-SP301-241024 L1792745-01 Air

Collected by

Collected date/time

Received date/time

10/24/24 13:03

10/25/24 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2390441	1	10/27/24 22:05	10/27/24 22:05	GH	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2392532	50	10/31/24 01:25	10/31/24 01:25	DAH	Mt. Juliet, TN

¹Cp ${}^2\text{Tc}$ 3S_s ${}^4\text{Cn}$ ^{87}Sr ${}^6\text{Qc}$

GI

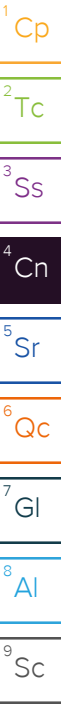
 ${}^8\text{Al}$ ⁹Sc

CASE NARRATIVE

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



Kelly Mercer
Project Manager



Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	1.25	2.97	ND	ND		1	WG2390441
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG2390441
Benzene	71-43-2	78.10	10.0	31.9	117	374		50	WG2392532
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG2390441
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG2390441
Bromoform	75-25-2	253	0.600	6.21	ND	ND		1	WG2390441
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG2390441
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG2390441
Carbon disulfide	75-15-0	76.10	0.400	1.24	ND	ND		1	WG2390441
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG2390441
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG2390441
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG2390441
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG2390441
Chloromethane	74-87-3	50.50	0.200	0.413	0.462	0.954		1	WG2390441
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG2390441
Cyclohexane	110-82-7	84.20	10.0	34.4	173	596		50	WG2392532
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG2390441
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG2390441
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG2390441
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG2390441
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG2390441
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG2390441
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG2390441
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG2390441
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG2390441
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG2390441
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG2390441
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG2390441
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG2390441
1,4-Dioxane	123-91-1	88.10	0.630	2.27	ND	ND		1	WG2390441
Ethanol	64-17-5	46.10	2.50	4.71	32.5	61.3		1	WG2390441
Ethylbenzene	100-41-4	106	0.200	0.867	18.7	81.1		1	WG2390441
4-Ethyltoluene	622-96-8	120	0.200	0.982	2.63	12.9		1	WG2390441
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	0.227	1.28		1	WG2390441
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.468	2.31		1	WG2390441
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG2390441
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG2390441
Heptane	142-82-5	100	10.0	40.9	98.9	404		50	WG2392532
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG2390441
n-Hexane	110-54-3	86.20	31.5	111	2110	7440		50	WG2392532
Isopropylbenzene	98-82-8	120.20	0.200	0.983	0.694	3.41		1	WG2390441
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG2390441
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG2390441
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	2.31	6.81		1	WG2390441
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	17.0	69.6		1	WG2390441
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG2390441
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG2390441
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG2390441
2-Propanol	67-63-0	60.10	1.25	3.07	ND	ND		1	WG2390441
Propene	115-07-1	42.10	1.25	2.15	5.18	8.92		1	WG2390441
Styrene	100-42-5	104	0.400	1.70	ND	ND		1	WG2390441
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG2390441
Tetrachloroethylene	127-18-4	166	0.200	1.36	ND	ND		1	WG2390441
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG2390441
Toluene	108-88-3	92.10	0.500	1.88	7.74	29.2		1	WG2390441
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND	J4	1	WG2390441

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG2390441
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG2390441
Trichloroethylene	79-01-6	131	0.200	1.07	ND	ND		1	WG2390441
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	5.96	29.3		1	WG2390441
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	6.47	31.8		1	WG2390441
2,2,4-Trimethylpentane	540-84-1	114.22	10.0	46.7	1660	7750		50	WG2392532
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG2390441
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG2390441
Vinyl acetate	108-05-4	86.10	0.630	2.22	ND	ND		1	WG2390441
Xylenes, Total	1330-20-7	106.16	0.600	2.61	98.6	428		1	WG2390441
m&p-Xylene	179601-23-1	106	0.400	1.73	85.6	371		1	WG2390441
o-Xylene	95-47-6	106	0.200	0.867	13.0	56.4		1	WG2390441
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		131				WG2390441
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		103				WG2392532

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4139154-3 10/27/24 10:13

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

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4139154-3 10/27/24 10:13

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
Xylenes, Total	U		0.135	0.600
m&p-Xylene	U		0.135	0.400
o-Xylene	U		0.0828	0.200
(S) 1,4-Bromofluorobenzene	88.3			60.0-140

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R4139154-1 10/27/24 09:11 • (LCSD) R4139154-2 10/27/24 09:43

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	3.74	3.66	99.7	97.6	70.0-130			2.16	25
Allyl chloride	3.75	3.50	3.35	93.3	89.3	70.0-130			4.38	25
Benzyl Chloride	3.75	2.87	2.78	76.5	74.1	70.0-152			3.19	25
Bromodichloromethane	3.75	3.96	3.87	106	103	70.0-130			2.30	25
Bromoform	3.75	4.05	3.96	108	106	70.0-130			2.25	25
Bromomethane	3.75	4.13	4.02	110	107	70.0-130			2.70	25
1,3-Butadiene	3.75	3.81	3.72	102	99.2	70.0-130			2.39	25
Carbon disulfide	7.50	8.46	8.18	113	109	70.0-130			3.37	25
Carbon tetrachloride	3.75	3.65	3.55	97.3	94.7	70.0-130			2.78	25

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

(LCS) R4139154-1 10/27/24 09:11 • (LCSD) R4139154-2 10/27/24 09:43

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Chlorobenzene	3.75	3.71	3.67	98.9	97.9	70.0-130			1.08	25
Chloroethane	3.75	4.01	3.87	107	103	70.0-130			3.55	25
Chloroform	3.75	3.76	3.69	100	98.4	70.0-130			1.88	25
Chloromethane	3.75	3.97	3.83	106	102	70.0-130			3.59	25
2-Chlorotoluene	3.75	3.60	3.59	96.0	95.7	70.0-130			0.278	25
Dibromochloromethane	3.75	3.93	3.81	105	102	70.0-130			3.10	25
1,2-Dibromoethane	3.75	3.75	3.65	100	97.3	70.0-130			2.70	25
1,2-Dichlorobenzene	3.75	3.61	3.49	96.3	93.1	70.0-130			3.38	25
1,3-Dichlorobenzene	3.75	3.59	3.51	95.7	93.6	70.0-130			2.25	25
1,4-Dichlorobenzene	3.75	3.53	3.42	94.1	91.2	70.0-130			3.17	25
1,2-Dichloroethane	3.75	3.66	3.59	97.6	95.7	70.0-130			1.93	25
1,1-Dichloroethane	3.75	3.76	3.73	100	99.5	70.0-130			0.801	25
1,1-Dichloroethene	3.75	3.86	3.75	103	100	70.0-130			2.89	25
cis-1,2-Dichloroethene	3.75	3.59	3.53	95.7	94.1	70.0-130			1.69	25
trans-1,2-Dichloroethene	3.75	3.96	3.84	106	102	70.0-130			3.08	25
1,2-Dichloropropane	3.75	3.90	3.83	104	102	70.0-130			1.81	25
cis-1,3-Dichloropropene	3.75	3.08	3.12	82.1	83.2	70.0-130			1.29	25
trans-1,3-Dichloropropene	3.75	3.53	3.47	94.1	92.5	70.0-130			1.71	25
1,4-Dioxane	3.75	3.91	3.74	104	99.7	70.0-140			4.44	25
Ethanol	3.75	2.80	2.68	74.7	71.5	55.0-148			4.38	25
Ethylbenzene	3.75	3.59	3.52	95.7	93.9	70.0-130			1.97	25
4-Ethyltoluene	3.75	3.68	3.60	98.1	96.0	70.0-130			2.20	25
Trichlorofluoromethane	3.75	3.88	3.76	103	100	70.0-130			3.14	25
Dichlorodifluoromethane	3.75	3.96	3.79	106	101	64.0-139			4.39	25
1,1,2-Trichlorotrifluoroethane	3.75	4.11	3.98	110	106	70.0-130			3.21	25
1,2-Dichlorotetrafluoroethane	3.75	4.19	4.06	112	108	70.0-130			3.15	25
Hexachloro-1,3-butadiene	3.75	3.34	3.21	89.1	85.6	70.0-151			3.97	25
Isopropylbenzene	3.75	3.69	3.63	98.4	96.8	70.0-130			1.64	25
Methylene Chloride	3.75	3.64	3.51	97.1	93.6	70.0-130			3.64	25
Methyl Butyl Ketone	3.75	3.33	3.37	88.8	89.9	70.0-149			1.19	25
2-Butanone (MEK)	3.75	3.64	3.62	97.1	96.5	70.0-130			0.551	25
4-Methyl-2-pentanone (MIBK)	3.75	3.52	3.53	93.9	94.1	70.0-139			0.284	25
Methyl methacrylate	3.75	3.53	3.49	94.1	93.1	70.0-130			1.14	25
MTBE	3.75	3.41	3.31	90.9	88.3	70.0-130			2.98	25
Naphthalene	3.75	3.02	2.99	80.5	79.7	70.0-159			0.998	25
2-Propanol	3.75	3.49	3.49	93.1	93.1	70.0-139			0.000	25
Propene	3.75	3.62	3.54	96.5	94.4	64.0-144			2.23	25
Styrene	7.50	7.75	7.50	103	100	70.0-130			3.28	25
1,1,2,2-Tetrachloroethane	3.75	4.10	4.00	109	107	70.0-130			2.47	25
Tetrachloroethylene	3.75	3.63	3.53	96.8	94.1	70.0-130			2.79	25

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4139154-1 10/27/24 09:11 • (LCSD) R4139154-2 10/27/24 09:43

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Tetrahydrofuran	3.75	3.42	3.20	91.2	85.3	70.0-137			6.65	25
Toluene	3.75	3.64	3.50	97.1	93.3	70.0-130			3.92	25
1,2,4-Trichlorobenzene	3.75	2.61	2.60	69.6	69.3	70.0-160	J4	J4	0.384	25
1,1,1-Trichloroethane	3.75	3.56	3.45	94.9	92.0	70.0-130			3.14	25
1,1,2-Trichloroethane	3.75	3.87	3.76	103	100	70.0-130			2.88	25
Trichloroethylene	3.75	3.78	3.72	101	99.2	70.0-130			1.60	25
1,2,4-Trimethylbenzene	3.75	3.76	3.70	100	98.7	70.0-130			1.61	25
1,3,5-Trimethylbenzene	3.75	3.72	3.61	99.2	96.3	70.0-130			3.00	25
Vinyl chloride	3.75	3.96	3.94	106	105	70.0-130			0.506	25
Vinyl Bromide	3.75	4.07	3.94	109	105	70.0-130			3.25	25
Vinyl acetate	3.75	2.94	3.08	78.4	82.1	70.0-130			4.65	25
Xylenes, Total	11.3	11.3	11.1	100	98.2	70.0-130			1.79	25
m&p-Xylene	7.50	7.51	7.37	100	98.3	70.0-130			1.88	25
o-Xylene	3.75	3.81	3.72	102	99.2	70.0-130			2.39	25
(S) 1,4-Bromofluorobenzene				99.4	100	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4140106-3 10/30/24 17:35

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ppbv		ppbv	ppbv
Benzene	U		0.110	0.200
Cyclohexane	U		0.170	0.200
Heptane	U		0.114	0.200
n-Hexane	U		0.143	0.630
2,2,4-Trimethylpentane	U		0.0898	0.200
(S) 1,4-Bromofluorobenzene	102			60.0-140

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

(LCS) R4140106-1 10/30/24 16:39 • (LCSD) R4140106-2 10/30/24 17:08

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppbv	ppbv	ppbv	%	%	%			%	%
Benzene	3.75	3.68	3.57	98.1	95.2	70.0-130			3.03	25
Cyclohexane	3.75	3.99	3.82	106	102	70.0-130			4.35	25
Heptane	3.75	3.64	3.47	97.1	92.5	70.0-130			4.78	25
n-Hexane	3.75	3.87	3.73	103	99.5	70.0-130			3.68	25
2,2,4-Trimethylpentane	3.75	3.87	3.80	103	101	70.0-130			1.83	25
(S) 1,4-Bromofluorobenzene				101	101	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

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

Qualifier Description

J4	The associated batch QC was outside the established quality control range for accuracy.
----	---

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

ACCREDITATIONS & LOCATIONS

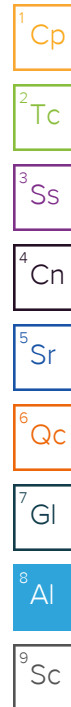
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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

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

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

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



Pace® Location Requested (City/State):		Air CHAIN-OF-CUSTODY Analytical Request Document Chain-of-Custody is a LEGAL DOCUMENT - Complete all relevant fields												
Company Name: Ramboll US Consulting, Inc. - Denver		Contact/Report To: Abby Small												
Street Address: 1999 Broadway Suite 2225 Denver, CO 80202		Phone #: 303-382-5474												
City, State Zip:		E-Mail: asmall@ramboll.com; rdeshpande@ramboll.com; eleis ter@ramboll.com; twvss@ramboll.com												
Customer Project #:		Cc E-Mail:												
Project Name: Monthyl GW Calumet - Great Falls, MT		Invoice to:												
Site Collection Info/Facility ID (as applicable): ENVIRONCO-CALU MONTH		Invoice E-Mail:												
Time Zone Collected: [] AK [] PT [] MT [] CT [] ET		Purchase Order # (if applicable):												
Data Deliverables: [] Level II [] Level III [] Level IV [] EQUIS [] Other		Quote #:												
Regulatory Program (CAA, RCRA, etc.) as applicable:		State origin of sample(s): Montana												
Rush (Pre-approval required): 2 Day 3 day 5 day Other		Units for Reporting: ug/m³ PPBV mg/m³ PPMV												
Date Results Requested:														
* 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	Start Pressure / Vacuum (in Hg)	End Pressure / Vacuum (in Hg)	Duration (minutes)	Flow Rate (m³/min or L/min)	Total Volume Sampled (m³ or L)	TO-15 Summa	Sample Comment
CMR-SP301-241024	0	022979	012873	10/24/24	12:59	10/24/24	13:03	27	2	4	.25	1		
Customer Remarks / Special Conditions / Possible Hazards:														
Collected By: Printed Name: Signature:														
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:														
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) Date/Time: FedEx UPS Other														
Relinquished by/Company: (Signature) Date/Time: Received by/Company: (Signature) Date/Time: Page: of:														

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1802448

Samples Received: 11/21/2024

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 National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 mydata.pacelabs.com

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		⁸ Al
		⁹ Sc

SAMPLE SUMMARY

CMR.SP301-241120 L1802448-01 Air

Collected by

Collected date/time

Received date/time

11/20/24 12:58

11/21/24 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2405838	1	11/21/24 23:03	11/21/24 23:03	DAH	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2407281	20	11/23/24 16:29	11/23/24 16:29	JAP	Mt. Juliet, TN

Cp

 ^{235}Tc ${}^3\text{Ss}$ ${}^4\text{Cn}$ ^{88}Sr

Qc

GI

Al

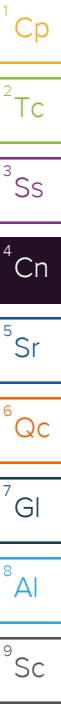
Sc

CASE NARRATIVE

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



Kelly Mercer
Project Manager



Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	1.25	2.97	ND	ND		1	WG2405838
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG2405838
Benzene	71-43-2	78.10	0.200	0.639	67.1	214		1	WG2405838
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG2405838
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG2405838
Bromoform	75-25-2	253	0.630	6.52	ND	ND		1	WG2405838
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG2405838
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG2405838
Carbon disulfide	75-15-0	76.10	0.400	1.24	ND	ND		1	WG2405838
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG2405838
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG2405838
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND		1	WG2405838
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG2405838
Chloromethane	74-87-3	50.50	0.200	0.413	0.302	0.624		1	WG2405838
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG2405838
Cyclohexane	110-82-7	84.20	4.00	13.8	113	389		20	WG2407281
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG2405838
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG2405838
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG2405838
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG2405838
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG2405838
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG2405838
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG2405838
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG2405838
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG2405838
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG2405838
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG2405838
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG2405838
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG2405838
1,4-Dioxane	123-91-1	88.10	0.630	2.27	ND	ND		1	WG2405838
Ethanol	64-17-5	46.10	2.50	4.71	14.0	26.4		1	WG2405838
Ethylbenzene	100-41-4	106	0.200	0.867	2.20	9.54		1	WG2405838
4-Ethyltoluene	622-96-8	120	0.200	0.982	0.283	1.39		1	WG2405838
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	0.209	1.17		1	WG2405838
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.483	2.39		1	WG2405838
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG2405838
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG2405838
Heptane	142-82-5	100	0.200	0.818	43.3	177		1	WG2405838
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG2405838
n-Hexane	110-54-3	86.20	12.6	44.4	146	515		20	WG2407281
Isopropylbenzene	98-82-8	120.20	0.200	0.983	ND	ND		1	WG2405838
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG2405838
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG2405838
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	ND	ND		1	WG2405838
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG2405838
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG2405838
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG2405838
Naphthalene	91-20-3	128	0.630	3.30	ND	ND		1	WG2405838
2-Propanol	67-63-0	60.10	1.25	3.07	1.40	3.44		1	WG2405838
Propene	115-07-1	42.10	1.25	2.15	2.35	4.05		1	WG2405838
Styrene	100-42-5	104	0.400	1.70	ND	ND		1	WG2405838
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG2405838
Tetrachloroethylene	127-18-4	166	0.200	1.36	ND	ND		1	WG2405838
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG2405838
Toluene	108-88-3	92.10	0.500	1.88	ND	ND		1	WG2405838
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND		1	WG2405838

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG2405838
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG2405838
Trichloroethylene	79-01-6	131	0.200	1.07	ND	ND		1	WG2405838
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	0.608	2.98		1	WG2405838
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	1.03	5.06		1	WG2405838
2,2,4-Trimethylpentane	540-84-1	114.22	4.00	18.7	1850	8640		20	WG2407281
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG2405838
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG2405838
Vinyl acetate	108-05-4	86.10	0.630	2.22	ND	ND		1	WG2405838
Xylenes, Total	1330-20-7	106.16	0.600	2.61	9.17	39.8		1	WG2405838
m&p-Xylene	179601-23-1	106	0.400	1.73	7.68	33.3		1	WG2405838
o-Xylene	95-47-6	106	0.200	0.867	1.49	6.46		1	WG2405838
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		110				WG2405838
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		97.8				WG2407281

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4148833-3 11/21/24 10:18

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Acetone	U		0.520	1.25
Allyl chloride	U		0.186	0.200
Benzene	U		0.110	0.200
Benzyl Chloride	U		0.0888	0.200
Bromodichloromethane	U		0.0695	0.200
Bromoform	U		0.0755	0.630
Bromomethane	U		0.0938	0.200
1,3-Butadiene	U		0.158	2.00
Carbon disulfide	U		0.160	0.400
Carbon tetrachloride	U		0.0746	0.200
Chlorobenzene	U		0.118	0.200
Chloroethane	U		0.110	0.200
Chloroform	U		0.104	0.200
Chloromethane	U		0.110	0.200
2-Chlorotoluene	U		0.0787	0.200
Dibromochloromethane	U		0.0696	0.200
1,2-Dibromoethane	U		0.0690	0.200
1,2-Dichlorobenzene	U		0.0734	0.200
1,3-Dichlorobenzene	U		0.0753	0.200
1,4-Dichlorobenzene	U		0.0768	0.200
1,2-Dichloroethane	U		0.0730	0.200
1,1-Dichloroethane	U		0.0710	0.200
1,1-Dichloroethene	U		0.0747	0.200
cis-1,2-Dichloroethene	U		0.0796	0.200
trans-1,2-Dichloroethene	U		0.0735	0.200
1,2-Dichloropropane	U		0.0752	0.200
cis-1,3-Dichloropropene	U		0.0743	0.200
trans-1,3-Dichloropropene	U		0.0795	0.200
1,4-Dioxane	U		0.164	0.630
Ethanol	U		2.37	2.50
Ethylbenzene	U		0.0778	0.200
4-Ethyltoluene	U		0.0887	0.200
Trichlorofluoromethane	U		0.0771	0.200
Dichlorodifluoromethane	U		0.0806	0.200
1,1,2-Trichlorotrifluoroethane	U		0.0751	0.200
1,2-Dichlorotetrafluoroethane	U		0.0756	0.200
Heptane	U		0.114	0.200
Hexachloro-1,3-butadiene	U		0.0800	0.630
Isopropylbenzene	U		0.0722	0.200
Methylene Chloride	U		0.169	0.200

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4148883-3 11/21/24 10:18

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Methyl Butyl Ketone	U		0.133	1.25
2-Butanone (MEK)	U		0.116	1.25
4-Methyl-2-pentanone (MIBK)	U		0.106	1.25
Methyl methacrylate	U		0.169	0.200
MTBE	U		0.0813	0.200
Naphthalene	U		0.617	0.630
2-Propanol	U		0.680	1.25
Propene	U		0.214	1.25
Styrene	U		0.0802	0.400
1,1,2,2-Tetrachloroethane	U		0.0695	0.200
Tetrachloroethylene	U		0.111	0.200
Tetrahydrofuran	U		0.164	0.200
Toluene	U		0.130	0.500
1,2,4-Trichlorobenzene	U		0.462	0.630
1,1,1-Trichloroethane	U		0.0718	0.200
1,1,2-Trichloroethane	U		0.0683	0.200
Trichloroethylene	U		0.0680	0.200
1,2,4-Trimethylbenzene	U		0.0927	0.200
1,3,5-Trimethylbenzene	U		0.0853	0.200
Vinyl chloride	U		0.0826	0.200
Vinyl Bromide	U		0.0749	0.200
Vinyl acetate	U		0.0968	0.630
Xylenes, Total	U		0.0887	0.600
m&p-Xylene	U		0.174	0.400
o-Xylene	U		0.0887	0.200
(S) 1,4-Bromofluorobenzene	96.2			60.0-140

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R4148883-1 11/21/24 09:22 • (LCSD) R4148883-2 11/21/24 09:51

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	3.65	3.69	97.3	98.4	70.0-130			1.09	25
Allyl chloride	3.75	3.66	3.72	97.6	99.2	70.0-130			1.63	25
Benzene	3.75	3.79	3.76	101	100	70.0-130			0.795	25
Benzyl Chloride	3.75	3.52	3.52	93.9	93.9	70.0-152			0.000	25
Bromodichloromethane	3.75	3.70	3.72	98.7	99.2	70.0-130			0.539	25
Bromoform	3.75	3.44	3.46	91.7	92.3	70.0-130			0.580	25
Bromomethane	3.75	3.77	3.88	101	103	70.0-130			2.88	25

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

(LCS) R4148883-1 11/21/24 09:22 • (LCSD) R4148883-2 11/21/24 09:51

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
1,3-Butadiene	3.75	3.74	3.77	99.7	101	70.0-130			0.799	25
Carbon disulfide	7.50	7.48	7.61	99.7	101	70.0-130			1.72	25
Carbon tetrachloride	3.75	3.83	3.83	102	102	70.0-130			0.000	25
Chlorobenzene	3.75	3.69	3.65	98.4	97.3	70.0-130			1.09	25
Chloroethane	3.75	3.82	3.71	102	98.9	70.0-130			2.92	25
Chloroform	3.75	3.85	3.91	103	104	70.0-130			1.55	25
Chloromethane	3.75	3.74	3.75	99.7	100	70.0-130			0.267	25
2-Chlorotoluene	3.75	3.84	3.98	102	106	70.0-130			3.58	25
Dibromochloromethane	3.75	3.64	3.64	97.1	97.1	70.0-130			0.000	25
1,2-Dibromoethane	3.75	3.85	3.86	103	103	70.0-130			0.259	25
1,2-Dichlorobenzene	3.75	3.67	3.74	97.9	99.7	70.0-130			1.89	25
1,3-Dichlorobenzene	3.75	3.73	3.82	99.5	102	70.0-130			2.38	25
1,4-Dichlorobenzene	3.75	3.75	3.73	100	99.5	70.0-130			0.535	25
1,2-Dichloroethane	3.75	3.86	3.84	103	102	70.0-130			0.519	25
1,1-Dichloroethane	3.75	3.90	3.91	104	104	70.0-130			0.256	25
1,1-Dichloroethene	3.75	3.83	3.87	102	103	70.0-130			1.04	25
cis-1,2-Dichloroethene	3.75	3.83	3.87	102	103	70.0-130			1.04	25
trans-1,2-Dichloroethene	3.75	3.81	3.82	102	102	70.0-130			0.262	25
1,2-Dichloropropane	3.75	3.83	3.87	102	103	70.0-130			1.04	25
cis-1,3-Dichloropropene	3.75	3.77	3.86	101	103	70.0-130			2.36	25
trans-1,3-Dichloropropene	3.75	3.83	3.86	102	103	70.0-130			0.780	25
1,4-Dioxane	3.75	3.73	3.57	99.5	95.2	70.0-140			4.38	25
Ethanol	3.75	3.77	3.77	101	101	55.0-148			0.000	25
Ethylbenzene	3.75	3.80	3.97	101	106	70.0-130			4.38	25
4-Ethyltoluene	3.75	3.98	3.98	106	106	70.0-130			0.000	25
Trichlorofluoromethane	3.75	3.76	3.83	100	102	70.0-130			1.84	25
Dichlorodifluoromethane	3.75	3.74	3.81	99.7	102	64.0-139			1.85	25
1,1,2-Trichlorotrifluoroethane	3.75	3.82	3.84	102	102	70.0-130			0.522	25
1,2-Dichlorotetrafluoroethane	3.75	3.79	3.84	101	102	70.0-130			1.31	25
Heptane	3.75	3.95	3.93	105	105	70.0-130			0.508	25
Hexachloro-1,3-butadiene	3.75	3.48	3.52	92.8	93.9	70.0-151			1.14	25
Isopropylbenzene	3.75	3.82	3.86	102	103	70.0-130			1.04	25
Methylene Chloride	3.75	3.74	3.73	99.7	99.5	70.0-130			0.268	25
Methyl Butyl Ketone	3.75	3.97	3.92	106	105	70.0-149			1.27	25
2-Butanone (MEK)	3.75	3.85	3.91	103	104	70.0-130			1.55	25
4-Methyl-2-pentanone (MIBK)	3.75	3.98	3.97	106	106	70.0-139			0.252	25
Methyl methacrylate	3.75	3.97	3.96	106	106	70.0-130			0.252	25
MTBE	3.75	3.85	3.95	103	105	70.0-130			2.56	25
Naphthalene	3.75	3.93	4.04	105	108	70.0-159			2.76	25
2-Propanol	3.75	3.64	3.68	97.1	98.1	70.0-139			1.09	25

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4148883-1 11/21/24 09:22 • (LCSD) R4148883-2 11/21/24 09:51

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Propene	3.75	3.70	3.81	98.7	102	64.0-144			2.93	25
Styrene	7.50	8.04	8.12	107	108	70.0-130			0.990	25
1,1,2,2-Tetrachloroethane	3.75	3.75	3.81	100	102	70.0-130			1.59	25
Tetrachloroethylene	3.75	3.63	3.65	96.8	97.3	70.0-130			0.549	25
Tetrahydrofuran	3.75	3.81	3.88	102	103	70.0-137			1.82	25
Toluene	3.75	3.82	3.87	102	103	70.0-130			1.30	25
1,2,4-Trichlorobenzene	3.75	3.53	3.53	94.1	94.1	70.0-160			0.000	25
1,1,1-Trichloroethane	3.75	3.92	3.89	105	104	70.0-130			0.768	25
1,1,2-Trichloroethane	3.75	3.77	3.76	101	100	70.0-130			0.266	25
Trichloroethylene	3.75	3.73	3.79	99.5	101	70.0-130			1.60	25
1,2,4-Trimethylbenzene	3.75	3.98	3.98	106	106	70.0-130			0.000	25
1,3,5-Trimethylbenzene	3.75	4.05	4.01	108	107	70.0-130			0.993	25
Vinyl chloride	3.75	3.74	3.86	99.7	103	70.0-130			3.16	25
Vinyl Bromide	3.75	3.83	3.88	102	103	70.0-130			1.30	25
Vinyl acetate	3.75	3.64	3.66	97.1	97.6	70.0-130			0.548	25
Xylenes, Total	11.3	11.8	11.9	104	105	70.0-130			0.844	25
m&p-Xylene	7.50	7.91	7.95	105	106	70.0-130			0.504	25
o-Xylene	3.75	3.90	3.96	104	106	70.0-130			1.53	25
(S) 1,4-Bromofluorobenzene				101	103	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4150210-3 11/23/24 09:46

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ppbv		ppbv	ppbv
Cyclohexane	U		0.170	0.200
n-Hexane	U		0.143	0.630
2,2,4-Trimethylpentane	U		0.0898	0.200
(S) 1,4-Bromofluorobenzene	97.1			60.0-140

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

(LCS) R4150210-1 11/23/24 08:59 • (LCSD) R4150210-2 11/23/24 09:16

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	ppbv	ppbv	ppbv	%	%	%			%	%
Cyclohexane	3.75	3.90	3.97	104	106	70.0-130			1.78	25
n-Hexane	3.75	3.83	3.85	102	103	70.0-130			0.521	25
2,2,4-Trimethylpentane	3.75	3.81	3.89	102	104	70.0-130			2.08	25
(S) 1,4-Bromofluorobenzene				101	99.8	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

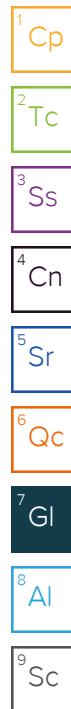
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

Abbreviations and Definitions

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

Qualifier Description

The remainder of this page intentionally left blank, there are no qualifiers applied to this SDG.



ACCREDITATIONS & LOCATIONS

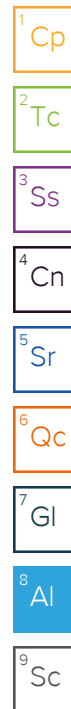
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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

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

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

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



 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 L1802448															
Company Name: Ramboll US Consulting, Inc. - Denver		Contact/Report To: Abby Small		Phone #: 303-382-5474		E-Mail: asmall@ramboll.com;rdeshpande@ramboll.com;elester@ramboll.com;twvss@ramboll.com		Cc E-Mail:		Sample Receipt Checklist Seal Present/Intact: ☒ Y ☐ N Signed/Accurate: ☒ Y ☐ N Size: ☒ 1L ☐ 6L ☐ 1.4 es arrive intact: ☒ Y ☐ N Tag Color: ☒ G ☐ W ☐ P ☐ B Tubing: ☒ Shunt ☐											
Street Address: 1999 Broadway Suite 2225 Denver, CO 80202		Invoice to:		Invoice		E-Mail:		Purchase Order # (if applicable):		Quote #:		State origin of sample(s): Montana		Field Information				Analyses Requested		Proj. Manager: 841 - Kelly Mercer	
City, State Zip:		Invoice		E-Mail:		Purchase Order # (if applicable):		Quote #:		State origin of sample(s):		Field Information				Analyses Requested		AcctNum / Client ID:			
Customer Project #:		Invoice		E-Mail:		Purchase Order # (if applicable):		Quote #:		State origin of sample(s):		Field Information				Analyses Requested		ENVIRONCO			
Project Name: Monthl GW Calumet - Great Falls, MT		Invoice		E-Mail:		Purchase Order # (if applicable):		Quote #:		State origin of sample(s):		Field Information				Analyses Requested		M102			
Site Collection Info/Facility ID (as applicable): ENVIRONCO-CALU MONTH		Invoice		E-Mail:		Purchase Order # (if applicable):		Quote #:		State origin of sample(s):		Field Information				Analyses Requested		Table			
Time Zone Collected: [] AK [] PT [☒ MT [] CT [] ET		Invoice		E-Mail:		Purchase Order # (if applicable):		Quote #:		State origin of sample(s):		Field Information				Analyses Requested		Profile / Template: T245957			
Data Deliverables:		Regulatory Program (CAA, RCRA, etc.) as applicable:		Rush (Pre-approval required): 2 Day 3 day 5 day Other _____		Permit # as applicable:		Units for Reporting: ug/m ³ PPBV mg/m ³ PPMV		Date Results Requested:		Field Information				Analyses Requested		Prelog / Bottle Ord. ID: P1104740			
[] Level II [] Level III [] Level IV		Regulatory Program (CAA, RCRA, etc.) as applicable:		Rush (Pre-approval required): 2 Day 3 day 5 day Other _____		Permit # as applicable:		Units for Reporting: ug/m ³ PPBV mg/m ³ PPMV		Date Results Requested:		Field Information				Analyses Requested		Sample Comment			
[] EQUIS		Regulatory Program (CAA, RCRA, etc.) as applicable:		Rush (Pre-approval required): 2 Day 3 day 5 day Other _____		Permit # as applicable:		Units for Reporting: ug/m ³ PPBV mg/m ³ PPMV		Date Results Requested:		Field Information				Analyses Requested					
[] Other _____		Regulatory Program (CAA, RCRA, etc.) as applicable:		Rush (Pre-approval required): 2 Day 3 day 5 day Other _____		Permit # as applicable:		Units for Reporting: ug/m ³ PPBV mg/m ³ PPMV		Date Results Requested:		Field Information				Analyses Requested					
* Matrix Codes (Insert in Matrix box below): Ambient (A), Indoor (I), Soil Vapor (SV), Other (O)																		TO-15 Summa			
Customer Sample ID		Matrix *	Summa Canister ID	Flow Controller ID	Begin Collection		End Collection		Start Pressure / Vacuum (in Hg)	End Pressure / Vacuum (in Hg)	Duration (minutes)	Rate m ³ /min or L/min	Total Volume Sampled m ³ or L								
CMR- SP301-241120		0	006954	014524	11/20 1255		11/20 1258		28	2	3	.34	1								

December 26, 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: L1811174

Samples Received: 12/19/2024

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

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

SDG:

L1811174

DATE/TIME:

12/26/24 09:46

PAGE:

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Cp: Cover Page	1	¹ Cp
Tc: Table of Contents	2	
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CMR-SP301-241218 L1811174-01	5	⁴ Cn
Qc: Quality Control Summary	7	
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		⁸ Al
		⁹ Sc

SAMPLE SUMMARY

CMR-SP301-241218 L1811174-01 Air

Collected by

Collected date/time

Received date/time

12/18/24 14:11

12/19/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Organic Compounds (MS) by Method TO-15	WG2422639	1	12/20/24 19:05	12/20/24 19:05	DAH	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2423558	10	12/22/24 19:29	12/22/24 19:29	MBF	Mt. Juliet, TN
Volatile Organic Compounds (MS) by Method TO-15	WG2423924	200	12/23/24 12:16	12/23/24 12:16	CRT	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

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L1811174

DATE/TIME:

12/26/24 09:46

PAGE:

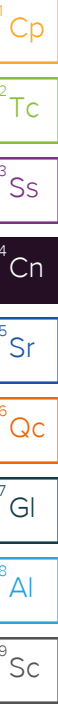
3 of 15

CASE NARRATIVE

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



Kelly Mercer
Project Manager



Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
Acetone	67-64-1	58.10	1.25	2.97	23.3	55.4		1	WG2422639
Allyl chloride	107-05-1	76.53	0.200	0.626	ND	ND		1	WG2422639
Benzene	71-43-2	78.10	0.200	0.639	75.4	241		1	WG2422639
Benzyl Chloride	100-44-7	127	0.200	1.04	ND	ND		1	WG2422639
Bromodichloromethane	75-27-4	164	0.200	1.34	ND	ND		1	WG2422639
Bromoform	75-25-2	253	0.630	6.52	ND	ND		1	WG2422639
Bromomethane	74-83-9	94.90	0.200	0.776	ND	ND		1	WG2422639
1,3-Butadiene	106-99-0	54.10	2.00	4.43	ND	ND		1	WG2422639
Carbon disulfide	75-15-0	76.10	0.400	1.24	0.882	2.75		1	WG2422639
Carbon tetrachloride	56-23-5	154	0.200	1.26	ND	ND		1	WG2422639
Chlorobenzene	108-90-7	113	0.200	0.924	ND	ND		1	WG2422639
Chloroethane	75-00-3	64.50	0.200	0.528	ND	ND	J4	1	WG2422639
Chloroform	67-66-3	119	0.200	0.973	ND	ND		1	WG2422639
Chloromethane	74-87-3	50.50	0.200	0.413	0.428	0.884		1	WG2422639
2-Chlorotoluene	95-49-8	126	0.200	1.03	ND	ND		1	WG2422639
Cyclohexane	110-82-7	84.20	2.00	6.89	172	592		10	WG2423558
Dibromochloromethane	124-48-1	208	0.200	1.70	ND	ND		1	WG2422639
1,2-Dibromoethane	106-93-4	188	0.200	1.54	ND	ND		1	WG2422639
1,2-Dichlorobenzene	95-50-1	147	0.200	1.20	ND	ND		1	WG2422639
1,3-Dichlorobenzene	541-73-1	147	0.200	1.20	ND	ND		1	WG2422639
1,4-Dichlorobenzene	106-46-7	147	0.200	1.20	ND	ND		1	WG2422639
1,2-Dichloroethane	107-06-2	99	0.200	0.810	ND	ND		1	WG2422639
1,1-Dichloroethane	75-34-3	98	0.200	0.802	ND	ND		1	WG2422639
1,1-Dichloroethene	75-35-4	96.90	0.200	0.793	ND	ND		1	WG2422639
cis-1,2-Dichloroethene	156-59-2	96.90	0.200	0.793	ND	ND		1	WG2422639
trans-1,2-Dichloroethene	156-60-5	96.90	0.200	0.793	ND	ND		1	WG2422639
1,2-Dichloropropane	78-87-5	113	0.200	0.924	ND	ND		1	WG2422639
cis-1,3-Dichloropropene	10061-01-5	111	0.200	0.908	ND	ND		1	WG2422639
trans-1,3-Dichloropropene	10061-02-6	111	0.200	0.908	ND	ND		1	WG2422639
1,4-Dioxane	123-91-1	88.10	0.630	2.27	ND	ND		1	WG2422639
Ethanol	64-17-5	46.10	2.50	4.71	32.9	62.0		1	WG2422639
Ethylbenzene	100-41-4	106	0.200	0.867	6.41	27.8		1	WG2422639
4-Ethyltoluene	622-96-8	120	0.200	0.982	ND	ND		1	WG2422639
Trichlorofluoromethane	75-69-4	137.40	0.200	1.12	ND	ND		1	WG2422639
Dichlorodifluoromethane	75-71-8	120.92	0.200	0.989	0.361	1.79		1	WG2422639
1,1,2-Trichlorotrifluoroethane	76-13-1	187.40	0.200	1.53	ND	ND		1	WG2422639
1,2-Dichlorotetrafluoroethane	76-14-2	171	0.200	1.40	ND	ND		1	WG2422639
Heptane	142-82-5	100	0.200	0.818	ND	ND		1	WG2422639
Hexachloro-1,3-butadiene	87-68-3	261	0.630	6.73	ND	ND		1	WG2422639
n-Hexane	110-54-3	86.20	6.30	22.2	294	1040		10	WG2423558
Isopropylbenzene	98-82-8	120.20	0.200	0.983	ND	ND		1	WG2422639
Methylene Chloride	75-09-2	84.90	0.200	0.694	ND	ND		1	WG2422639
Methyl Butyl Ketone	591-78-6	100	1.25	5.11	ND	ND		1	WG2422639
2-Butanone (MEK)	78-93-3	72.10	1.25	3.69	3.18	9.38		1	WG2422639
4-Methyl-2-pentanone (MIBK)	108-10-1	100.10	1.25	5.12	ND	ND		1	WG2422639
Methyl methacrylate	80-62-6	100.12	0.200	0.819	ND	ND		1	WG2422639
MTBE	1634-04-4	88.10	0.200	0.721	ND	ND		1	WG2422639
Naphthalene	91-20-3	128	0.630	3.30	0.704	3.69		1	WG2422639
2-Propanol	67-63-0	60.10	1.25	3.07	2.07	5.09		1	WG2422639
Propene	115-07-1	42.10	1.25	2.15	ND	ND		1	WG2422639
Styrene	100-42-5	104	0.400	1.70	ND	ND		1	WG2422639
1,1,2,2-Tetrachloroethane	79-34-5	168	0.200	1.37	ND	ND		1	WG2422639
Tetrachloroethylene	127-18-4	166	0.200	1.36	ND	ND		1	WG2422639
Tetrahydrofuran	109-99-9	72.10	0.200	0.590	ND	ND		1	WG2422639
Toluene	108-88-3	92.10	0.500	1.88	ND	ND		1	WG2422639
1,2,4-Trichlorobenzene	120-82-1	181	0.630	4.66	ND	ND		1	WG2422639

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Volatile Organic Compounds (MS) by Method TO-15

Analyte	CAS #	Mol. Wt.	RDL1 ppbv	RDL2 ug/m3	Result ppbv	Result ug/m3	Qualifier	Dilution	Batch
1,1,1-Trichloroethane	71-55-6	133	0.200	1.09	ND	ND		1	WG2422639
1,1,2-Trichloroethane	79-00-5	133	0.200	1.09	ND	ND		1	WG2422639
Trichloroethylene	79-01-6	131	0.200	1.07	ND	ND		1	WG2422639
1,2,4-Trimethylbenzene	95-63-6	120	0.200	0.982	6.00	29.4		1	WG2422639
1,3,5-Trimethylbenzene	108-67-8	120	0.200	0.982	9.21	45.2		1	WG2422639
2,2,4-Trimethylpentane	540-84-1	114.22	40.0	187	965	4510		200	WG2423924
Vinyl chloride	75-01-4	62.50	0.200	0.511	ND	ND		1	WG2422639
Vinyl Bromide	593-60-2	106.95	0.200	0.875	ND	ND		1	WG2422639
Vinyl acetate	108-05-4	86.10	0.630	2.22	ND	ND	J4	1	WG2422639
Xylenes, Total	1330-20-7	106.16	0.600	2.61	37.4	162		1	WG2422639
m&p-Xylene	179601-23-1	106	0.400	1.73	32.1	139		1	WG2422639
o-Xylene	95-47-6	106	0.200	0.867	5.25	22.8		1	WG2422639
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		126				WG2422639
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		99.4				WG2423558
(S) 1,4-Bromofluorobenzene	460-00-4	175	60.0-140		93.2				WG2423924

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4160645-3 12/20/24 10:21

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Acetone	U		0.520	1.25
Allyl chloride	U		0.186	0.200
Benzene	U		0.110	0.200
Benzyl Chloride	U		0.0888	0.200
Bromodichloromethane	U		0.0695	0.200
Bromoform	U		0.0755	0.630
Bromomethane	U		0.0938	0.200
1,3-Butadiene	U		0.158	2.00
Carbon disulfide	U		0.160	0.400
Carbon tetrachloride	U		0.0746	0.200
Chlorobenzene	U		0.118	0.200
Chloroethane	U		0.110	0.200
Chloroform	U		0.104	0.200
Chloromethane	U		0.110	0.200
2-Chlorotoluene	U		0.0787	0.200
Dibromochloromethane	U		0.0696	0.200
1,2-Dibromoethane	U		0.0690	0.200
1,2-Dichlorobenzene	U		0.0734	0.200
1,3-Dichlorobenzene	U		0.0753	0.200
1,4-Dichlorobenzene	U		0.0768	0.200
1,2-Dichloroethane	U		0.0730	0.200
1,1-Dichloroethane	U		0.0710	0.200
1,1-Dichloroethene	U		0.0747	0.200
cis-1,2-Dichloroethene	U		0.0796	0.200
trans-1,2-Dichloroethene	U		0.0735	0.200
1,2-Dichloropropane	U		0.0752	0.200
cis-1,3-Dichloropropene	U		0.0743	0.200
trans-1,3-Dichloropropene	U		0.0795	0.200
1,4-Dioxane	U		0.164	0.630
Ethanol	U		2.37	2.50
Ethylbenzene	U		0.0778	0.200
4-Ethyltoluene	U		0.0887	0.200
Trichlorofluoromethane	U		0.0771	0.200
Dichlorodifluoromethane	U		0.0806	0.200
1,1,2-Trichlorotrifluoroethane	U		0.0751	0.200
1,2-Dichlorotetrafluoroethane	U		0.0756	0.200
Heptane	U		0.114	0.200
Hexachloro-1,3-butadiene	U		0.0800	0.630
Isopropylbenzene	U		0.0722	0.200
Methylene Chloride	U		0.169	0.200

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4160645-3 12/20/24 10:21

Analyte	MB Result ppbv	MB Qualifier	MB MDL ppbv	MB RDL ppbv
Methyl Butyl Ketone	U		0.133	1.25
2-Butanone (MEK)	U		0.116	1.25
4-Methyl-2-pentanone (MIBK)	U		0.106	1.25
Methyl methacrylate	U		0.169	0.200
MTBE	U		0.0813	0.200
Naphthalene	U		0.617	0.630
2-Propanol	U		0.680	1.25
Propene	U		0.214	1.25
Styrene	U		0.0802	0.400
1,1,2,2-Tetrachloroethane	U		0.0695	0.200
Tetrachloroethylene	U		0.111	0.200
Tetrahydrofuran	U		0.164	0.200
Toluene	U		0.130	0.500
1,2,4-Trichlorobenzene	U		0.462	0.630
1,1,1-Trichloroethane	U		0.0718	0.200
1,1,2-Trichloroethane	U		0.0683	0.200
Trichloroethylene	U		0.0680	0.200
1,2,4-Trimethylbenzene	U		0.0927	0.200
1,3,5-Trimethylbenzene	U		0.0853	0.200
Vinyl chloride	U		0.0826	0.200
Vinyl Bromide	U		0.0749	0.200
Vinyl acetate	U		0.0968	0.630
Xylenes, Total	U		0.0887	0.600
m&p-Xylene	U		0.174	0.400
o-Xylene	U		0.0887	0.200
(S) 1,4-Bromofluorobenzene	96.7			60.0-140

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4160645-1 12/20/24 09:03 • (LCSD) R4160645-2 12/20/24 09:43

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	3.89	3.93	104	105	70.0-130			1.02	25
Allyl chloride	3.75	4.30	4.18	115	111	70.0-130			2.83	25
Benzene	3.75	4.10	4.08	109	109	70.0-130			0.489	25
Benzyl Chloride	3.75	4.35	4.34	116	116	70.0-152			0.230	25
Bromodichloromethane	3.75	4.10	4.09	109	109	70.0-130			0.244	25
Bromoform	3.75	4.23	4.15	113	111	70.0-130			1.91	25
Bromomethane	3.75	4.25	4.20	113	112	70.0-130			1.18	25

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

(LCS) R4160645-1 12/20/24 09:03 • (LCSD) R4160645-2 12/20/24 09:43

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
1,3-Butadiene	3.75	4.30	4.33	115	115	70.0-130			0.695	25
Carbon disulfide	7.50	8.33	8.38	111	112	70.0-130			0.598	25
Carbon tetrachloride	3.75	4.24	4.22	113	113	70.0-130			0.473	25
Chlorobenzene	3.75	3.98	4.01	106	107	70.0-130			0.751	25
Chloroethane	3.75	6.46	6.41	172	171	70.0-130	J4	J4	0.777	25
Chloroform	3.75	4.15	4.14	111	110	70.0-130			0.241	25
Chloromethane	3.75	4.36	4.43	116	118	70.0-130			1.59	25
2-Chlorotoluene	3.75	4.38	4.30	117	115	70.0-130			1.84	25
Dibromochloromethane	3.75	4.01	4.01	107	107	70.0-130			0.000	25
1,2-Dibromoethane	3.75	4.06	4.08	108	109	70.0-130			0.491	25
1,2-Dichlorobenzene	3.75	4.12	4.07	110	109	70.0-130			1.22	25
1,3-Dichlorobenzene	3.75	4.23	4.17	113	111	70.0-130			1.43	25
1,4-Dichlorobenzene	3.75	4.18	4.19	111	112	70.0-130			0.239	25
1,2-Dichloroethane	3.75	4.11	4.02	110	107	70.0-130			2.21	25
1,1-Dichloroethane	3.75	4.18	4.27	111	114	70.0-130			2.13	25
1,1-Dichloroethene	3.75	4.23	4.15	113	111	70.0-130			1.91	25
cis-1,2-Dichloroethene	3.75	4.38	4.41	117	118	70.0-130			0.683	25
trans-1,2-Dichloroethene	3.75	4.18	4.19	111	112	70.0-130			0.239	25
1,2-Dichloropropane	3.75	4.18	4.14	111	110	70.0-130			0.962	25
cis-1,3-Dichloropropene	3.75	4.36	4.35	116	116	70.0-130			0.230	25
trans-1,3-Dichloropropene	3.75	4.35	4.28	116	114	70.0-130			1.62	25
1,4-Dioxane	3.75	4.72	4.73	126	126	70.0-140			0.212	25
Ethanol	3.75	4.06	4.01	108	107	55.0-148			1.24	25
Ethylbenzene	3.75	4.43	4.37	118	117	70.0-130			1.36	25
4-Ethyltoluene	3.75	4.57	4.52	122	121	70.0-130			1.10	25
Trichlorofluoromethane	3.75	4.12	4.09	110	109	70.0-130			0.731	25
Dichlorodifluoromethane	3.75	3.76	3.88	100	103	64.0-139			3.14	25
1,1,2-Trichlorotrifluoroethane	3.75	4.13	4.16	110	111	70.0-130			0.724	25
1,2-Dichlorotetrafluoroethane	3.75	4.20	4.25	112	113	70.0-130			1.18	25
Heptane	3.75	4.15	4.41	111	118	70.0-130			6.07	25
Hexachloro-1,3-butadiene	3.75	4.02	3.95	107	105	70.0-151			1.76	25
Isopropylbenzene	3.75	4.64	4.56	124	122	70.0-130			1.74	25
Methylene Chloride	3.75	3.94	3.94	105	105	70.0-130			0.000	25
Methyl Butyl Ketone	3.75	4.52	4.47	121	119	70.0-149			1.11	25
2-Butanone (MEK)	3.75	4.28	4.27	114	114	70.0-130			0.234	25
4-Methyl-2-pentanone (MIBK)	3.75	4.36	4.36	116	116	70.0-139			0.000	25
Methyl methacrylate	3.75	4.42	4.23	118	113	70.0-130			4.39	25
MTBE	3.75	4.45	4.44	119	118	70.0-130			0.225	25
Naphthalene	3.75	4.17	4.18	111	111	70.0-159			0.240	25
2-Propanol	3.75	4.18	4.21	111	112	70.0-139			0.715	25

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4160645-1 12/20/24 09:03 • (LCSD) R4160645-2 12/20/24 09:43

Analyte	Spike Amount ppbv	LCS Result ppbv	LCSD Result ppbv	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Propene	3.75	4.44	4.39	118	117	64.0-144			1.13	25
Styrene	7.50	9.51	9.20	127	123	70.0-130			3.31	25
1,1,2,2-Tetrachloroethane	3.75	4.19	4.19	112	112	70.0-130			0.000	25
Tetrachloroethylene	3.75	4.04	4.02	108	107	70.0-130			0.496	25
Tetrahydrofuran	3.75	4.20	4.29	112	114	70.0-137			2.12	25
Toluene	3.75	4.29	4.28	114	114	70.0-130			0.233	25
1,2,4-Trichlorobenzene	3.75	4.26	4.15	114	111	70.0-160			2.62	25
1,1,1-Trichloroethane	3.75	4.19	4.15	112	111	70.0-130			0.959	25
1,1,2-Trichloroethane	3.75	4.14	4.10	110	109	70.0-130			0.971	25
Trichloroethylene	3.75	4.19	4.14	112	110	70.0-130			1.20	25
1,2,4-Trimethylbenzene	3.75	4.43	4.44	118	118	70.0-130			0.225	25
1,3,5-Trimethylbenzene	3.75	4.46	4.42	119	118	70.0-130			0.901	25
Vinyl chloride	3.75	4.42	4.32	118	115	70.0-130			2.29	25
Vinyl Bromide	3.75	4.17	4.12	111	110	70.0-130			1.21	25
Vinyl acetate	3.75	4.64	4.92	124	131	70.0-130		J4	5.86	25
Xylenes, Total	11.3	13.9	13.6	123	120	70.0-130			2.18	25
m&p-Xylene	7.50	9.20	9.06	123	121	70.0-130			1.53	25
o-Xylene	3.75	4.68	4.56	125	122	70.0-130			2.60	25
(S) 1,4-Bromofluorobenzene				100	97.9	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4160954-2 12/22/24 09:44

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ppbv		ppbv	ppbv
Cyclohexane	U		0.170	0.200
n-Hexane	U		0.143	0.630
(S) 1,4-Bromofluorobenzene	91.7			60.0-140

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

(LCS) R4160954-1 12/22/24 09:18 • (LCSD) R4160954-3 12/22/24 11:14

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppbv	ppbv	ppbv	%	%	%			%	%
Cyclohexane	3.75	4.01	3.89	107	104	70.0-130			3.04	25
n-Hexane	3.75	3.78	3.71	101	98.9	70.0-130			1.87	25
(S) 1,4-Bromofluorobenzene				99.8	102	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4161355-3 12/23/24 10:05

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ppbv		ppbv	ppbv
2,2,4-Trimethylpentane	U		0.0898	0.200
(S) 1,4-Bromofluorobenzene	95.5			60.0-140

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

(LCS) R4161355-1 12/23/24 08:43 • (LCSD) R4161355-2 12/23/24 09:25

Analyte	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
	ppbv	ppbv	ppbv	%	%	%			%	%
2,2,4-Trimethylpentane	3.75	3.58	3.60	95.5	96.0	70.0-130			0.557	25
(S) 1,4-Bromofluorobenzene				94.1	94.7	60.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

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

Abbreviations and Definitions

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

Qualifier Description

J4	The associated batch QC was outside the established quality control range for accuracy.
----	---

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

ACCREDITATIONS & LOCATIONS

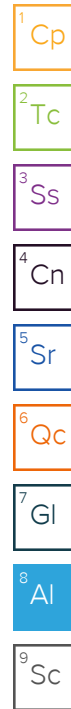
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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

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

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

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



APPENDIX A2

DUAL-PHASE EXTRACTION EFFLUENT LIQUID ANALYTICAL RESULTS

Pace Project Numbers:

L1792897, L1802699, L1811434

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1792897
Samples Received: 10/25/2024
Project Number:
Description: CMR Great Falls - 2023 RFI Soil Sampling
Site: GREAT FALLS, MT
Report To: Abby Small
1999 Broadway Suite 2225
Denver, CO 80202

Entire Report Reviewed By:



Kelly Mercer
Project Manager

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

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

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

SDG:

L1792897

DATE/TIME:

11/08/24 10:47

PAGE:

1 of 29

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

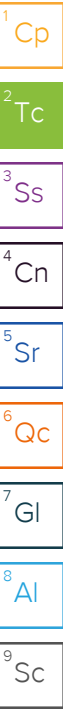
7 Gl

8 Al

9 Sc

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Cn: Case Narrative	4
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TPH by Method MTDEQ EPH	18
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Al: Accreditations & Locations	27
Sc: Sample Chain of Custody	28



SAMPLE SUMMARY

CMR-SP200-241024 L1792897-01 GW

Collected by
Kyle Groves

Collected date/time
10/24/24 12:35

Received date/time
10/25/24 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2393960	10	11/02/24 14:35	11/02/24 14:35	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2394739	10	11/04/24 13:12	11/04/24 13:12	ADM	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2391155	15	10/28/24 18:01	10/30/24 09:09	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2391155	15	10/28/24 18:01	10/30/24 09:31	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2391155	3	10/28/24 18:01	10/29/24 11:33	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2391989	20	10/30/24 08:36	10/31/24 05:14	ADF	Mt. Juliet, TN

TRIP BLANK L1792897-02 GW

Collected by
Kyle Groves

Collected date/time
10/24/24 00:00

Received date/time
10/25/24 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2393960	1	11/02/24 02:57	11/02/24 02:57	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2394739	1	11/04/24 06:36	11/04/24 06:36	ADM	Mt. Juliet, TN



CASE NARRATIVE

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



Kelly Mercer
Project Manager

Project Narrative

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

¹ Cp

² Tc

³ Ss

⁴ Cn

⁵ Sr

⁶ Qc

⁷ Gl

⁸ Al

⁹ Sc

Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

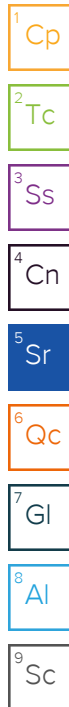
Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	U		333	1000	10	11/02/2024 14:35	WG2393960
Unadjusted C9-C12 Aliphatics	2990		333	1000	10	11/02/2024 14:35	WG2393960
Unadjusted C9-C10 Aromatics	982	J	333	1000	10	11/02/2024 14:35	WG2393960
Adjusted C5-C8 Aliphatics	U		333	1000	10	11/02/2024 14:35	WG2393960
Adjusted C9-C12 Aliphatics	2980		333	1000	10	11/02/2024 14:35	WG2393960
Total VPH	3970		667	2000	10	11/02/2024 14:35	WG2393960
(S) 2,5-Dibromotoluene(FID)	93.9			70.0-130		11/02/2024 14:35	WG2393960
(S) 2,5-Dibromotoluene(PID)	80.0			70.0-130		11/02/2024 14:35	WG2393960

Sample Narrative:

L1792897-01 WG2393960: Lowest possible dilution due to sample foaming.

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		113	250	10	11/04/2024 13:12	WG2394739
Acrylonitrile	U		6.71	50.0	10	11/04/2024 13:12	WG2394739
Benzene	1.11	J	0.941	5.00	10	11/04/2024 13:12	WG2394739
Bromobenzene	U		1.18	5.00	10	11/04/2024 13:12	WG2394739
Bromodichloromethane	U		1.36	5.00	10	11/04/2024 13:12	WG2394739
Bromochloromethane	U		1.28	5.00	10	11/04/2024 13:12	WG2394739
Bromoform	U		1.29	5.00	10	11/04/2024 13:12	WG2394739
Bromomethane	U		6.05	25.0	10	11/04/2024 13:12	WG2394739
n-Butylbenzene	U		1.57	5.00	10	11/04/2024 13:12	WG2394739
sec-Butylbenzene	U		1.25	5.00	10	11/04/2024 13:12	WG2394739
tert-Butylbenzene	U		1.27	5.00	10	11/04/2024 13:12	WG2394739
Carbon disulfide	U		0.962	5.00	10	11/04/2024 13:12	WG2394739
Carbon tetrachloride	U		1.28	5.00	10	11/04/2024 13:12	WG2394739
Chlorobenzene	U		1.17	5.00	10	11/04/2024 13:12	WG2394739
Chlorodibromomethane	U		1.40	5.00	10	11/04/2024 13:12	WG2394739
Chloroethane	U		1.92	25.0	10	11/04/2024 13:12	WG2394739
2-Chloroethyl vinyl ether	U		5.75	500	10	11/04/2024 13:12	WG2394739
Chloroform	U		1.11	5.00	10	11/04/2024 13:12	WG2394739
Chloromethane	U		9.60	12.5	10	11/04/2024 13:12	WG2394739
2-Chlorotoluene	U		1.06	5.00	10	11/04/2024 13:12	WG2394739
4-Chlorotoluene	U		1.14	5.00	10	11/04/2024 13:12	WG2394739
1,2-Dibromo-3-Chloropropane	U		2.76	25.0	10	11/04/2024 13:12	WG2394739
1,2-Dibromoethane	U		1.26	5.00	10	11/04/2024 13:12	WG2394739
Dibromomethane	U		1.22	5.00	10	11/04/2024 13:12	WG2394739
1,2-Dichlorobenzene	U		1.07	5.00	10	11/04/2024 13:12	WG2394739
1,3-Dichlorobenzene	U		2.99	5.00	10	11/04/2024 13:12	WG2394739
1,4-Dichlorobenzene	U		1.20	5.00	10	11/04/2024 13:12	WG2394739
Dichlorodifluoromethane	U		3.74	25.0	10	11/04/2024 13:12	WG2394739
1,1-Dichloroethane	U		1.00	5.00	10	11/04/2024 13:12	WG2394739
1,2-Dichloroethane	U		0.819	5.00	10	11/04/2024 13:12	WG2394739
1,1-Dichloroethene	U		1.88	5.00	10	11/04/2024 13:12	WG2394739
cis-1,2-Dichloroethene	U		1.26	5.00	10	11/04/2024 13:12	WG2394739
trans-1,2-Dichloroethene	U		1.49	5.00	10	11/04/2024 13:12	WG2394739
1,2-Dichloropropane	U		1.49	5.00	10	11/04/2024 13:12	WG2394739
1,1-Dichloropropene	U		1.42	5.00	10	11/04/2024 13:12	WG2394739
1,3-Dichloropropane	U		1.09	10.0	10	11/04/2024 13:12	WG2394739
cis-1,3-Dichloropropene	U		1.11	5.00	10	11/04/2024 13:12	WG2394739
trans-1,3-Dichloropropene	U		1.18	5.00	10	11/04/2024 13:12	WG2394739
trans-1,4-Dichloro-2-butene	U	J3	4.67	50.0	10	11/04/2024 13:12	WG2394739
2,2-Dichloropropane	U		1.61	5.00	10	11/04/2024 13:12	WG2394739



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	11/04/2024 13:12	WG2394739
Ethylbenzene	U		1.37	5.00	10	11/04/2024 13:12	WG2394739
Hexachloro-1,3-butadiene	U		3.37	10.0	10	11/04/2024 13:12	WG2394739
2-Hexanone	U		7.87	50.0	10	11/04/2024 13:12	WG2394739
n-Hexane	U		7.49	50.0	10	11/04/2024 13:12	WG2394739
Iodomethane	U		5.54	50.0	10	11/04/2024 13:12	WG2394739
Isopropylbenzene	U		1.05	5.00	10	11/04/2024 13:12	WG2394739
p-Isopropyltoluene	U		1.20	5.00	10	11/04/2024 13:12	WG2394739
2-Butanone (MEK)	U		11.9	50.0	10	11/04/2024 13:12	WG2394739
Methylene Chloride	U		4.30	25.0	10	11/04/2024 13:12	WG2394739
4-Methyl-2-pentanone (MIBK)	U		4.78	50.0	10	11/04/2024 13:12	WG2394739
Methyl tert-butyl ether	U		1.01	5.00	10	11/04/2024 13:12	WG2394739
Naphthalene	U		1.74	25.0	10	11/04/2024 13:12	WG2394739
n-Propylbenzene	U		0.993	5.00	10	11/04/2024 13:12	WG2394739
Styrene	U		1.18	5.00	10	11/04/2024 13:12	WG2394739
1,1,1,2-Tetrachloroethane	U		1.47	5.00	10	11/04/2024 13:12	WG2394739
1,1,2,2-Tetrachloroethane	U		1.33	5.00	10	11/04/2024 13:12	WG2394739
1,1,2-Trichlorotrifluoroethane	U		1.80	5.00	10	11/04/2024 13:12	WG2394739
Tetrachloroethene	U		3.00	5.00	10	11/04/2024 13:12	WG2394739
Toluene	U		2.78	5.00	10	11/04/2024 13:12	WG2394739
1,2,3-Trichlorobenzene	U		1.64	5.00	10	11/04/2024 13:12	WG2394739
1,2,4-Trichlorobenzene	U		4.81	10.0	10	11/04/2024 13:12	WG2394739
1,1,1-Trichloroethane	U		1.49	5.00	10	11/04/2024 13:12	WG2394739
1,1,2-Trichloroethane	U		1.58	5.00	10	11/04/2024 13:12	WG2394739
Trichloroethene	U		1.90	5.00	10	11/04/2024 13:12	WG2394739
Trichlorofluoromethane	U		1.60	25.0	10	11/04/2024 13:12	WG2394739
1,2,3-Trichloropropane	U		2.37	25.0	10	11/04/2024 13:12	WG2394739
1,2,4-Trimethylbenzene	4.86	J	3.22	5.00	10	11/04/2024 13:12	WG2394739
1,2,3-Trimethylbenzene	7.53		1.04	5.00	10	11/04/2024 13:12	WG2394739
1,3,5-Trimethylbenzene	5.69		1.04	5.00	10	11/04/2024 13:12	WG2394739
Vinyl acetate	U		6.92	50.0	10	11/04/2024 13:12	WG2394739
Vinyl chloride	U		2.34	5.00	10	11/04/2024 13:12	WG2394739
Xylenes, Total	8.85	J	1.74	15.0	10	11/04/2024 13:12	WG2394739
(S) Toluene-d8	100			80.0-120		11/04/2024 13:12	WG2394739
(S) 4-Bromofluorobenzene	94.7			77.0-126		11/04/2024 13:12	WG2394739
(S) 1,2-Dichloroethane-d4	111			70.0-130		11/04/2024 13:12	WG2394739

Sample Narrative:

L1792897-01 WG2394739: Lowest possible dilution due to sample matrix.

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	44500		1040	9000	15	10/30/2024 09:31	WG2391155
Unadjusted C19-C36 Aliphatics	16400		176	1800	3	10/29/2024 11:33	WG2391155
Unadjusted C11-C22 Aromatics	23300		738	9000	15	10/30/2024 09:09	WG2391155
Unadjusted Total Petroleum Hydrocarbons	84200		3000	9000	15	10/30/2024 09:31	WG2391155
Adjusted C11-C22 Aromatics	23300		3000	9000	15	10/30/2024 09:09	WG2391155
Adjusted Total Petroleum Hydrocarbons	84200		3000	9000	15	10/30/2024 09:31	WG2391155
(S) o-Terphenyl	66.6			40.0-140		10/30/2024 09:09	WG2391155
(S) 1-Chloro-octadecane	3.93	J2		40.0-140		10/30/2024 09:31	WG2391155
(S) 1-Chloro-octadecane	21.2	J2		40.0-140		10/29/2024 11:33	WG2391155
(S) 2-Fluorobiphenyl	148	J1		40.0-140		10/30/2024 09:09	WG2391155
(S) 2-Bromonaphthalene	70.3			40.0-140		10/30/2024 09:09	WG2391155

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

TPH by Method MTDEQ EPH

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

L1792897-01 WG2391155: Surrogate failure due to matrix interference

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acenaphthene	U		1.77	20.0	20	10/31/2024 05:14	WG2391989
Acenaphthylene	U		1.84	20.0	20	10/31/2024 05:14	WG2391989
Anthracene	U		1.61	20.0	20	10/31/2024 05:14	WG2391989
Benzidine	U	J3 J4	74.8	200	20	10/31/2024 05:14	WG2391989
Benzo(a)anthracene	U		3.98	20.0	20	10/31/2024 05:14	WG2391989
Benzo(b)fluoranthene	U		2.60	20.0	20	10/31/2024 05:14	WG2391989
Benzo(k)fluoranthene	U		2.40	20.0	20	10/31/2024 05:14	WG2391989
Benzo(g,h,i)perylene	U		2.42	20.0	20	10/31/2024 05:14	WG2391989
Benzo(a)pyrene	U		0.762	20.0	20	10/31/2024 05:14	WG2391989
Bis(2-chlorethoxy)methane	U		2.32	200	20	10/31/2024 05:14	WG2391989
Bis(2-chloroethyl)ether	U		2.74	200	20	10/31/2024 05:14	WG2391989
2,2-Oxybis(1-Chloropropane)	U		4.20	200	20	10/31/2024 05:14	WG2391989
4-Bromophenyl-phenylether	U		1.75	200	20	10/31/2024 05:14	WG2391989
2-Chloronaphthalene	U		1.30	20.0	20	10/31/2024 05:14	WG2391989
4-Chlorophenyl-phenylether	U		1.85	200	20	10/31/2024 05:14	WG2391989
Chrysene	U		2.60	20.0	20	10/31/2024 05:14	WG2391989
Dibenz(a,h)anthracene	U		1.29	20.0	20	10/31/2024 05:14	WG2391989
3,3-Dichlorobenzidine	U	J3	4.24	200	20	10/31/2024 05:14	WG2391989
2,4-Dinitrotoluene	U		1.97	200	20	10/31/2024 05:14	WG2391989
2,6-Dinitrotoluene	U		5.00	200	20	10/31/2024 05:14	WG2391989
Fluoranthene	U		2.04	20.0	20	10/31/2024 05:14	WG2391989
Fluorene	U		1.69	20.0	20	10/31/2024 05:14	WG2391989
Hexachlorobenzene	U		1.51	20.0	20	10/31/2024 05:14	WG2391989
Hexachloro-1,3-butadiene	U		1.94	200	20	10/31/2024 05:14	WG2391989
Hexachlorocyclopentadiene	U		1.20	200	20	10/31/2024 05:14	WG2391989
Hexachloroethane	U		2.54	200	20	10/31/2024 05:14	WG2391989
Indeno(1,2,3-cd)pyrene	U		5.58	20.0	20	10/31/2024 05:14	WG2391989
Isophorone	U		2.86	200	20	10/31/2024 05:14	WG2391989
Naphthalene	U		3.18	20.0	20	10/31/2024 05:14	WG2391989
Nitrobenzene	U		5.94	200	20	10/31/2024 05:14	WG2391989
n-Nitrosodimethylamine	U		20.0	200	20	10/31/2024 05:14	WG2391989
n-Nitrosodiphenylamine	U		47.4	200	20	10/31/2024 05:14	WG2391989
n-Nitrosodi-n-propylamine	U		5.22	200	20	10/31/2024 05:14	WG2391989
Phenanthrene	U		2.24	20.0	20	10/31/2024 05:14	WG2391989
Benzylbutyl phthalate	U		15.3	60.0	20	10/31/2024 05:14	WG2391989
Bis(2-Ethylhexyl)phthalate	U		17.9	60.0	20	10/31/2024 05:14	WG2391989
Di-n-butyl phthalate	U		9.06	60.0	20	10/31/2024 05:14	WG2391989
Diethyl phthalate	U		5.74	60.0	20	10/31/2024 05:14	WG2391989
Dimethyl phthalate	U		5.20	60.0	20	10/31/2024 05:14	WG2391989
Di-n-octyl phthalate	U		18.6	60.0	20	10/31/2024 05:14	WG2391989
Pyrene	2.17	J	2.14	20.0	20	10/31/2024 05:14	WG2391989
1,2,4-Trichlorobenzene	U		1.40	200	20	10/31/2024 05:14	WG2391989
Aniline	U	J3 J4	33.0	200	20	10/31/2024 05:14	WG2391989
1,2-Diphenylhydrazine	U	N2	2.10	200	20	10/31/2024 05:14	WG2391989
Benzyl alcohol	U		11.3	200	20	10/31/2024 05:14	WG2391989
4-Chloroaniline	U	J3	4.68	200	20	10/31/2024 05:14	WG2391989
4-Chloro-3-methylphenol	U		2.62	200	20	10/31/2024 05:14	WG2391989
2-Chlorophenol	U		2.66	200	20	10/31/2024 05:14	WG2391989
Dibenzofuran	U		1.94	200	20	10/31/2024 05:14	WG2391989

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2,4-Dichlorophenol	U		2.04	200	20	10/31/2024 05:14	WG2391989
2,4-Dimethylphenol	U		1.27	200	20	10/31/2024 05:14	WG2391989
4,6-Dinitro-2-methylphenol	U		22.4	200	20	10/31/2024 05:14	WG2391989
2,4-Dinitrophenol	U		119	200	20	10/31/2024 05:14	WG2391989
2-Methylnaphthalene	U		2.34	20.0	20	10/31/2024 05:14	WG2391989
2-Methylphenol	U		1.86	200	20	10/31/2024 05:14	WG2391989
3&4-Methyl Phenol	U		3.36	200	20	10/31/2024 05:14	WG2391989
2-Nitroaniline	U		2.04	200	20	10/31/2024 05:14	WG2391989
3-Nitroaniline	U		1.74	200	20	10/31/2024 05:14	WG2391989
4-Nitroaniline	U		1.82	200	20	10/31/2024 05:14	WG2391989
2-Nitrophenol	U		2.34	200	20	10/31/2024 05:14	WG2391989
4-Nitrophenol	U		2.86	200	20	10/31/2024 05:14	WG2391989
Pentachlorophenol	U		6.26	200	20	10/31/2024 05:14	WG2391989
Phenol	U		86.6	200	20	10/31/2024 05:14	WG2391989
Pyridine	U	J3 J4	12.5	200	20	10/31/2024 05:14	WG2391989
2,4,6-Trichlorophenol	U		2.00	200	20	10/31/2024 05:14	WG2391989
Acetophenone	U		4.16	200	20	10/31/2024 05:14	WG2391989
2-Acetylaminofluorene	U		5.06	200	20	10/31/2024 05:14	WG2391989
4-Aminobiphenyl	U	J4	9.22	200	20	10/31/2024 05:14	WG2391989
Chlorobenzilate	U		76.8	1000	20	10/31/2024 05:14	WG2391989
Diallate	U		10.5	200	20	10/31/2024 05:14	WG2391989
2,6-Dichlorophenol	U		2.04	200	20	10/31/2024 05:14	WG2391989
Dimethoate	U		101	1000	20	10/31/2024 05:14	WG2391989
P-(Dimethylamino) Azobenzene	U		73.8	200	20	10/31/2024 05:14	WG2391989
Dimethylbenz (A) Anthracene	U		34.2	200	20	10/31/2024 05:14	WG2391989
3,3-Dimethylbenzidine	U	J4	67.8	200	20	10/31/2024 05:14	WG2391989
a,a-Dimethylphenethylamine	U	J4	62.6	1000	20	10/31/2024 05:14	WG2391989
1,3-Dinitrobenzene	U		7.18	200	20	10/31/2024 05:14	WG2391989
Diphenylamine	U		47.4	200	20	10/31/2024 05:14	WG2391989
Dinoseb	U		160	1000	20	10/31/2024 05:14	WG2391989
Disulfoton	U		5.34	200	20	10/31/2024 05:14	WG2391989
Ethyl methanesulfonate	U		6.52	200	20	10/31/2024 05:14	WG2391989
Ethyl Parathion	U		7.58	200	20	10/31/2024 05:14	WG2391989
Famphur	U		78.4	400	20	10/31/2024 05:14	WG2391989
Hexachloropropene	U		2.98	1000	20	10/31/2024 05:14	WG2391989
Hexachlorophene	U	J4	28.8	1000	20	10/31/2024 05:14	WG2391989
Isodrin	U		82.2	200	20	10/31/2024 05:14	WG2391989
Isosafrole	U		77.6	200	20	10/31/2024 05:14	WG2391989
Kepone	U		53.2	400	20	10/31/2024 05:14	WG2391989
Methapyrilene	U	J4	200	1000	20	10/31/2024 05:14	WG2391989
3-Methylcholanthrene	U		3.28	200	20	10/31/2024 05:14	WG2391989
Methyl methanesulfonate	U		68.0	1000	20	10/31/2024 05:14	WG2391989
Methyl parathion	U		4.26	200	20	10/31/2024 05:14	WG2391989
1,4-Naphthoquinone	U	J4	111	1000	20	10/31/2024 05:14	WG2391989
1-Naphthylamine	U		5.78	200	20	10/31/2024 05:14	WG2391989
2-Naphthylamine	U		89.6	200	20	10/31/2024 05:14	WG2391989
5-Nitro-o-toluidine	U		39.8	200	20	10/31/2024 05:14	WG2391989
4-Nitroquinoline 1-oxide	U		40.6	200	20	10/31/2024 05:14	WG2391989
n-Nitrosodiethylamine	U		71.4	200	20	10/31/2024 05:14	WG2391989
n-Nitrosodi-n-butylamine	U		78.2	200	20	10/31/2024 05:14	WG2391989
n-Nitrosomethylethylamine	U		65.0	200	20	10/31/2024 05:14	WG2391989
n-Nitrosomorpholine	U		65.0	200	20	10/31/2024 05:14	WG2391989
n-Nitrosopiperidine	U		74.4	200	20	10/31/2024 05:14	WG2391989
n-Nitrosopyrrolidine	U		67.8	200	20	10/31/2024 05:14	WG2391989
Pentachlorobenzene	U		83.0	200	20	10/31/2024 05:14	WG2391989
Pentachloroethane	U		56.6	1000	20	10/31/2024 05:14	WG2391989

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Pentachloronitrobenzene	U		83.0	200	20	10/31/2024 05:14	WG2391989
Phenacetin	U		93.2	200	20	10/31/2024 05:14	WG2391989
p-Phenylenediamine	U	J4	7740	138000	20	10/31/2024 05:14	WG2391989
Phorate	U		97.2	1000	20	10/31/2024 05:14	WG2391989
2-Picoline	U		137	1000	20	10/31/2024 05:14	WG2391989
Pronamide	U		84.2	200	20	10/31/2024 05:14	WG2391989
Safrole	U		73.6	200	20	10/31/2024 05:14	WG2391989
Sulfotep	U		79.8	1000	20	10/31/2024 05:14	WG2391989
1,2,4,5-Tetrachlorobenzene	U		1.29	200	20	10/31/2024 05:14	WG2391989
2,3,4,6-Tetrachlorophenol	U		4.62	200	20	10/31/2024 05:14	WG2391989
Thionazin	U		81.4	200	20	10/31/2024 05:14	WG2391989
o-Toluidine	U		70.6	200	20	10/31/2024 05:14	WG2391989
2,4,5-Trichlorophenol	U		2.18	200	20	10/31/2024 05:14	WG2391989
O,O,O-Triethyl Phosphorothioate	U		58.6	200	20	10/31/2024 05:14	WG2391989
1,3,5-Trinitrobenzene	U		26.4	200	20	10/31/2024 05:14	WG2391989
(S) 2-Fluorophenol	25.2	J7		10.0-120		10/31/2024 05:14	WG2391989
(S) Phenol-d5	20.2	J7		10.0-120		10/31/2024 05:14	WG2391989
(S) Nitrobenzene-d5	44.4	J7		10.0-127		10/31/2024 05:14	WG2391989
(S) 2-Fluorobiphenyl	44.3	J7		10.0-130		10/31/2024 05:14	WG2391989
(S) 2,4,6-Tribromophenol	56.6	J7		10.0-155		10/31/2024 05:14	WG2391989
(S) p-Terphenyl-d14	60.9	J7		10.0-128		10/31/2024 05:14	WG2391989

Sample Narrative:

L1792897-01 WG2391989: Dilution due to matrix.

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

TRIP BLANK

Collected date/time: 10/24/24 00:00

SAMPLE RESULTS - 02

L1792897

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	11/02/2024 02:57	WG2393960
Unadjusted C9-C12 Aliphatics	U		33.3	100	1	11/02/2024 02:57	WG2393960
Unadjusted C9-C10 Aromatics	U		33.3	100	1	11/02/2024 02:57	WG2393960
Adjusted C5-C8 Aliphatics	U		33.3	100	1	11/02/2024 02:57	WG2393960
Adjusted C9-C12 Aliphatics	U		33.3	100	1	11/02/2024 02:57	WG2393960
Total VPH	U		66.7	200	1	11/02/2024 02:57	WG2393960
(S) 2,5-Dibromotoluene(FID)	88.8			70.0-130		11/02/2024 02:57	WG2393960
(S) 2,5-Dibromotoluene(PID)	79.8			70.0-130		11/02/2024 02:57	WG2393960

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	11/04/2024 06:36	WG2394739
Acrylonitrile	U		0.671	5.00	1	11/04/2024 06:36	WG2394739
Benzene	U		0.0941	0.500	1	11/04/2024 06:36	WG2394739
Bromobenzene	U		0.118	0.500	1	11/04/2024 06:36	WG2394739
Bromodichloromethane	U		0.136	0.500	1	11/04/2024 06:36	WG2394739
Bromochloromethane	U		0.128	0.500	1	11/04/2024 06:36	WG2394739
Bromoform	U		0.129	0.500	1	11/04/2024 06:36	WG2394739
Bromomethane	U		0.605	2.50	1	11/04/2024 06:36	WG2394739
n-Butylbenzene	U		0.157	0.500	1	11/04/2024 06:36	WG2394739
sec-Butylbenzene	U		0.125	0.500	1	11/04/2024 06:36	WG2394739
tert-Butylbenzene	U		0.127	0.500	1	11/04/2024 06:36	WG2394739
Carbon disulfide	U		0.0962	0.500	1	11/04/2024 06:36	WG2394739
Carbon tetrachloride	U		0.128	0.500	1	11/04/2024 06:36	WG2394739
Chlorobenzene	U		0.117	0.500	1	11/04/2024 06:36	WG2394739
Chlorodibromomethane	U		0.140	0.500	1	11/04/2024 06:36	WG2394739
Chloroethane	U		0.192	2.50	1	11/04/2024 06:36	WG2394739
2-Chloroethyl vinyl ether	U		0.575	50.0	1	11/04/2024 06:36	WG2394739
Chloroform	U		0.111	0.500	1	11/04/2024 06:36	WG2394739
Chloromethane	U		0.960	1.25	1	11/04/2024 06:36	WG2394739
2-Chlorotoluene	U		0.106	0.500	1	11/04/2024 06:36	WG2394739
4-Chlorotoluene	U		0.114	0.500	1	11/04/2024 06:36	WG2394739
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	11/04/2024 06:36	WG2394739
1,2-Dibromoethane	U		0.126	0.500	1	11/04/2024 06:36	WG2394739
Dibromomethane	U		0.122	0.500	1	11/04/2024 06:36	WG2394739
1,2-Dichlorobenzene	U		0.107	0.500	1	11/04/2024 06:36	WG2394739
1,3-Dichlorobenzene	U		0.299	0.500	1	11/04/2024 06:36	WG2394739
1,4-Dichlorobenzene	U		0.120	0.500	1	11/04/2024 06:36	WG2394739
Dichlorodifluoromethane	U		0.374	2.50	1	11/04/2024 06:36	WG2394739
1,1-Dichloroethane	U		0.100	0.500	1	11/04/2024 06:36	WG2394739
1,2-Dichloroethane	U		0.0819	0.500	1	11/04/2024 06:36	WG2394739
1,1-Dichloroethene	U		0.188	0.500	1	11/04/2024 06:36	WG2394739
cis-1,2-Dichloroethene	U		0.126	0.500	1	11/04/2024 06:36	WG2394739
trans-1,2-Dichloroethene	U		0.149	0.500	1	11/04/2024 06:36	WG2394739
1,2-Dichloropropane	U		0.149	0.500	1	11/04/2024 06:36	WG2394739
1,1-Dichloropropene	U		0.142	0.500	1	11/04/2024 06:36	WG2394739
1,3-Dichloropropane	U		0.109	1.00	1	11/04/2024 06:36	WG2394739
cis-1,3-Dichloropropene	U		0.111	0.500	1	11/04/2024 06:36	WG2394739
trans-1,3-Dichloropropene	U		0.118	0.500	1	11/04/2024 06:36	WG2394739
trans-1,4-Dichloro-2-butene	U	J3	0.467	5.00	1	11/04/2024 06:36	WG2394739
2,2-Dichloropropane	U		0.161	0.500	1	11/04/2024 06:36	WG2394739
Di-isopropyl ether	U		0.105	0.500	1	11/04/2024 06:36	WG2394739
Ethylbenzene	U		0.137	0.500	1	11/04/2024 06:36	WG2394739
Hexachloro-1,3-butadiene	U		0.337	1.00	1	11/04/2024 06:36	WG2394739

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

SDG:

L1792897

DATE/TIME:

11/08/24 10:47

PAGE:

10 of 29

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Hexanone	U		0.787	5.00	1	11/04/2024 06:36	WG2394739
n-Hexane	U		0.749	5.00	1	11/04/2024 06:36	WG2394739
Iodomethane	U		0.554	5.00	1	11/04/2024 06:36	WG2394739
Isopropylbenzene	U		0.105	0.500	1	11/04/2024 06:36	WG2394739
p-Isopropyltoluene	U		0.120	0.500	1	11/04/2024 06:36	WG2394739
2-Butanone (MEK)	U		1.19	5.00	1	11/04/2024 06:36	WG2394739
Methylene Chloride	U		0.430	2.50	1	11/04/2024 06:36	WG2394739
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	11/04/2024 06:36	WG2394739
Methyl tert-butyl ether	U		0.101	0.500	1	11/04/2024 06:36	WG2394739
Naphthalene	U		0.174	2.50	1	11/04/2024 06:36	WG2394739
n-Propylbenzene	U		0.0993	0.500	1	11/04/2024 06:36	WG2394739
Styrene	U		0.118	0.500	1	11/04/2024 06:36	WG2394739
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	11/04/2024 06:36	WG2394739
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	11/04/2024 06:36	WG2394739
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	11/04/2024 06:36	WG2394739
Tetrachloroethene	U		0.300	0.500	1	11/04/2024 06:36	WG2394739
Toluene	U		0.278	0.500	1	11/04/2024 06:36	WG2394739
1,2,3-Trichlorobenzene	U		0.164	0.500	1	11/04/2024 06:36	WG2394739
1,2,4-Trichlorobenzene	U		0.481	1.00	1	11/04/2024 06:36	WG2394739
1,1,1-Trichloroethane	U		0.149	0.500	1	11/04/2024 06:36	WG2394739
1,1,2-Trichloroethane	U		0.158	0.500	1	11/04/2024 06:36	WG2394739
Trichloroethene	U		0.190	0.500	1	11/04/2024 06:36	WG2394739
Trichlorofluoromethane	U		0.160	2.50	1	11/04/2024 06:36	WG2394739
1,2,3-Trichloropropane	U		0.237	2.50	1	11/04/2024 06:36	WG2394739
1,2,4-Trimethylbenzene	U		0.322	0.500	1	11/04/2024 06:36	WG2394739
1,2,3-Trimethylbenzene	U		0.104	0.500	1	11/04/2024 06:36	WG2394739
1,3,5-Trimethylbenzene	U		0.104	0.500	1	11/04/2024 06:36	WG2394739
Vinyl acetate	U		0.692	5.00	1	11/04/2024 06:36	WG2394739
Vinyl chloride	U		0.234	0.500	1	11/04/2024 06:36	WG2394739
Xylenes, Total	U		0.174	1.50	1	11/04/2024 06:36	WG2394739
(S) Toluene-d8	106			80.0-120		11/04/2024 06:36	WG2394739
(S) 4-Bromofluorobenzene	89.7			77.0-126		11/04/2024 06:36	WG2394739
(S) 1,2-Dichloroethane-d4	107			70.0-130		11/04/2024 06:36	WG2394739

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4141274-3 11/02/24 02:20

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C5-C8 Aliphatics	U		33.3	100
Unadjusted C9-C12 Aliphatics	U		33.3	100
Unadjusted C9-C10 Aromatics	U		33.3	100
Adjusted C5-C8 Aliphatics	U		33.3	100
Adjusted C9-C12 Aliphatics	U		33.3	100
Total VPH	U		66.7	200
(S) 2,5-Dibromotoluene(FID)	87.1			70.0-130
(S) 2,5-Dibromotoluene(PID)	78.2			70.0-130

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

(LCS) R4141274-1 11/01/24 23:54 • (LCSD) R4141274-2 11/02/24 00:30

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C5-C8 Aliphatics	1200	1310	1330	109	111	70.0-130			1.52	50
Unadjusted C9-C12 Aliphatics	1400	1700	1710	121	122	70.0-130			0.587	50
Unadjusted C9-C10 Aromatics	200	217	221	108	111	70.0-130			1.83	50
Total VPH	2800	3230	3260	115	116	70.0-130			0.924	50
(S) 2,5-Dibromotoluene(FID)				79.5	86.7	70.0-130				
(S) 2,5-Dibromotoluene(PID)				71.5	78.3	70.0-130				

L1792799-04 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1792799-04 11/02/24 04:47 • (MS) R4141274-4 11/02/24 15:12 • (MSD) R4141274-5 11/02/24 15:49

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	1320	1230	110	103	1	70.0-130			7.06	50
Unadjusted C9-C12 Aliphatics	1400	U	1740	1690	124	121	1	70.0-130			2.92	50
Unadjusted C9-C10 Aromatics	200	U	237	223	118	112	1	70.0-130			6.09	50
Total VPH	2800	U	3300	3140	118	112	1	70.0-130			4.97	50
(S) 2,5-Dibromotoluene(FID)					96.9	95.3		70.0-130				
(S) 2,5-Dibromotoluene(PID)					91.0	89.7		70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1792799-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1792799-10 11/02/24 07:14 • (MS) R4141274-6 11/02/24 16:26 • (MSD) R4141274-7 11/02/24 17:03

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	1250	1210	104	101	1	70.0-130			3.25	50
Unadjusted C9-C12 Aliphatics	1400	U	1690	1670	121	119	1	70.0-130			1.19	50
Unadjusted C9-C10 Aromatics	200	U	227	222	114	111	1	70.0-130			2.23	50
Total VPH	2800	U	3170	3100	113	111	1	70.0-130			2.23	50
(S) 2,5-Dibromotoluene(FID)					94.4	94.7		70.0-130				
(S) 2,5-Dibromotoluene(PID)					89.0	89.0		70.0-130				

L1792799-15 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1792799-15 11/02/24 10:17 • (MS) R4141274-8 11/02/24 17:39 • (MSD) R4141274-9 11/02/24 18:16

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Unadjusted C5-C8 Aliphatics	1200	1520	2700	2730	98.3	101	1	70.0-130			1.10	50
Unadjusted C9-C12 Aliphatics	1400	U	1700	1720	121	123	1	70.0-130			1.17	50
Unadjusted C9-C10 Aromatics	200	U	247	252	123	126	1	70.0-130			2.00	50
Total VPH	2800	1520	4650	4700	112	114	1	70.0-130			1.07	50
(S) 2,5-Dibromotoluene(FID)					92.2	90.1		70.0-130				
(S) 2,5-Dibromotoluene(PID)					87.2	85.0		70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4142106-3 11/04/24 06:15

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4142106-3 11/04/24 06:15

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	103			80.0-120
(S) 4-Bromofluorobenzene	94.2			77.0-126
(S) 1,2-Dichloroethane-d4	106			70.0-130

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R4142106-1 11/04/24 04:11 • (LCSD) R4142106-2 11/04/24 04:32

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Acetone	25.0	22.1	22.8	88.4	91.2	19.0-160	J	J	3.12	27
Acrylonitrile	25.0	26.0	26.0	104	104	55.0-149			0.000	20
Benzene	5.00	5.02	4.84	100	96.8	70.0-123			3.65	20
Bromobenzene	5.00	5.04	4.97	101	99.4	73.0-121			1.40	20
Bromodichloromethane	5.00	5.07	4.95	101	99.0	75.0-120			2.40	20
Bromochloromethane	5.00	5.38	5.41	108	108	76.0-122			0.556	20
Bromoform	5.00	4.69	4.28	93.8	85.6	68.0-132			9.14	20
Bromomethane	5.00	5.02	5.71	100	114	10.0-160			12.9	25
n-Butylbenzene	5.00	4.55	4.49	91.0	89.8	73.0-125			1.33	20
sec-Butylbenzene	5.00	5.10	4.97	102	99.4	75.0-125			2.58	20
tert-Butylbenzene	5.00	4.87	4.63	97.4	92.6	76.0-124			5.05	20
Carbon disulfide	5.00	4.81	4.62	96.2	92.4	61.0-128			4.03	20
Carbon tetrachloride	5.00	5.43	5.25	109	105	68.0-126			3.37	20
Chlorobenzene	5.00	5.23	5.30	105	106	80.0-121			1.33	20
Chlorodibromomethane	5.00	4.78	4.91	95.6	98.2	77.0-125			2.68	20
Chloroethane	5.00	4.96	4.76	99.2	95.2	47.0-150			4.12	20
2-Chloroethyl vinyl ether	25.0	14.3	14.2	57.2	56.8	51.0-160	J	J	0.702	20
Chloroform	5.00	5.17	4.90	103	98.0	73.0-120			5.36	20
Chloromethane	5.00	3.32	3.16	66.4	63.2	41.0-142			4.94	20
2-Chlorotoluene	5.00	5.01	4.92	100	98.4	76.0-123			1.81	20
4-Chlorotoluene	5.00	4.84	4.75	96.8	95.0	75.0-122			1.88	20
1,2-Dibromo-3-Chloropropane	5.00	3.72	3.37	74.4	67.4	58.0-134			9.87	20
1,2-Dibromoethane	5.00	4.87	4.60	97.4	92.0	80.0-122			5.70	20
Dibromomethane	5.00	5.28	5.07	106	101	80.0-120			4.06	20
1,2-Dichlorobenzene	5.00	5.06	4.96	101	99.2	79.0-121			2.00	20
1,3-Dichlorobenzene	5.00	4.93	4.91	98.6	98.2	79.0-120			0.406	20
1,4-Dichlorobenzene	5.00	5.09	4.95	102	99.0	79.0-120			2.79	20
Dichlorodifluoromethane	5.00	4.75	4.01	95.0	80.2	51.0-149			16.9	20
1,1-Dichloroethane	5.00	5.61	5.12	112	102	70.0-126			9.13	20
1,2-Dichloroethane	5.00	5.64	5.50	113	110	70.0-128			2.51	20
1,1-Dichloroethene	5.00	4.87	4.53	97.4	90.6	71.0-124			7.23	20
cis-1,2-Dichloroethene	5.00	5.00	5.03	100	101	73.0-120			0.598	20
trans-1,2-Dichloroethene	5.00	4.98	4.97	99.6	99.4	73.0-120			0.201	20
1,2-Dichloropropane	5.00	5.33	5.24	107	105	77.0-125			1.70	20
1,1-Dichloropropene	5.00	4.89	4.54	97.8	90.8	74.0-126			7.42	20
1,3-Dichloropropane	5.00	4.78	4.79	95.6	95.8	80.0-120			0.209	20
cis-1,3-Dichloropropene	5.00	4.72	4.82	94.4	96.4	80.0-123			2.10	20
trans-1,3-Dichloropropene	5.00	4.98	4.72	99.6	94.4	78.0-124			5.36	20
trans-1,4-Dichloro-2-butene	5.00	5.29	4.32	106	86.4	33.0-144		JJ3	20.2	20
2,2-Dichloropropane	5.00	5.10	4.54	102	90.8	58.0-130			11.6	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4142106-1 11/04/24 04:11 • (LCSD) R4142106-2 11/04/24 04:32

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Di-isopropyl ether	5.00	6.25	6.20	125	124	58.0-138			0.803	20
Ethylbenzene	5.00	4.94	4.64	98.8	92.8	79.0-123			6.26	20
Hexachloro-1,3-butadiene	5.00	4.51	4.35	90.2	87.0	54.0-138			3.61	20
2-Hexanone	25.0	19.6	18.9	78.4	75.6	67.0-149			3.64	20
n-Hexane	5.00	5.50	4.84	110	96.8	57.0-133			12.8	20
Iodomethane	25.0	12.3	15.0	49.2	60.0	33.0-147			19.8	26
Isopropylbenzene	5.00	4.84	4.63	96.8	92.6	76.0-127			4.44	20
p-Isopropyltoluene	5.00	4.89	4.85	97.8	97.0	76.0-125			0.821	20
2-Butanone (MEK)	25.0	23.3	23.5	93.2	94.0	44.0-160			0.855	20
Methylene Chloride	5.00	5.06	5.00	101	100	67.0-120			1.19	20
4-Methyl-2-pentanone (MIBK)	25.0	26.8	26.5	107	106	68.0-142			1.13	20
Methyl tert-butyl ether	5.00	4.59	4.64	91.8	92.8	68.0-125			1.08	20
Naphthalene	5.00	2.91	3.03	58.2	60.6	54.0-135			4.04	20
n-Propylbenzene	5.00	4.71	4.72	94.2	94.4	77.0-124			0.212	20
Styrene	5.00	4.56	4.67	91.2	93.4	73.0-130			2.38	20
1,1,1,2-Tetrachloroethane	5.00	5.45	5.04	109	101	75.0-125			7.82	20
1,1,2,2-Tetrachloroethane	5.00	4.81	4.89	96.2	97.8	65.0-130			1.65	20
1,1,2-Trichlorotrifluoroethane	5.00	4.81	4.35	96.2	87.0	69.0-132			10.0	20
Tetrachloroethene	5.00	4.85	4.54	97.0	90.8	72.0-132			6.60	20
Toluene	5.00	4.99	4.87	99.8	97.4	79.0-120			2.43	20
1,2,3-Trichlorobenzene	5.00	3.99	4.12	79.8	82.4	50.0-138			3.21	20
1,2,4-Trichlorobenzene	5.00	4.06	4.05	81.2	81.0	57.0-137			0.247	20
1,1,1-Trichloroethane	5.00	5.05	4.88	101	97.6	73.0-124			3.42	20
1,1,2-Trichloroethane	5.00	4.87	4.73	97.4	94.6	80.0-120			2.92	20
Trichloroethene	5.00	5.04	4.92	101	98.4	78.0-124			2.41	20
Trichlorofluoromethane	5.00	5.34	4.74	107	94.8	59.0-147			11.9	20
1,2,3-Trichloropropane	5.00	4.80	5.10	96.0	102	73.0-130			6.06	20
1,2,4-Trimethylbenzene	5.00	4.86	4.87	97.2	97.4	76.0-121			0.206	20
1,2,3-Trimethylbenzene	5.00	5.23	5.12	105	102	77.0-120			2.13	20
1,3,5-Trimethylbenzene	5.00	5.08	4.94	102	98.8	76.0-122			2.79	20
Vinyl acetate	25.0	36.5	36.3	146	145	11.0-160			0.549	20
Vinyl chloride	5.00	4.92	4.45	98.4	89.0	67.0-131			10.0	20
Xylenes, Total	15.0	15.0	14.6	100	97.3	79.0-123			2.70	20
(S) Toluene-d8				102	103	80.0-120				
(S) 4-Bromofluorobenzene				92.9	94.3	77.0-126				
(S) 1,2-Dichloroethane-d4				107	103	70.0-130				

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4139554-3 10/29/24 09:28

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C11-C22 Aromatics	58.5	J	49.2	600
(S) o-Terphenyl	58.0			40.0-140
(S) 2-Fluorobiphenyl	83.0			40.0-140
(S) 2-Bromonaphthalene	90.4			40.0-140

Method Blank (MB)

(MB) R4139554-6 10/30/24 08:03

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C9-C18 Aliphatics	U		69.6	600
Unadjusted C19-C36 Aliphatics	U		58.5	600
(S) 1-Chloro-octadecane	41.0			40.0-140

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

(LCS) R4139554-1 10/29/24 08:22 • (LCSD) R4139554-2 10/29/24 09:06

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	366	406	61.0	67.7	40.0-140	J	J	10.4	25
Unadjusted C19-C36 Aliphatics	800	545	547	68.1	68.4	40.0-140	J	J	0.366	25
(S) 1-Chloro-octadecane				48.5	51.1	40.0-140				

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

(LCS) R4139554-4 10/29/24 09:50 • (LCSD) R4139554-5 10/29/24 10:13

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C11-C22 Aromatics	1700	1360	1470	80.0	86.5	40.0-140			7.77	25
(S) o-Terphenyl				65.6	69.9	40.0-140				
(S) 2-Fluorobiphenyl				89.0	91.1	40.0-140				
(S) 2-Bromonaphthalene				97.5	99.8	40.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4142907-4 10/30/24 22:52

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

¹Cp

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Method Blank (MB)

(MB) R4142907-4 10/30/24 22:52

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	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	43.0			10.0-120
(S) Phenol-d5	28.0			10.0-120
(S) Nitrobenzene-d5	49.1			10.0-127
(S) 2-Fluorobiphenyl	68.8			10.0-130
(S) 2,4,6-Tribromophenol	57.5			10.0-155
(S) p-Terphenyl-d14	84.6			10.0-128

1Cp

2Tc

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Method Blank (MB)

(MB) R4142907-4 10/30/24 22:52

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

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Method Blank (MB)

(MB) R4142907-4 10/30/24 22:52

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) R4142907-1 10/30/24 21:47 • (LCSD) R4142907-2 10/30/24 22:09

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 %
Acenaphthene	50.0	40.5	35.1	81.0	70.2	41.0-120			14.3	22
Acenaphthylene	50.0	39.1	33.6	78.2	67.2	43.0-120			15.1	22
Anthracene	50.0	46.1	40.1	92.2	80.2	45.0-120			13.9	20
Benzidine	100	0.000	6.06	0.000	6.06	10.0-120	J4	J J3 J4	200	36
Benzo(a)anthracene	50.0	47.2	41.8	94.4	83.6	47.0-120			12.1	20
Benzo(b)fluoranthene	50.0	47.9	41.9	95.8	83.8	46.0-120			13.4	20
Benzo(k)fluoranthene	50.0	46.7	40.4	93.4	80.8	46.0-120			14.5	21
Benzo(g,h,i)perylene	50.0	44.9	38.0	89.8	76.0	48.0-121			16.6	20
Benzo(a)pyrene	50.0	47.8	40.2	95.6	80.4	47.0-120			17.3	20
Bis(2-chlorethoxy)methane	50.0	32.5	27.8	65.0	55.6	33.0-120			15.6	24
Bis(2-chloroethyl)ether	50.0	30.5	23.5	61.0	47.0	23.0-120			25.9	33
2,2-Oxybis(1-Chloropropane)	50.0	29.6	23.0	59.2	46.0	28.0-120			25.1	31
4-Bromophenyl-phenylether	50.0	51.2	45.8	102	91.6	45.0-120			11.1	20
2-Chloronaphthalene	50.0	38.8	32.8	77.6	65.6	37.0-120			16.8	25
4-Chlorophenyl-phenylether	50.0	46.3	41.7	92.6	83.4	44.0-120			10.5	20
Chrysene	50.0	44.9	39.5	89.8	79.0	48.0-120			12.8	20
Dibenz(a,h)anthracene	50.0	51.9	43.7	104	87.4	47.0-120			17.2	20
3,3-Dichlorobenzidine	100	61.7	75.7	61.7	75.7	44.0-120		J3	20.4	20
2,4-Dinitrotoluene	50.0	45.5	40.8	91.0	81.6	49.0-124			10.9	20
2,6-Dinitrotoluene	50.0	45.6	40.8	91.2	81.6	46.0-120			11.1	21
Fluoranthene	50.0	50.7	44.5	101	89.0	51.0-120			13.0	20
Fluorene	50.0	43.4	38.9	86.8	77.8	47.0-120			10.9	20
Hexachlorobenzene	50.0	51.1	44.5	102	89.0	44.0-120			13.8	20

1Cp

2Tc

3Ss

4Cn

5Sr

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7Gl

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9Sc

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

(LCS) R4142907-1 10/30/24 21:47 • (LCSD) R4142907-2 10/30/24 22:09

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Hexachloro-1,3-butadiene	50.0	34.6	26.8	69.2	53.6	19.0-120			25.4	32
Hexachlorocyclopentadiene	50.0	13.5	10.5	27.0	21.0	15.0-120			25.0	31
Hexachloroethane	50.0	28.8	20.5	57.6	41.0	15.0-120			33.7	37
Indeno(1,2,3-cd)pyrene	50.0	47.2	40.4	94.4	80.8	49.0-122			15.5	20
Isophorone	50.0	31.6	27.9	63.2	55.8	36.0-120			12.4	23
Naphthalene	50.0	29.8	24.0	59.6	48.0	27.0-120			21.6	27
Nitrobenzene	50.0	27.6	22.1	55.2	44.2	27.0-120			22.1	29
n-Nitrosodimethylamine	50.0	25.2	18.4	50.4	36.8	10.0-120			31.2	40
n-Nitrosodiphenylamine	50.0	40.9	36.7	81.8	73.4	47.0-120			10.8	20
n-Nitrosodi-n-propylamine	50.0	29.8	25.1	59.6	50.2	31.0-120			17.1	28
Phenanthrene	50.0	47.1	41.1	94.2	82.2	46.0-120			13.6	20
Benzylbutyl phthalate	50.0	48.9	43.0	97.8	86.0	43.0-121			12.8	20
Bis(2-Ethylhexyl)phthalate	50.0	41.2	36.1	82.4	72.2	43.0-122			13.2	20
Di-n-butyl phthalate	50.0	48.4	41.8	96.8	83.6	49.0-121			14.6	20
Diethyl phthalate	50.0	43.2	38.9	86.4	77.8	48.0-122			10.5	20
Dimethyl phthalate	50.0	45.3	40.8	90.6	81.6	48.0-120			10.5	20
Di-n-octyl phthalate	50.0	45.4	40.3	90.8	80.6	42.0-125			11.9	20
Pyrene	50.0	44.6	39.7	89.2	79.4	47.0-120			11.6	20
1,2,4-Trichlorobenzene	50.0	32.1	25.1	64.2	50.2	24.0-120			24.5	29
Aniline	50.0	2.34	15.0	4.68	30.0	13.0-120	J J4	J3	146	31
1,2-Diphenylhydrazine	50.0	38.6	34.9	77.2	69.8	41.0-126	N2	N2	10.1	20
Benzyl alcohol	50.0	30.3	24.6	60.6	49.2	25.0-120			20.8	26
4-Chloroaniline	50.0	14.9	20.4	29.8	40.8	25.0-120		J3	31.2	25
4-Chloro-3-methylphenol	50.0	36.7	32.9	73.4	65.8	40.0-120			10.9	21
2-Chlorophenol	50.0	32.6	24.3	65.2	48.6	25.0-120			29.2	35
Dibenzofuran	50.0	41.8	37.2	83.6	74.4	44.0-120			11.6	22
2,4-Dichlorophenol	50.0	35.7	29.5	71.4	59.0	36.0-120			19.0	26
2,4-Dimethylphenol	50.0	31.5	26.6	63.0	53.2	33.0-120			16.9	26
4,6-Dinitro-2-methylphenol	50.0	43.4	38.1	86.8	76.2	38.0-138			13.0	25
2,4-Dinitrophenol	50.0	38.0	33.0	76.0	66.0	10.0-120			14.1	39
2-Methylnaphthalene	50.0	35.6	30.4	71.2	60.8	33.0-120			15.8	25
2-Methylphenol	50.0	28.9	23.3	57.8	46.6	28.0-120			21.5	29
3&4-Methyl Phenol	50.0	30.8	25.7	61.6	51.4	31.0-120			18.1	30
2-Nitroaniline	50.0	46.2	40.5	92.4	81.0	43.0-120			13.1	22
3-Nitroaniline	50.0	38.1	34.4	76.2	68.8	38.0-120			10.2	21
4-Nitroaniline	50.0	44.5	39.7	89.0	79.4	18.0-160			11.4	21
2-Nitrophenol	50.0	33.6	27.1	67.2	54.2	31.0-120			21.4	29
4-Nitrophenol	50.0	18.3	16.1	36.6	32.2	10.0-120			12.8	33
Pentachlorophenol	50.0	33.7	28.5	67.4	57.0	23.0-120			16.7	25
Phenol	50.0	17.8	13.6	35.6	27.2	10.0-120			26.8	36

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4142907-1 10/30/24 21:47 • (LCSD) R4142907-2 10/30/24 22:09

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Pyridine	50.0	1.23	13.4	2.46	26.8	10.0-120	J J4	J3	166	38
2,4,6-Trichlorophenol	50.0	46.3	40.7	92.6	81.4	42.0-120			12.9	23
Acetophenone	50.0	31.3	25.3	62.6	50.6	29.0-120			21.2	28
Diphenylamine	50.0	40.9	36.7	81.8	73.4	35.0-120			10.8	20
1,2,4,5-Tetrachlorobenzene	50.0	42.0	36.0	84.0	72.0	31.0-121			15.4	27
2,3,4,6-Tetrachlorophenol	50.0	53.1	47.1	106	94.2	42.0-132			12.0	22
2,4,5-Trichlorophenol	50.0	47.1	40.5	94.2	81.0	44.0-120			15.1	22
(S) 2-Fluorophenol				50.5	37.8	10.0-120				
(S) Phenol-d5				34.0	26.2	10.0-120				
(S) Nitrobenzene-d5				51.6	42.8	10.0-127				
(S) 2-Fluorobiphenyl				82.0	68.7	10.0-130				
(S) 2,4,6-Tribromophenol				97.0	84.5	10.0-155				
(S) p-Terphenyl-d14				94.3	81.3	10.0-128				

Laboratory Control Sample (LCS)

(LCS) R4142907-3 10/30/24 22:30

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
2-Acetylaminofluorene	50.0	41.4	82.8	32.0-120	
4-Aminobiphenyl	50.0	8.07	16.1	20.0-120	J J4
Chlorobenzilate	50.0	48.2	96.4	29.0-128	J
Diallate	50.0	37.6	75.2	30.0-120	
2,6-Dichlorophenol	50.0	35.1	70.2	19.0-136	
Dimethoate	50.0	38.5	77.0	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	37.5	75.0	27.0-120	
Dimethylbenz (A) Anthracene	50.0	49.5	99.0	14.0-124	
3,3-Dimethylbenzidine	50.0	0.000	0.000	13.0-120	J4
a,a-Dimethylphenethylamine	50.0	0.480	0.960	10.0-129	J J4
1,3-Dinitrobenzene	50.0	43.3	86.6	34.0-120	
Diphenylamine	50.0	39.4	78.8	35.0-120	
Dinoseb	50.0	43.8	87.6	39.0-120	J
Disulfoton	50.0	36.2	72.4	32.0-120	
Ethyl methanesulfonate	50.0	31.6	63.2	10.0-120	
Ethyl Parathion	50.0	45.7	91.4	46.0-130	
Famphur	50.0	45.8	91.6	32.0-120	
Hexachloropropene	50.0	26.0	52.0	10.0-120	J
Hexachlorophene	100	0.000	0.000	10.0-120	J4
Isodrin	50.0	34.0	68.0	22.0-157	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4142907-3 10/30/24 22:30

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Isosafrole	50.0	39.4	78.8	25.0-133	
Kepone	50.0	34.8	69.6	10.0-120	
Methapyrilene	50.0	4.81	9.62	10.0-120	J J4
3-Methylcholanthrene	50.0	40.7	81.4	30.0-160	
Methyl methanesulfonate	50.0	25.3	50.6	10.0-120	J
Methyl parathion	50.0	47.2	94.4	42.0-120	
1,4-Naphthoquinone	50.0	3.71	7.42	50.0-150	J J4
1-Naphthylamine	50.0	12.7	25.4	19.0-120	
2-Naphthylamine	50.0	16.2	32.4	10.0-120	
5-Nitro-o-toluidine	50.0	39.8	79.6	34.0-120	
4-Nitroquinoline 1-oxide	50.0	31.0	62.0	10.0-159	
n-Nitrosodiethylamine	50.0	30.1	60.2	10.0-120	
n-Nitrosodi-n-butylamine	50.0	39.3	78.6	13.0-143	
n-Nitrosomethylethylamine	50.0	28.9	57.8	10.0-120	
n-Nitrosomorpholine	50.0	29.1	58.2	10.0-120	
n-Nitrosopiperidine	50.0	35.5	71.0	10.0-160	
n-Nitrosopyrrolidine	50.0	32.8	65.6	10.0-124	
Pentachlorobenzene	50.0	42.2	84.4	25.0-120	
Pentachloroethane	50.0	29.1	58.2	10.0-120	J
Pentachloronitrobenzene	50.0	47.5	95.0	34.0-132	
Phenacetin	50.0	45.6	91.2	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	38.7	77.4	13.0-160	J
2-Picoline	50.0	10.2	20.4	10.0-120	J
Pronamide	50.0	45.0	90.0	38.0-130	
Safrole	50.0	34.5	69.0	21.0-120	
Sulfotep	50.0	40.2	80.4	52.0-120	J
Thionazin	50.0	39.3	78.6	38.0-121	
o-Toluidine	50.0	18.7	37.4	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	37.1	74.2	11.0-135	
1,3,5-Trinitrobenzene	50.0	41.9	83.8	37.0-147	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

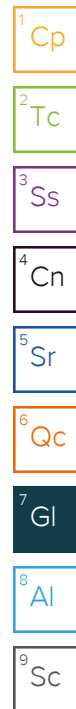
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

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

Abbreviations and Definitions

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

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
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.
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.



ACCREDITATIONS & LOCATIONS

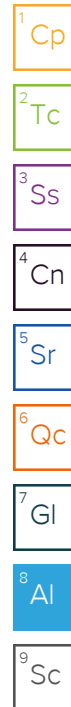
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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

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

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

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



[illegible]

R5

10/25-NCF-L1792897-ENVIRONCO PM

Time estimate: 0h

Time spent: 0h

Members



Paul Minnich (responsible)

- ☐ Parameter(s) past holding time
- ☐ Temperature not in range
- ☐ Improper container type
- ☐ pH not in range
- ☐ Insufficient sample volume
- ☐ Sample is biphasic
- ☐ Vials received with headspace
- ☒ Broken container
- ☒ Sufficient sample remains
- ☐ If broken container: Insufficient packing material around container
- ☒ If broken container: Insufficient packing material inside cooler
- ☐ If broken container: Improper handling by carrier: _____
- ☐ If broken container: Sample was frozen
- ☐ If broken container: Container lid not intact
- ☐ Client informed by Call
- ☐ Client informed by Email
- ☐ Client informed by Voicemail
- ☐ Date/Time: _____
- ☐ PM initials: _____
- ☐ Client Contact: _____

Comments

Paul Minnich

One HCl vial received broken

26 October 2024 4:16 AM

December 12, 2024

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1802699
Samples Received: 11/21/2024
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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¹ Cp
² Tc
³ Ss
⁴ Cn
⁵ Sr
⁶ Qc
⁷ Gl
⁸ Al
⁹ Sc

SAMPLE SUMMARY

CMR-SP200-241120 L1802699-01 GW

Collected by
Kyle Groves

Collected date/time
11/20/24 12:30

Received date/time
11/21/24 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2410443	10	11/30/24 03:56	11/30/24 03:56	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2410710	10	12/01/24 02:42	12/01/24 02:42	JBE	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2406679	1	11/22/24 03:27	11/26/24 10:50	DMG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2406679	1	11/22/24 03:27	11/26/24 14:39	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2407558	5	11/25/24 13:02	11/26/24 09:17	LS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2407558	5	11/25/24 13:02	12/10/24 19:53	ADF	Mt. Juliet, TN

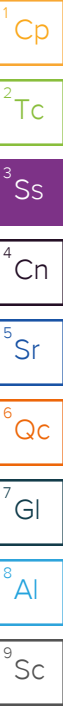
TRIP BLANK L1802699-02 GW

Collected by
Kyle Groves

Collected date/time
11/20/24 00:00

Received date/time
11/21/24 09:30

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2410443	1	11/29/24 17:27	11/29/24 17:27	NCD	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2410710	1	11/30/24 21:12	11/30/24 21:12	JBE	Mt. Juliet, TN



CASE NARRATIVE

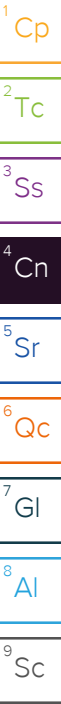
All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples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



Kelly Mercer
Project Manager

Project Narrative

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



Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	U		333	1000	10	11/30/2024 03:56	WG2410443
Unadjusted C9-C12 Aliphatics	745	B J	333	1000	10	11/30/2024 03:56	WG2410443
Unadjusted C9-C10 Aromatics	U		333	1000	10	11/30/2024 03:56	WG2410443
Adjusted C5-C8 Aliphatics	U		333	1000	10	11/30/2024 03:56	WG2410443
Adjusted C9-C12 Aliphatics	745	B J	333	1000	10	11/30/2024 03:56	WG2410443
Total VPH	1050	J	667	2000	10	11/30/2024 03:56	WG2410443
(S) 2,5-Dibromotoluene(FID)	104			70.0-130		11/30/2024 03:56	WG2410443
(S) 2,5-Dibromotoluene(PID)	108			70.0-130		11/30/2024 03:56	WG2410443

Sample Narrative:

L1802699-01 WG2410443: Lowest possible dilution due to sample foaming.

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acetone	U		113	250	10	12/01/2024 02:42	WG2410710
Acrylonitrile	U		6.71	50.0	10	12/01/2024 02:42	WG2410710
Benzene	U		0.941	5.00	10	12/01/2024 02:42	WG2410710
Bromobenzene	U		1.18	5.00	10	12/01/2024 02:42	WG2410710
Bromodichloromethane	U		1.36	5.00	10	12/01/2024 02:42	WG2410710
Bromochloromethane	U		1.28	5.00	10	12/01/2024 02:42	WG2410710
Bromoform	U		1.29	5.00	10	12/01/2024 02:42	WG2410710
Bromomethane	U		6.05	25.0	10	12/01/2024 02:42	WG2410710
n-Butylbenzene	U		1.57	5.00	10	12/01/2024 02:42	WG2410710
sec-Butylbenzene	U		1.25	5.00	10	12/01/2024 02:42	WG2410710
tert-Butylbenzene	U		1.27	5.00	10	12/01/2024 02:42	WG2410710
Carbon disulfide	2.53	J	0.962	5.00	10	12/01/2024 02:42	WG2410710
Carbon tetrachloride	U		1.28	5.00	10	12/01/2024 02:42	WG2410710
Chlorobenzene	U		1.17	5.00	10	12/01/2024 02:42	WG2410710
Chlorodibromomethane	U		1.40	5.00	10	12/01/2024 02:42	WG2410710
Chloroethane	U		1.92	25.0	10	12/01/2024 02:42	WG2410710
2-Chloroethyl vinyl ether	U		5.75	500	10	12/01/2024 02:42	WG2410710
Chloroform	U		1.11	5.00	10	12/01/2024 02:42	WG2410710
Chloromethane	U		9.60	12.5	10	12/01/2024 02:42	WG2410710
2-Chlorotoluene	U		1.06	5.00	10	12/01/2024 02:42	WG2410710
4-Chlorotoluene	U		1.14	5.00	10	12/01/2024 02:42	WG2410710
1,2-Dibromo-3-Chloropropane	U		2.76	25.0	10	12/01/2024 02:42	WG2410710
1,2-Dibromoethane	U		1.26	5.00	10	12/01/2024 02:42	WG2410710
Dibromomethane	U		1.22	5.00	10	12/01/2024 02:42	WG2410710
1,2-Dichlorobenzene	U		1.07	5.00	10	12/01/2024 02:42	WG2410710
1,3-Dichlorobenzene	U		2.99	5.00	10	12/01/2024 02:42	WG2410710
1,4-Dichlorobenzene	U		1.20	5.00	10	12/01/2024 02:42	WG2410710
Dichlorodifluoromethane	U		3.74	25.0	10	12/01/2024 02:42	WG2410710
1,1-Dichloroethane	U		1.00	5.00	10	12/01/2024 02:42	WG2410710
1,2-Dichloroethane	U		0.819	5.00	10	12/01/2024 02:42	WG2410710
1,1-Dichloroethene	U		1.88	5.00	10	12/01/2024 02:42	WG2410710
cis-1,2-Dichloroethene	U		1.26	5.00	10	12/01/2024 02:42	WG2410710
trans-1,2-Dichloroethene	U		1.49	5.00	10	12/01/2024 02:42	WG2410710
1,2-Dichloropropane	U		1.49	5.00	10	12/01/2024 02:42	WG2410710
1,1-Dichloropropene	U		1.42	5.00	10	12/01/2024 02:42	WG2410710
1,3-Dichloropropane	U		1.09	10.0	10	12/01/2024 02:42	WG2410710
cis-1,3-Dichloropropene	U		1.11	5.00	10	12/01/2024 02:42	WG2410710
trans-1,3-Dichloropropene	U		1.18	5.00	10	12/01/2024 02:42	WG2410710
trans-1,4-Dichloro-2-butene	U		4.67	50.0	10	12/01/2024 02:42	WG2410710
2,2-Dichloropropane	U		1.61	5.00	10	12/01/2024 02:42	WG2410710

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Di-isopropyl ether	U		1.05	5.00	10	12/01/2024 02:42	WG2410710
Ethylbenzene	U		1.37	5.00	10	12/01/2024 02:42	WG2410710
Hexachloro-1,3-butadiene	U		3.37	10.0	10	12/01/2024 02:42	WG2410710
2-Hexanone	U		7.87	50.0	10	12/01/2024 02:42	WG2410710
n-Hexane	U		7.49	50.0	10	12/01/2024 02:42	WG2410710
Iodomethane	U		5.54	50.0	10	12/01/2024 02:42	WG2410710
Isopropylbenzene	U		1.05	5.00	10	12/01/2024 02:42	WG2410710
p-Isopropyltoluene	U		1.20	5.00	10	12/01/2024 02:42	WG2410710
2-Butanone (MEK)	U		11.9	50.0	10	12/01/2024 02:42	WG2410710
Methylene Chloride	U		4.30	25.0	10	12/01/2024 02:42	WG2410710
4-Methyl-2-pentanone (MIBK)	U		4.78	50.0	10	12/01/2024 02:42	WG2410710
Methyl tert-butyl ether	U		1.01	5.00	10	12/01/2024 02:42	WG2410710
Naphthalene	U		1.74	25.0	10	12/01/2024 02:42	WG2410710
n-Propylbenzene	U		0.993	5.00	10	12/01/2024 02:42	WG2410710
Styrene	U		1.18	5.00	10	12/01/2024 02:42	WG2410710
1,1,1,2-Tetrachloroethane	U		1.47	5.00	10	12/01/2024 02:42	WG2410710
1,1,2,2-Tetrachloroethane	U		1.33	5.00	10	12/01/2024 02:42	WG2410710
1,1,2-Trichlorotrifluoroethane	U		1.80	5.00	10	12/01/2024 02:42	WG2410710
Tetrachloroethene	U		3.00	5.00	10	12/01/2024 02:42	WG2410710
Toluene	U		2.78	5.00	10	12/01/2024 02:42	WG2410710
1,2,3-Trichlorobenzene	U		1.64	5.00	10	12/01/2024 02:42	WG2410710
1,2,4-Trichlorobenzene	U		4.81	10.0	10	12/01/2024 02:42	WG2410710
1,1,1-Trichloroethane	U		1.49	5.00	10	12/01/2024 02:42	WG2410710
1,1,2-Trichloroethane	U		1.58	5.00	10	12/01/2024 02:42	WG2410710
Trichloroethene	U		1.90	5.00	10	12/01/2024 02:42	WG2410710
Trichlorofluoromethane	U		1.60	25.0	10	12/01/2024 02:42	WG2410710
1,2,3-Trichloropropane	U		2.37	25.0	10	12/01/2024 02:42	WG2410710
1,2,4-Trimethylbenzene	U		3.22	5.00	10	12/01/2024 02:42	WG2410710
1,2,3-Trimethylbenzene	U		1.04	5.00	10	12/01/2024 02:42	WG2410710
1,3,5-Trimethylbenzene	U		1.04	5.00	10	12/01/2024 02:42	WG2410710
Vinyl acetate	U		6.92	50.0	10	12/01/2024 02:42	WG2410710
Vinyl chloride	U		2.34	5.00	10	12/01/2024 02:42	WG2410710
Xylenes, Total	U		1.74	15.0	10	12/01/2024 02:42	WG2410710
(S) Toluene-d8	101			80.0-120		12/01/2024 02:42	WG2410710
(S) 4-Bromofluorobenzene	97.4			77.0-126		12/01/2024 02:42	WG2410710
(S) 1,2-Dichloroethane-d4	103			70.0-130		12/01/2024 02:42	WG2410710

Sample Narrative:

L1802699-01 WG2410710: Lowest possible dilution due to sample matrix.

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	2630		69.6	600	1	11/26/2024 10:50	WG2406679
Unadjusted C19-C36 Aliphatics	1170		58.5	600	1	11/26/2024 10:50	WG2406679
Unadjusted C11-C22 Aromatics	1350		49.2	600	1	11/26/2024 14:39	WG2406679
Unadjusted Total Petroleum Hydrocarbons	5150		200	600	1	11/26/2024 14:39	WG2406679
Adjusted C11-C22 Aromatics	1350		200	600	1	11/26/2024 14:39	WG2406679
Adjusted Total Petroleum Hydrocarbons	5150		200	600	1	11/26/2024 14:39	WG2406679
(S) o-Terphenyl	48.5			40.0-140		11/26/2024 14:39	WG2406679
(S) 1-Chloro-octadecane	25.1	J2		40.0-140		11/26/2024 10:50	WG2406679
(S) 2-Fluorobiphenyl	81.1			40.0-140		11/26/2024 14:39	WG2406679
(S) 2-Bromonaphthalene	83.4			40.0-140		11/26/2024 14:39	WG2406679

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

TPH by Method MTDEQ EPH

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

L1802699-01 WG2406679: 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	U		0.443	5.00	5	11/26/2024 09:17	WG2407558
Acenaphthylene	U		0.461	5.00	5	11/26/2024 09:17	WG2407558
Anthracene	U		0.402	5.00	5	11/26/2024 09:17	WG2407558
Benzdine	U	J3 J4	18.7	50.0	5	11/26/2024 09:17	WG2407558
Benzo(a)anthracene	U		0.995	5.00	5	11/26/2024 09:17	WG2407558
Benzo(b)fluoranthene	U		0.650	5.00	5	11/26/2024 09:17	WG2407558
Benzo(k)fluoranthene	U		0.600	5.00	5	11/26/2024 09:17	WG2407558
Benzo(g,h,i)perylene	U		0.605	5.00	5	11/26/2024 09:17	WG2407558
Benzo(a)pyrene	U		0.191	5.00	5	11/26/2024 09:17	WG2407558
Bis(2-chlorethoxy)methane	U		0.580	50.0	5	11/26/2024 09:17	WG2407558
Bis(2-chloroethyl)ether	U		0.685	50.0	5	11/26/2024 09:17	WG2407558
2,2-Oxybis(1-Chloropropane)	U		1.05	50.0	5	11/26/2024 09:17	WG2407558
4-Bromophenyl-phenylether	U		0.439	50.0	5	11/26/2024 09:17	WG2407558
2-Chloronaphthalene	U		0.324	5.00	5	11/26/2024 09:17	WG2407558
4-Chlorophenyl-phenylether	U		0.463	50.0	5	11/26/2024 09:17	WG2407558
Chrysene	U		0.650	5.00	5	11/26/2024 09:17	WG2407558
Dibenz(a,h)anthracene	U		0.322	5.00	5	11/26/2024 09:17	WG2407558
3,3-Dichlorobenzidine	U		1.06	50.0	5	11/26/2024 09:17	WG2407558
2,4-Dinitrotoluene	U		0.491	50.0	5	11/26/2024 09:17	WG2407558
2,6-Dinitrotoluene	U		1.25	50.0	5	11/26/2024 09:17	WG2407558
Fluoranthene	U		0.510	5.00	5	11/26/2024 09:17	WG2407558
Fluorene	U		0.422	5.00	5	11/26/2024 09:17	WG2407558
Hexachlorobenzene	U		0.378	5.00	5	11/26/2024 09:17	WG2407558
Hexachloro-1,3-butadiene	U		0.484	50.0	5	11/26/2024 09:17	WG2407558
Hexachlorocyclopentadiene	U		0.299	50.0	5	11/26/2024 09:17	WG2407558
Hexachloroethane	U		0.635	50.0	5	11/26/2024 09:17	WG2407558
Indeno(1,2,3-cd)pyrene	U		1.40	5.00	5	11/26/2024 09:17	WG2407558
Isophorone	U		0.715	50.0	5	11/26/2024 09:17	WG2407558
Naphthalene	U		0.795	5.00	5	11/26/2024 09:17	WG2407558
Nitrobenzene	U		1.48	50.0	5	11/26/2024 09:17	WG2407558
n-Nitrosodimethylamine	U		4.99	50.0	5	11/26/2024 09:17	WG2407558
n-Nitrosodiphenylamine	U		11.9	50.0	5	11/26/2024 09:17	WG2407558
n-Nitrosodi-n-propylamine	U		1.31	50.0	5	11/26/2024 09:17	WG2407558
Phenanthrene	U		0.560	5.00	5	11/26/2024 09:17	WG2407558
Benzylbutyl phthalate	U		3.83	15.0	5	11/26/2024 09:17	WG2407558
Bis(2-Ethylhexyl)phthalate	U		4.48	15.0	5	11/26/2024 09:17	WG2407558
Di-n-butyl phthalate	U		2.27	15.0	5	11/26/2024 09:17	WG2407558
Diethyl phthalate	U		1.43	15.0	5	11/26/2024 09:17	WG2407558
Dimethyl phthalate	U		1.30	15.0	5	11/26/2024 09:17	WG2407558
Di-n-octyl phthalate	U		4.66	15.0	5	11/26/2024 09:17	WG2407558
Pyrene	U		0.535	5.00	5	11/26/2024 09:17	WG2407558
1,2,4-Trichlorobenzene	U		0.349	50.0	5	11/26/2024 09:17	WG2407558
Aniline	U	J3 J4	8.25	50.0	5	11/26/2024 09:17	WG2407558
1,2-Diphenylhydrazine	U	N2	0.525	50.0	5	11/26/2024 09:17	WG2407558
Benzyl alcohol	U		2.82	50.0	5	11/26/2024 09:17	WG2407558
4-Chloroaniline	U	J3 J4	1.17	50.0	5	11/26/2024 09:17	WG2407558
4-Chloro-3-methylphenol	U		0.655	50.0	5	11/26/2024 09:17	WG2407558
2-Chlorophenol	U		0.665	50.0	5	11/26/2024 09:17	WG2407558
Dibenzofuran	U		0.485	50.0	5	11/26/2024 09:17	WG2407558
2,4-Dichlorophenol	U		0.510	50.0	5	11/26/2024 09:17	WG2407558

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2,4-Dimethylphenol	1.78	J	0.318	50.0	5	11/26/2024 09:17	WG2407558
4,6-Dinitro-2-methylphenol	U		5.60	50.0	5	11/26/2024 09:17	WG2407558
2,4-Dinitrophenol	U		29.7	50.0	5	11/26/2024 09:17	WG2407558
2-Methylnaphthalene	U		0.585	5.00	5	11/26/2024 09:17	WG2407558
2-Methylphenol	U		0.465	50.0	5	11/26/2024 09:17	WG2407558
3&4-Methyl Phenol	U		0.840	50.0	5	11/26/2024 09:17	WG2407558
2-Nitroaniline	U		0.510	50.0	5	11/26/2024 09:17	WG2407558
3-Nitroaniline	U		0.435	50.0	5	11/26/2024 09:17	WG2407558
4-Nitroaniline	U		0.455	50.0	5	11/26/2024 09:17	WG2407558
2-Nitrophenol	U		0.585	50.0	5	11/26/2024 09:17	WG2407558
4-Nitrophenol	U		0.715	50.0	5	11/26/2024 09:17	WG2407558
Pentachlorophenol	U		1.57	50.0	5	11/26/2024 09:17	WG2407558
Phenol	U		21.7	50.0	5	11/26/2024 09:17	WG2407558
Pyridine	U	J3 J4	3.13	50.0	5	11/26/2024 09:17	WG2407558
2,4,6-Trichlorophenol	U		0.500	50.0	5	11/26/2024 09:17	WG2407558
Acetophenone	U		1.04	50.0	5	11/26/2024 09:17	WG2407558
2-Acetylaminofluorene	U		1.27	50.0	5	12/10/2024 19:53	WG2407558
4-Aminobiphenyl	U		2.30	50.0	5	12/10/2024 19:53	WG2407558
Chlorobenzilate	U		19.2	250	5	12/10/2024 19:53	WG2407558
Diallate	U		2.62	50.0	5	12/10/2024 19:53	WG2407558
2,6-Dichlorophenol	U		0.510	50.0	5	12/10/2024 19:53	WG2407558
Dimethoate	U		25.3	250	5	12/10/2024 19:53	WG2407558
P-(Dimethylamino) Azobenzene	U		18.5	50.0	5	12/10/2024 19:53	WG2407558
Dimethylbenz (A) Anthracene	U		8.55	50.0	5	12/10/2024 19:53	WG2407558
3,3-Dimethylbenzidine	U		16.9	50.0	5	12/10/2024 19:53	WG2407558
a,a-Dimethylphenethylamine	U	J4	15.7	250	5	12/10/2024 19:53	WG2407558
1,3-Dinitrobenzene	U		1.80	50.0	5	12/10/2024 19:53	WG2407558
Diphenylamine	U		11.9	50.0	5	11/26/2024 09:17	WG2407558
Dinoseb	U		40.1	250	5	12/10/2024 19:53	WG2407558
Disulfoton	U		1.33	50.0	5	12/10/2024 19:53	WG2407558
Ethyl methanesulfonate	U		1.63	50.0	5	12/10/2024 19:53	WG2407558
Ethyl Parathion	U		1.90	50.0	5	12/10/2024 19:53	WG2407558
Famphur	U		19.6	100	5	12/10/2024 19:53	WG2407558
Hexachloropropene	U		0.745	250	5	12/10/2024 19:53	WG2407558
Hexachlorophene	U	J4	7.20	250	5	12/10/2024 19:53	WG2407558
Isodrin	U		20.5	50.0	5	12/10/2024 19:53	WG2407558
Isosafrole	U		19.4	50.0	5	12/10/2024 19:53	WG2407558
Kepone	U		13.3	100	5	12/10/2024 19:53	WG2407558
Methapyrilene	U		50.0	250	5	12/10/2024 19:53	WG2407558
3-Methylcholanthrene	U		0.820	50.0	5	12/10/2024 19:53	WG2407558
Methyl methanesulfonate	U		17.0	250	5	12/10/2024 19:53	WG2407558
Methyl parathion	U		1.07	50.0	5	12/10/2024 19:53	WG2407558
1,4-Naphthoquinone	U	J4	27.8	250	5	12/10/2024 19:53	WG2407558
1-Naphthylamine	U		1.44	50.0	5	12/10/2024 19:53	WG2407558
2-Naphthylamine	U		22.4	50.0	5	12/10/2024 19:53	WG2407558
5-Nitro-o-toluidine	U		9.95	50.0	5	12/10/2024 19:53	WG2407558
4-Nitroquinoline 1-oxide	U		10.2	50.0	5	12/10/2024 19:53	WG2407558
n-Nitrosodiethylamine	U		17.9	50.0	5	12/10/2024 19:53	WG2407558
n-Nitrosodi-n-butylamine	U		19.6	50.0	5	12/10/2024 19:53	WG2407558
n-Nitrosomethylethylamine	U		16.3	50.0	5	12/10/2024 19:53	WG2407558
n-Nitrosomorpholine	U		16.3	50.0	5	12/10/2024 19:53	WG2407558
n-Nitrosopiperidine	U		18.6	50.0	5	12/10/2024 19:53	WG2407558
n-Nitrosopyrrolidine	U		16.9	50.0	5	12/10/2024 19:53	WG2407558
Pentachlorobenzene	U		20.8	50.0	5	12/10/2024 19:53	WG2407558
Pentachloroethane	U		14.1	250	5	12/10/2024 19:53	WG2407558
Pentachloronitrobenzene	U		20.8	50.0	5	12/10/2024 19:53	WG2407558

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Phenacetin	U		23.3	50.0	5	12/10/2024 19:53	WG2407558
p-Phenylenediamine	U	J4	1940	34500	5	12/10/2024 19:53	WG2407558
Phorate	U		24.3	250	5	12/10/2024 19:53	WG2407558
2-Picoline	U		34.2	250	5	12/10/2024 19:53	WG2407558
Pronamide	U		21.1	50.0	5	12/10/2024 19:53	WG2407558
Safrole	U		18.4	50.0	5	12/10/2024 19:53	WG2407558
Sulfotep	U		19.9	250	5	12/10/2024 19:53	WG2407558
1,2,4,5-Tetrachlorobenzene	U		0.324	50.0	5	11/26/2024 09:17	WG2407558
2,3,4,6-Tetrachlorophenol	U		1.15	50.0	5	11/26/2024 09:17	WG2407558
Thionazin	U		20.4	50.0	5	12/10/2024 19:53	WG2407558
o-Toluidine	U		17.7	50.0	5	12/10/2024 19:53	WG2407558
2,4,5-Trichlorophenol	U		0.545	50.0	5	11/26/2024 09:17	WG2407558
O,O,O-Triethyl Phosphorothioate	U		14.6	50.0	5	12/10/2024 19:53	WG2407558
1,3,5-Trinitrobenzene	U		6.60	50.0	5	12/10/2024 19:53	WG2407558
(S) 2-Fluorophenol	24.4			10.0-120		11/26/2024 09:17	WG2407558
(S) Phenol-d5	13.7			10.0-120		11/26/2024 09:17	WG2407558
(S) Nitrobenzene-d5	37.9			10.0-127		11/26/2024 09:17	WG2407558
(S) 2-Fluorobiphenyl	52.4			10.0-130		11/26/2024 09:17	WG2407558
(S) 2,4,6-Tribromophenol	91.2			10.0-155		11/26/2024 09:17	WG2407558
(S) p-Terphenyl-d14	63.1			10.0-128		11/26/2024 09:17	WG2407558

Sample Narrative:

L1802699-01 WG2407558: Dilution due to matrix.

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	U		33.3	100	1	11/29/2024 17:27	WG2410443
Unadjusted C9-C12 Aliphatics	38.9	B J	33.3	100	1	11/29/2024 17:27	WG2410443
Unadjusted C9-C10 Aromatics	U		33.3	100	1	11/29/2024 17:27	WG2410443
Adjusted C5-C8 Aliphatics	U		33.3	100	1	11/29/2024 17:27	WG2410443
Adjusted C9-C12 Aliphatics	38.9	B J	33.3	100	1	11/29/2024 17:27	WG2410443
Total VPH	67.9	J	66.7	200	1	11/29/2024 17:27	WG2410443
(S) 2,5-Dibromotoluene(FID)	98.8			70.0-130		11/29/2024 17:27	WG2410443
(S) 2,5-Dibromotoluene(PID)	104			70.0-130		11/29/2024 17:27	WG2410443

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	15.7	J	11.3	25.0	1	11/30/2024 21:12	WG2410710
Acrylonitrile	U		0.671	5.00	1	11/30/2024 21:12	WG2410710
Benzene	U		0.0941	0.500	1	11/30/2024 21:12	WG2410710
Bromobenzene	U		0.118	0.500	1	11/30/2024 21:12	WG2410710
Bromodichloromethane	U		0.136	0.500	1	11/30/2024 21:12	WG2410710
Bromochloromethane	U		0.128	0.500	1	11/30/2024 21:12	WG2410710
Bromoform	U		0.129	0.500	1	11/30/2024 21:12	WG2410710
Bromomethane	U		0.605	2.50	1	11/30/2024 21:12	WG2410710
n-Butylbenzene	U		0.157	0.500	1	11/30/2024 21:12	WG2410710
sec-Butylbenzene	U		0.125	0.500	1	11/30/2024 21:12	WG2410710
tert-Butylbenzene	U		0.127	0.500	1	11/30/2024 21:12	WG2410710
Carbon disulfide	U		0.0962	0.500	1	11/30/2024 21:12	WG2410710
Carbon tetrachloride	U		0.128	0.500	1	11/30/2024 21:12	WG2410710
Chlorobenzene	U		0.117	0.500	1	11/30/2024 21:12	WG2410710
Chlorodibromomethane	U		0.140	0.500	1	11/30/2024 21:12	WG2410710
Chloroethane	U		0.192	2.50	1	11/30/2024 21:12	WG2410710
2-Chloroethyl vinyl ether	U		0.575	50.0	1	11/30/2024 21:12	WG2410710
Chloroform	U		0.111	0.500	1	11/30/2024 21:12	WG2410710
Chloromethane	U		0.960	1.25	1	11/30/2024 21:12	WG2410710
2-Chlorotoluene	U		0.106	0.500	1	11/30/2024 21:12	WG2410710
4-Chlorotoluene	U		0.114	0.500	1	11/30/2024 21:12	WG2410710
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	11/30/2024 21:12	WG2410710
1,2-Dibromoethane	U		0.126	0.500	1	11/30/2024 21:12	WG2410710
Dibromomethane	U		0.122	0.500	1	11/30/2024 21:12	WG2410710
1,2-Dichlorobenzene	U		0.107	0.500	1	11/30/2024 21:12	WG2410710
1,3-Dichlorobenzene	U		0.299	0.500	1	11/30/2024 21:12	WG2410710
1,4-Dichlorobenzene	U		0.120	0.500	1	11/30/2024 21:12	WG2410710
Dichlorodifluoromethane	U		0.374	2.50	1	11/30/2024 21:12	WG2410710
1,1-Dichloroethane	U		0.100	0.500	1	11/30/2024 21:12	WG2410710
1,2-Dichloroethane	U		0.0819	0.500	1	11/30/2024 21:12	WG2410710
1,1-Dichloroethene	U		0.188	0.500	1	11/30/2024 21:12	WG2410710
cis-1,2-Dichloroethene	U		0.126	0.500	1	11/30/2024 21:12	WG2410710
trans-1,2-Dichloroethene	U		0.149	0.500	1	11/30/2024 21:12	WG2410710
1,2-Dichloropropane	U		0.149	0.500	1	11/30/2024 21:12	WG2410710
1,1-Dichloropropene	U		0.142	0.500	1	11/30/2024 21:12	WG2410710
1,3-Dichloropropane	U		0.109	1.00	1	11/30/2024 21:12	WG2410710
cis-1,3-Dichloropropene	U		0.111	0.500	1	11/30/2024 21:12	WG2410710
trans-1,3-Dichloropropene	U		0.118	0.500	1	11/30/2024 21:12	WG2410710
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	11/30/2024 21:12	WG2410710
2,2-Dichloropropane	U		0.161	0.500	1	11/30/2024 21:12	WG2410710
Di-isopropyl ether	U		0.105	0.500	1	11/30/2024 21:12	WG2410710
Ethylbenzene	U		0.137	0.500	1	11/30/2024 21:12	WG2410710
Hexachloro-1,3-butadiene	U		0.337	1.00	1	11/30/2024 21:12	WG2410710



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	11/30/2024 21:12	WG2410710
n-Hexane	U		0.749	5.00	1	11/30/2024 21:12	WG2410710
Iodomethane	U		0.554	5.00	1	11/30/2024 21:12	WG2410710
Isopropylbenzene	U		0.105	0.500	1	11/30/2024 21:12	WG2410710
p-Isopropyltoluene	U		0.120	0.500	1	11/30/2024 21:12	WG2410710
2-Butanone (MEK)	U		1.19	5.00	1	11/30/2024 21:12	WG2410710
Methylene Chloride	U		0.430	2.50	1	11/30/2024 21:12	WG2410710
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	11/30/2024 21:12	WG2410710
Methyl tert-butyl ether	U		0.101	0.500	1	11/30/2024 21:12	WG2410710
Naphthalene	U		0.174	2.50	1	11/30/2024 21:12	WG2410710
n-Propylbenzene	U		0.0993	0.500	1	11/30/2024 21:12	WG2410710
Styrene	U		0.118	0.500	1	11/30/2024 21:12	WG2410710
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	11/30/2024 21:12	WG2410710
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	11/30/2024 21:12	WG2410710
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	11/30/2024 21:12	WG2410710
Tetrachloroethene	U		0.300	0.500	1	11/30/2024 21:12	WG2410710
Toluene	U		0.278	0.500	1	11/30/2024 21:12	WG2410710
1,2,3-Trichlorobenzene	U		0.164	0.500	1	11/30/2024 21:12	WG2410710
1,2,4-Trichlorobenzene	U		0.481	1.00	1	11/30/2024 21:12	WG2410710
1,1,1-Trichloroethane	U		0.149	0.500	1	11/30/2024 21:12	WG2410710
1,1,2-Trichloroethane	U		0.158	0.500	1	11/30/2024 21:12	WG2410710
Trichloroethene	U		0.190	0.500	1	11/30/2024 21:12	WG2410710
Trichlorofluoromethane	U		0.160	2.50	1	11/30/2024 21:12	WG2410710
1,2,3-Trichloropropane	U		0.237	2.50	1	11/30/2024 21:12	WG2410710
1,2,4-Trimethylbenzene	U		0.322	0.500	1	11/30/2024 21:12	WG2410710
1,2,3-Trimethylbenzene	U		0.104	0.500	1	11/30/2024 21:12	WG2410710
1,3,5-Trimethylbenzene	U		0.104	0.500	1	11/30/2024 21:12	WG2410710
Vinyl acetate	U		0.692	5.00	1	11/30/2024 21:12	WG2410710
Vinyl chloride	U		0.234	0.500	1	11/30/2024 21:12	WG2410710
Xylenes, Total	U		0.174	1.50	1	11/30/2024 21:12	WG2410710
(S) Toluene-d8	101			80.0-120		11/30/2024 21:12	WG2410710
(S) 4-Bromofluorobenzene	99.9			77.0-126		11/30/2024 21:12	WG2410710
(S) 1,2-Dichloroethane-d4	111			70.0-130		11/30/2024 21:12	WG2410710

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4154389-3 11/29/24 14:36

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	39.9	J	33.3	100
Unadjusted C9-C10 Aromatics	U		33.3	100
Adjusted C5-C8 Aliphatics	U		33.3	100
Adjusted C9-C12 Aliphatics	39.9	J	33.3	100
Total VPH	U		66.7	200
(S) 2,5-Dibromotoluene(FID)	107			70.0-130
(S) 2,5-Dibromotoluene(PID)	111			70.0-130

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

(LCS) R4154389-1 11/29/24 11:58 • (LCSD) R4154389-2 11/29/24 12:32

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	1060	1060	88.3	88.3	70.0-130			0.000	50
Unadjusted C9-C12 Aliphatics	1400	1390	1390	99.3	99.3	70.0-130			0.000	50
Unadjusted C9-C10 Aromatics	200	248	246	124	123	70.0-130			0.810	50
Total VPH	2800	2700	2700	96.4	96.4	70.0-130			0.000	50
(S) 2,5-Dibromotoluene(FID)				103	104	70.0-130				
(S) 2,5-Dibromotoluene(PID)				107	108	70.0-130				

L1802707-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1802707-01 11/29/24 21:32 • (MS) R4154389-4 11/30/24 08:00 • (MSD) R4154389-5 11/30/24 08:35

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	1290	1290	107	107	1	70.0-130			0.000	50
Unadjusted C9-C12 Aliphatics	1400	U	1590	1590	114	114	1	70.0-130			0.000	50
Unadjusted C9-C10 Aromatics	200	U	274	276	137	138	1	70.0-130	J5	J5	0.727	50
Total VPH	2800	U	3150	3160	113	113	1	70.0-130			0.317	50
(S) 2,5-Dibromotoluene(FID)					108	112		70.0-130				
(S) 2,5-Dibromotoluene(PID)					110	113		70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1803231-21 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1803231-21 11/30/24 02:11 • (MS) R4154389-6 11/30/24 09:11 • (MSD) R4154389-7 11/30/24 09:45

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Unadjusted C5-C8 Aliphatics	1200	U	1310	1280	109	107	1	70.0-130			2.32	50
Unadjusted C9-C12 Aliphatics	1400	37.7	1680	1640	117	114	1	70.0-130			2.41	50
Unadjusted C9-C10 Aromatics	200	U	283	277	142	139	1	70.0-130	J5	J5	2.14	50
Total VPH	2800	U	3270	3200	117	114	1	70.0-130			2.16	50
(S) 2,5-Dibromotoluene(FID)					110	105		70.0-130				
(S) 2,5-Dibromotoluene(PID)					112	108		70.0-130				

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4153628-2 11/30/24 20:24

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4153628-2 11/30/24 20:24

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	100			80.0-120
(S) 4-Bromofluorobenzene	97.5			77.0-126
(S) 1,2-Dichloroethane-d4	107			70.0-130

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R4153628-1 11/30/24 19:45

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Acetone	25.0	37.7	151	19.0-160	
Acrylonitrile	25.0	36.5	146	55.0-149	
Benzene	5.00	5.10	102	70.0-123	
Bromobenzene	5.00	5.32	106	73.0-121	
Bromodichloromethane	5.00	4.90	98.0	75.0-120	
Bromochloromethane	5.00	5.27	105	76.0-122	
Bromoform	5.00	3.69	73.8	68.0-132	
Bromomethane	5.00	4.87	97.4	10.0-160	
n-Butylbenzene	5.00	4.83	96.6	73.0-125	
sec-Butylbenzene	5.00	5.26	105	75.0-125	
tert-Butylbenzene	5.00	5.14	103	76.0-124	
Carbon disulfide	5.00	4.50	90.0	61.0-128	
Carbon tetrachloride	5.00	4.69	93.8	68.0-126	
Chlorobenzene	5.00	4.96	99.2	80.0-121	
Chlorodibromomethane	5.00	4.56	91.2	77.0-125	
Chloroethane	5.00	5.26	105	47.0-150	
2-Chloroethyl vinyl ether	25.0	29.6	118	51.0-160	U
Chloroform	5.00	4.98	99.6	73.0-120	
Chloromethane	5.00	5.74	115	41.0-142	
2-Chlorotoluene	5.00	5.09	102	76.0-123	
4-Chlorotoluene	5.00	5.10	102	75.0-122	
1,2-Dibromo-3-Chloropropane	5.00	3.94	78.8	58.0-134	
1,2-Dibromoethane	5.00	4.95	99.0	80.0-122	
Dibromomethane	5.00	5.05	101	80.0-120	
1,2-Dichlorobenzene	5.00	4.89	97.8	79.0-121	
1,3-Dichlorobenzene	5.00	4.69	93.8	79.0-120	
1,4-Dichlorobenzene	5.00	4.63	92.6	79.0-120	
Dichlorodifluoromethane	5.00	4.86	97.2	51.0-149	
1,1-Dichloroethane	5.00	5.33	107	70.0-126	
1,2-Dichloroethane	5.00	5.60	112	70.0-128	
1,1-Dichloroethene	5.00	5.25	105	71.0-124	
cis-1,2-Dichloroethene	5.00	5.14	103	73.0-120	
trans-1,2-Dichloroethene	5.00	5.24	105	73.0-120	
1,2-Dichloropropane	5.00	5.49	110	77.0-125	
1,1-Dichloropropene	5.00	5.42	108	74.0-126	
1,3-Dichloropropane	5.00	5.71	114	80.0-120	
cis-1,3-Dichloropropene	5.00	4.66	93.2	80.0-123	
trans-1,3-Dichloropropene	5.00	4.63	92.6	78.0-124	
trans-1,4-Dichloro-2-butene	5.00	4.21	84.2	33.0-144	U
2,2-Dichloropropane	5.00	4.35	87.0	58.0-130	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4153628-1 11/30/24 19:45

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Di-isopropyl ether	5.00	5.51	110	58.0-138	
Ethylbenzene	5.00	5.05	101	79.0-123	
Hexachloro-1,3-butadiene	5.00	3.79	75.8	54.0-138	
2-Hexanone	25.0	30.0	120	67.0-149	
n-Hexane	5.00	4.18	83.6	57.0-133	J
Iodomethane	25.0	23.9	95.6	33.0-147	
Isopropylbenzene	5.00	4.96	99.2	76.0-127	
p-Isopropyltoluene	5.00	5.14	103	76.0-125	
2-Butanone (MEK)	25.0	29.8	119	44.0-160	
Methylene Chloride	5.00	5.41	108	67.0-120	
4-Methyl-2-pentanone (MIBK)	25.0	30.4	122	68.0-142	
Methyl tert-butyl ether	5.00	4.82	96.4	68.0-125	
Naphthalene	5.00	3.79	75.8	54.0-135	
n-Propylbenzene	5.00	5.33	107	77.0-124	
Styrene	5.00	4.74	94.8	73.0-130	
1,1,1,2-Tetrachloroethane	5.00	4.44	88.8	75.0-125	
1,1,2,2-Tetrachloroethane	5.00	4.95	99.0	65.0-130	
1,1,2-Trichlorotrifluoroethane	5.00	4.52	90.4	69.0-132	
Tetrachloroethene	5.00	5.05	101	72.0-132	
Toluene	5.00	5.06	101	79.0-120	
1,2,3-Trichlorobenzene	5.00	3.75	75.0	50.0-138	
1,2,4-Trichlorobenzene	5.00	4.04	80.8	57.0-137	
1,1,1-Trichloroethane	5.00	5.05	101	73.0-124	
1,1,2-Trichloroethane	5.00	5.16	103	80.0-120	
Trichloroethene	5.00	5.24	105	78.0-124	
Trichlorofluoromethane	5.00	4.43	88.6	59.0-147	
1,2,3-Trichloropropane	5.00	5.53	111	73.0-130	
1,2,4-Trimethylbenzene	5.00	4.64	92.8	76.0-121	
1,2,3-Trimethylbenzene	5.00	4.61	92.2	77.0-120	
1,3,5-Trimethylbenzene	5.00	4.81	96.2	76.0-122	
Vinyl acetate	25.0	32.5	130	11.0-160	
Vinyl chloride	5.00	4.56	91.2	67.0-131	
Xylenes, Total	15.0	14.6	97.3	79.0-123	
(S) Toluene-d8			101	80.0-120	
(S) 4-Bromofluorobenzene			96.3	77.0-126	
(S) 1,2-Dichloroethane-d4			106	70.0-130	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4150246-1 11/25/24 07:53

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C9-C18 Aliphatics	U	U	69.6	600
Unadjusted C19-C36 Aliphatics	U	U	58.5	600
Unadjusted Total Petroleum Hydrocarbons	U	U	200	600
(S) 1-Chloro-octadecane	48.8			40.0-140

1Cp

2Tc

3Ss

4Cn

Method Blank (MB)

(MB) R4150246-4 11/25/24 09:17

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C11-C22 Aromatics	U	U	49.2	600
Unadjusted Total Petroleum Hydrocarbons	U	U	200	600
(S) o-Terphenyl	66.5			40.0-140
(S) 2-Fluorobiphenyl	80.6			40.0-140
(S) 2-Bromonaphthalene	88.5			40.0-140

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4150246-2 11/25/24 08:15 • (LCSD) R4150246-3 11/25/24 08:45

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C9-C18 Aliphatics	600	290	294	48.3	49.0	40.0-140	U	U	1.37	25
Unadjusted C19-C36 Aliphatics	800	562	542	70.3	67.8	40.0-140	U	U	3.62	25
(S) 1-Chloro-octadecane				50.9	48.6	40.0-140				

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

(LCS) R4150246-5 11/25/24 09:39 • (LCSD) R4150246-6 11/25/24 10:01

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	1470	1530	86.5	90.0	40.0-140			4.00	25
(S) o-Terphenyl				71.0	73.0	40.0-140				
(S) 2-Fluorobiphenyl				87.4	90.5	40.0-140				
(S) 2-Bromonaphthalene				95.6	98.9	40.0-140				

L1802489-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1802489-01 11/25/24 14:12 • (MS) R4150246-7 11/25/24 14:34 • (MSD) R4150246-8 11/25/24 14:57

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 C9-C18 Aliphatics	567	U	280	295	49.4	52.0	1	40.0-140	<u>J</u>	<u>J</u>	5.22	50
Unadjusted C19-C36 Aliphatics	756	U	511	524	67.6	69.3	1	40.0-140	<u>J</u>	<u>J</u>	2.51	50
(S) 1-Chloro-octadecane					23.1	26.7		40.0-140	<u>J2</u>	<u>J2</u>		

Sample Narrative:

OS: Sample produced heavy emulsion during Extraction process, low surr/spike recoveries due to matrix

L1802489-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1802489-01 11/26/24 08:54 • (MS) R4150246-10 11/26/24 07:25 • (MSD) R4150246-9 11/26/24 07:03

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 C11-C22 Aromatics	1610	U	1150	1260	71.4	78.3	1	40.0-140			9.13	50
(S) o-Terphenyl					54.4	59.9		40.0-140				
(S) 2-Fluorobiphenyl					85.3	88.8		40.0-140				
(S) 2-Bromonaphthalene					93.4	97.6		40.0-140				

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

Method Blank (MB)

(MB) R4150786-3 11/26/24 02:15

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4150786-3 11/26/24 02:15

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	29.3			10.0-120
(S) Phenol-d5	14.8			10.0-120
(S) Nitrobenzene-d5	52.0			10.0-127
(S) 2-Fluorobiphenyl	61.3			10.0-130
(S) 2,4,6-Tribromophenol	61.0			10.0-155
(S) p-Terphenyl-d14	68.9			10.0-128

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4156115-2 12/10/24 12:46

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4156115-2 12/10/24 12:46

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) R4150786-1 11/26/24 01:33 • (LCSD) R4150786-2 11/26/24 01:54

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 %
Acenaphthene	50.0	38.7	37.7	77.4	75.4	41.0-120			2.62	22
Acenaphthylene	50.0	36.6	36.1	73.2	72.2	43.0-120			1.38	22
Anthracene	50.0	39.9	39.5	79.8	79.0	45.0-120			1.01	20
Benzidine	100	0.000	6.12	0.000	6.12	10.0-120	J4	J J3 J4	200	36
Benzo(a)anthracene	50.0	38.2	38.4	76.4	76.8	47.0-120			0.522	20
Benzo(b)fluoranthene	50.0	39.1	39.6	78.2	79.2	46.0-120			1.27	20
Benzo(k)fluoranthene	50.0	38.9	39.9	77.8	79.8	46.0-120			2.54	21
Benzo(g,h,i)perylene	50.0	36.5	37.6	73.0	75.2	48.0-121			2.97	20
Benzo(a)pyrene	50.0	40.3	41.9	80.6	83.8	47.0-120			3.89	20
Bis(2-chlorethoxy)methane	50.0	34.8	35.0	69.6	70.0	33.0-120			0.573	24
Bis(2-chloroethyl)ether	50.0	33.0	34.4	66.0	68.8	23.0-120			4.15	33
2,2-Oxybis(1-Chloropropane)	50.0	31.4	33.0	62.8	66.0	28.0-120			4.97	31
4-Bromophenyl-phenylether	50.0	43.6	41.6	87.2	83.2	45.0-120			4.69	20
2-Chloronaphthalene	50.0	36.8	36.0	73.6	72.0	37.0-120			2.20	25
4-Chlorophenyl-phenylether	50.0	39.5	37.7	79.0	75.4	44.0-120			4.66	20
Chrysene	50.0	38.0	38.6	76.0	77.2	48.0-120			1.57	20
Dibenz(a,h)anthracene	50.0	39.9	40.7	79.8	81.4	47.0-120			1.99	20
3,3-Dichlorobenzidine	100	77.6	90.2	77.6	90.2	44.0-120			15.0	20
2,4-Dinitrotoluene	50.0	45.1	43.8	90.2	87.6	49.0-124			2.92	20
2,6-Dinitrotoluene	50.0	41.9	40.3	83.8	80.6	46.0-120			3.89	21
Fluoranthene	50.0	39.6	39.5	79.2	79.0	51.0-120			0.253	20
Fluorene	50.0	40.1	38.5	80.2	77.0	47.0-120			4.07	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4150786-1 11/26/24 01:33 • (LCSD) R4150786-2 11/26/24 01:54

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 %
Hexachlorobenzene	50.0	44.2	43.2	88.4	86.4	44.0-120			2.29	20
Hexachloro-1,3-butadiene	50.0	37.9	38.7	75.8	77.4	19.0-120			2.09	32
Hexachlorocyclopentadiene	50.0	22.2	23.3	44.4	46.6	15.0-120			4.84	31
Hexachloroethane	50.0	33.7	33.8	67.4	67.6	15.0-120			0.296	37
Indeno(1,2,3-cd)pyrene	50.0	38.3	40.1	76.6	80.2	49.0-122			4.59	20
Isophorone	50.0	33.3	33.5	66.6	67.0	36.0-120			0.599	23
Naphthalene	50.0	33.4	33.5	66.8	67.0	27.0-120			0.299	27
Nitrobenzene	50.0	31.1	31.3	62.2	62.6	27.0-120			0.641	29
n-Nitrosodimethylamine	50.0	16.8	18.2	33.6	36.4	10.0-120			8.00	40
n-Nitrosodiphenylamine	50.0	38.7	39.7	77.4	79.4	47.0-120			2.55	20
n-Nitrosodi-n-propylamine	50.0	29.9	30.6	59.8	61.2	31.0-120			2.31	28
Phenanthrene	50.0	38.9	37.5	77.8	75.0	46.0-120			3.66	20
Benzylbutyl phthalate	50.0	46.7	47.1	93.4	94.2	43.0-121			0.853	20
Bis(2-Ethylhexyl)phthalate	50.0	43.0	45.1	86.0	90.2	43.0-122			4.77	20
Di-n-butyl phthalate	50.0	43.6	44.6	87.2	89.2	49.0-121			2.27	20
Diethyl phthalate	50.0	40.4	39.5	80.8	79.0	48.0-122			2.25	20
Dimethyl phthalate	50.0	40.5	38.4	81.0	76.8	48.0-120			5.32	20
Di-n-octyl phthalate	50.0	42.9	44.0	85.8	88.0	42.0-125			2.53	20
Pyrene	50.0	41.5	42.4	83.0	84.8	47.0-120			2.15	20
1,2,4-Trichlorobenzene	50.0	36.9	38.0	73.8	76.0	24.0-120			2.94	29
Aniline	50.0	4.02	10.7	8.04	21.4	13.0-120	J J4	J3	90.8	31
1,2-Diphenylhydrazine	50.0	34.8	33.9	69.6	67.8	41.0-126	N2	N2	2.62	20
Benzyl alcohol	50.0	18.6	21.1	37.2	42.2	25.0-120			12.6	26
4-Chloroaniline	50.0	12.4	19.9	24.8	39.8	25.0-120	J4	J3	46.4	25
4-Chloro-3-methylphenol	50.0	29.4	32.2	58.8	64.4	40.0-120			9.09	21
2-Chlorophenol	50.0	25.4	28.8	50.8	57.6	25.0-120			12.5	35
Dibenzofuran	50.0	39.3	37.7	78.6	75.4	44.0-120			4.16	22
2,4-Dichlorophenol	50.0	33.5	37.3	67.0	74.6	36.0-120			10.7	26
2,4-Dimethylphenol	50.0	27.0	31.1	54.0	62.2	33.0-120			14.1	26
4,6-Dinitro-2-methylphenol	50.0	40.2	39.8	80.4	79.6	38.0-138			1.00	25
2,4-Dinitrophenol	50.0	31.4	33.8	62.8	67.6	10.0-120			7.36	39
2-Methylnaphthalene	50.0	37.5	37.9	75.0	75.8	33.0-120			1.06	25
2-Methylphenol	50.0	20.1	23.2	40.2	46.4	28.0-120			14.3	29
3&4-Methyl Phenol	50.0	21.3	23.9	42.6	47.8	31.0-120			11.5	30
2-Nitroaniline	50.0	41.1	39.6	82.2	79.2	43.0-120			3.72	22
3-Nitroaniline	50.0	31.8	34.8	63.6	69.6	38.0-120			9.01	21
4-Nitroaniline	50.0	32.9	34.8	65.8	69.6	18.0-160			5.61	21
2-Nitrophenol	50.0	37.4	39.7	74.8	79.4	31.0-120			5.97	29
4-Nitrophenol	50.0	11.0	11.4	22.0	22.8	10.0-120			3.57	33
Pentachlorophenol	50.0	26.7	30.2	53.4	60.4	23.0-120			12.3	25

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4150786-1 11/26/24 01:33 • (LCSD) R4150786-2 11/26/24 01:54

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 %
Phenol	50.0	9.10	9.60	18.2	19.2	10.0-120	J	J	5.35	36
Pyridine	50.0	4.58	11.2	9.16	22.4	10.0-120	J J4	J3	83.9	38
2,4,6-Trichlorophenol	50.0	37.9	38.3	75.8	76.6	42.0-120			1.05	23
Acetophenone	50.0	32.4	33.4	64.8	66.8	29.0-120			3.04	28
Diphenylamine	50.0	38.7	39.7	77.4	79.4	35.0-120			2.55	20
1,2,4,5-Tetrachlorobenzene	50.0	45.3	45.3	90.6	90.6	31.0-121			0.000	27
2,3,4,6-Tetrachlorophenol	50.0	42.5	43.2	85.0	86.4	42.0-132			1.63	22
2,4,5-Trichlorophenol	50.0	38.9	39.9	77.8	79.8	44.0-120			2.54	22
(S) 2-Fluorophenol				32.1	35.2	10.0-120				
(S) Phenol-d5				17.8	19.1	10.0-120				
(S) Nitrobenzene-d5				56.8	56.4	10.0-127				
(S) 2-Fluorobiphenyl				71.1	69.4	10.0-130				
(S) 2,4,6-Tribromophenol				93.0	92.5	10.0-155				
(S) p-Terphenyl-d14				80.0	83.6	10.0-128				

Laboratory Control Sample (LCS)

(LCS) R4156115-1 12/10/24 12:24

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Acetylaminofluorene	50.0	57.4	115	32.0-120	
4-Aminobiphenyl	50.0	21.8	43.6	20.0-120	
Chlorobenzilate	50.0	53.3	107	29.0-128	
Diallate	50.0	46.1	92.2	30.0-120	
2,6-Dichlorophenol	50.0	50.0	100	19.0-136	
Dimethoate	50.0	47.5	95.0	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	46.4	92.8	27.0-120	
Dimethylbenz (A) Anthracene	50.0	11.6	23.2	14.0-124	
3,3-Dimethylbenzidine	50.0	7.10	14.2	13.0-120	J
a,a-Dimethylphenethylamine	50.0	0.000	0.000	10.0-129	J4
1,3-Dinitrobenzene	50.0	53.9	108	34.0-120	
Diphenylamine	50.0	47.0	94.0	35.0-120	
Dinoseb	50.0	54.4	109	39.0-120	
Disulfoton	50.0	40.4	80.8	32.0-120	
Ethyl methanesulfonate	50.0	41.2	82.4	10.0-120	
Ethyl Parathion	50.0	59.8	120	46.0-130	
Famphur	50.0	48.0	96.0	32.0-120	
Hexachloropropene	50.0	33.9	67.8	10.0-120	J
Hexachlorophene	100	0.000	0.000	10.0-120	J4

Cp

Tc

Ss

Cn

Sr

Qc

Gl

Al

Sc

Laboratory Control Sample (LCS)

(LCS) R4156115-1 12/10/24 12:24

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Isodrin	50.0	55.3	111	22.0-157	
Isosafrole	50.0	44.3	88.6	25.0-133	
Kepone	50.0	51.2	102	10.0-120	
Methapyrilene	50.0	16.8	33.6	10.0-120	J
3-Methylcholanthrene	50.0	38.1	76.2	30.0-160	
Methyl methanesulfonate	50.0	29.3	58.6	10.0-120	J
Methyl parathion	50.0	58.8	118	42.0-120	
1,4-Naphthoquinone	50.0	2.15	4.30	50.0-150	J J4
1-Naphthylamine	50.0	18.3	36.6	19.0-120	
2-Naphthylamine	50.0	8.46	16.9	10.0-120	J
5-Nitro-o-toluidine	50.0	54.8	110	34.0-120	
4-Nitroquinoline 1-oxide	50.0	35.6	71.2	10.0-159	
n-Nitrosodiethylamine	50.0	41.3	82.6	10.0-120	
n-Nitrosodi-n-butylamine	50.0	59.2	118	13.0-143	
n-Nitrosomethylethylamine	50.0	37.5	75.0	10.0-120	
n-Nitrosomorpholine	50.0	33.9	67.8	10.0-120	
n-Nitrosopiperidine	50.0	49.3	98.6	10.0-160	
n-Nitrosopyrrolidine	50.0	38.3	76.6	10.0-124	
Pentachlorobenzene	50.0	47.3	94.6	25.0-120	
Pentachloroethane	50.0	40.6	81.2	10.0-120	J
Pentachloronitrobenzene	50.0	59.2	118	34.0-132	
Phenacetin	50.0	56.1	112	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	50.3	101	13.0-160	
2-Picoline	50.0	22.7	45.4	10.0-120	J
Pronamide	50.0	55.3	111	38.0-130	
Safrole	50.0	45.8	91.6	21.0-120	
Sulfotep	50.0	55.0	110	52.0-120	
Thionazin	50.0	54.3	109	38.0-121	
o-Toluidine	50.0	27.8	55.6	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	46.0	92.0	11.0-135	
1,3,5-Trinitrobenzene	50.0	62.5	125	37.0-147	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

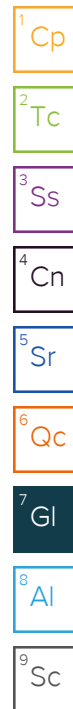
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

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

Abbreviations and Definitions

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

Qualifier	Description
B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J5	The sample matrix interfered with the ability to make any accurate determination; spike value is high.
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.



ACCREDITATIONS & LOCATIONS

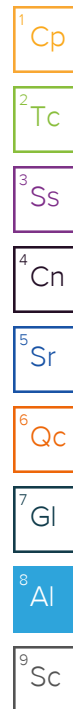
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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

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

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

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



Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1811434
Samples Received: 12/19/2024
Project Number:
Description: CMR Great Falls - 2023 RFI Soil Sampling
Site: GREAT FALLS, MT
Report To: Abby Small
1999 Broadway Suite 2225
Denver, CO 80202

Entire Report Reviewed By:



Kelly Mercer
Project Manager

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

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

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

SAMPLE SUMMARY

CMR-SP200-241218 L1811434-01 GW

Collected by
Kyle Groves

Collected date/time
12/18/24 12:10

Received date/time
12/19/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2425151	10	12/27/24 07:27	12/27/24 07:27	JAH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2425670	10	12/29/24 17:01	12/29/24 17:01	JTO	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2423993	3	12/22/24 18:04	12/30/24 07:49	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2422674	10	12/20/24 16:02	01/04/25 09:38	ADF	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2422674	10	12/20/24 16:02	12/26/24 19:32	ADF	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2426641	10	01/02/25 11:29	01/04/25 22:16	ADF	Mt. Juliet, TN

TRIP BLANK L1811434-02 GW

Collected by
Kyle Groves

Collected date/time
12/18/24 00:00

Received date/time
12/19/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2424147	1	12/24/24 01:36	12/24/24 01:36	JHH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2425670	1	12/29/24 10:50	12/29/24 10:50	JTO	Mt. Juliet, TN



ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

SDG:

L1811434

DATE/TIME:

01/06/25 15:56

PAGE:

3 of 30

CASE NARRATIVE

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



Kelly Mercer
Project Manager

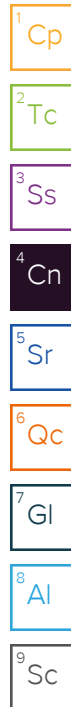
Project Narrative

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

Sample Delivery Group (SDG) Narrative

Analyzed from headspace vial.

<u>Lab Sample ID</u>	<u>Project Sample ID</u>	<u>Method</u>
L1811434-02	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	U		333	1000	10	12/27/2024 07:27	WG2425151
Unadjusted C9-C12 Aliphatics	2100		333	1000	10	12/27/2024 07:27	WG2425151
Unadjusted C9-C10 Aromatics	595	J	333	1000	10	12/27/2024 07:27	WG2425151
Adjusted C5-C8 Aliphatics	U		333	1000	10	12/27/2024 07:27	WG2425151
Adjusted C9-C12 Aliphatics	2100		333	1000	10	12/27/2024 07:27	WG2425151
Total VPH	2700		667	2000	10	12/27/2024 07:27	WG2425151
(S) 2,5-Dibromotoluene(FID)	98.7			70.0-130		12/27/2024 07:27	WG2425151
(S) 2,5-Dibromotoluene(PID)	89.9			70.0-130		12/27/2024 07:27	WG2425151

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		113	250	10	12/29/2024 17:01	WG2425670
Acrylonitrile	U		6.71	50.0	10	12/29/2024 17:01	WG2425670
Benzene	U		0.941	5.00	10	12/29/2024 17:01	WG2425670
Bromobenzene	U		1.18	5.00	10	12/29/2024 17:01	WG2425670
Bromodichloromethane	U		1.36	5.00	10	12/29/2024 17:01	WG2425670
Bromochloromethane	U		1.28	5.00	10	12/29/2024 17:01	WG2425670
Bromoform	U		1.29	5.00	10	12/29/2024 17:01	WG2425670
Bromomethane	U	J3	6.05	25.0	10	12/29/2024 17:01	WG2425670
n-Butylbenzene	U		1.57	5.00	10	12/29/2024 17:01	WG2425670
sec-Butylbenzene	U		1.25	5.00	10	12/29/2024 17:01	WG2425670
tert-Butylbenzene	U		1.27	5.00	10	12/29/2024 17:01	WG2425670
Carbon disulfide	U		0.962	5.00	10	12/29/2024 17:01	WG2425670
Carbon tetrachloride	U		1.28	5.00	10	12/29/2024 17:01	WG2425670
Chlorobenzene	U		1.17	5.00	10	12/29/2024 17:01	WG2425670
Chlorodibromomethane	U		1.40	5.00	10	12/29/2024 17:01	WG2425670
Chloroethane	U		1.92	25.0	10	12/29/2024 17:01	WG2425670
2-Chloroethyl vinyl ether	U		5.75	500	10	12/29/2024 17:01	WG2425670
Chloroform	U		1.11	5.00	10	12/29/2024 17:01	WG2425670
Chloromethane	U	J3	9.60	12.5	10	12/29/2024 17:01	WG2425670
2-Chlorotoluene	U		1.06	5.00	10	12/29/2024 17:01	WG2425670
4-Chlorotoluene	U		1.14	5.00	10	12/29/2024 17:01	WG2425670
1,2-Dibromo-3-Chloropropane	U		2.76	25.0	10	12/29/2024 17:01	WG2425670
1,2-Dibromoethane	U		1.26	5.00	10	12/29/2024 17:01	WG2425670
Dibromomethane	U		1.22	5.00	10	12/29/2024 17:01	WG2425670
1,2-Dichlorobenzene	U		1.07	5.00	10	12/29/2024 17:01	WG2425670
1,3-Dichlorobenzene	U		2.99	5.00	10	12/29/2024 17:01	WG2425670
1,4-Dichlorobenzene	U		1.20	5.00	10	12/29/2024 17:01	WG2425670
Dichlorodifluoromethane	U		3.74	25.0	10	12/29/2024 17:01	WG2425670
1,1-Dichloroethane	U		1.00	5.00	10	12/29/2024 17:01	WG2425670
1,2-Dichloroethane	U		0.819	5.00	10	12/29/2024 17:01	WG2425670
1,1-Dichloroethene	U	J3	1.88	5.00	10	12/29/2024 17:01	WG2425670
cis-1,2-Dichloroethene	U		1.26	5.00	10	12/29/2024 17:01	WG2425670
trans-1,2-Dichloroethene	U		1.49	5.00	10	12/29/2024 17:01	WG2425670
1,2-Dichloropropane	U		1.49	5.00	10	12/29/2024 17:01	WG2425670
1,1-Dichloropropene	U		1.42	5.00	10	12/29/2024 17:01	WG2425670
1,3-Dichloropropane	U		1.09	10.0	10	12/29/2024 17:01	WG2425670
cis-1,3-Dichloropropene	U		1.11	5.00	10	12/29/2024 17:01	WG2425670
trans-1,3-Dichloropropene	U		1.18	5.00	10	12/29/2024 17:01	WG2425670
trans-1,4-Dichloro-2-butene	U		4.67	50.0	10	12/29/2024 17:01	WG2425670
2,2-Dichloropropane	U		1.61	5.00	10	12/29/2024 17:01	WG2425670
Di-isopropyl ether	U		1.05	5.00	10	12/29/2024 17:01	WG2425670
Ethylbenzene	U		1.37	5.00	10	12/29/2024 17:01	WG2425670
Hexachloro-1,3-butadiene	U		3.37	10.0	10	12/29/2024 17:01	WG2425670

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Hexanone	U		7.87	50.0	10	12/29/2024 17:01	WG2425670
n-Hexane	U		7.49	50.0	10	12/29/2024 17:01	WG2425670
Iodomethane	U		5.54	50.0	10	12/29/2024 17:01	WG2425670
Isopropylbenzene	U		1.05	5.00	10	12/29/2024 17:01	WG2425670
p-Isopropyltoluene	U		1.20	5.00	10	12/29/2024 17:01	WG2425670
2-Butanone (MEK)	U	J4	11.9	50.0	10	12/29/2024 17:01	WG2425670
Methylene Chloride	U		4.30	25.0	10	12/29/2024 17:01	WG2425670
4-Methyl-2-pentanone (MIBK)	U		4.78	50.0	10	12/29/2024 17:01	WG2425670
Methyl tert-butyl ether	U		1.01	5.00	10	12/29/2024 17:01	WG2425670
Naphthalene	U		1.74	25.0	10	12/29/2024 17:01	WG2425670
n-Propylbenzene	U		0.993	5.00	10	12/29/2024 17:01	WG2425670
Styrene	U		1.18	5.00	10	12/29/2024 17:01	WG2425670
1,1,1,2-Tetrachloroethane	U		1.47	5.00	10	12/29/2024 17:01	WG2425670
1,1,2,2-Tetrachloroethane	U		1.33	5.00	10	12/29/2024 17:01	WG2425670
1,1,2-Trichlorotrifluoroethane	U		1.80	5.00	10	12/29/2024 17:01	WG2425670
Tetrachloroethene	U		3.00	5.00	10	12/29/2024 17:01	WG2425670
Toluene	U		2.78	5.00	10	12/29/2024 17:01	WG2425670
1,2,3-Trichlorobenzene	U		1.64	5.00	10	12/29/2024 17:01	WG2425670
1,2,4-Trichlorobenzene	U		4.81	10.0	10	12/29/2024 17:01	WG2425670
1,1,1-Trichloroethane	U		1.49	5.00	10	12/29/2024 17:01	WG2425670
1,1,2-Trichloroethane	U		1.58	5.00	10	12/29/2024 17:01	WG2425670
Trichloroethene	U		1.90	5.00	10	12/29/2024 17:01	WG2425670
Trichlorofluoromethane	U		1.60	25.0	10	12/29/2024 17:01	WG2425670
1,2,3-Trichloropropane	U		2.37	25.0	10	12/29/2024 17:01	WG2425670
1,2,4-Trimethylbenzene	U		3.22	5.00	10	12/29/2024 17:01	WG2425670
1,2,3-Trimethylbenzene	2.08	J	1.04	5.00	10	12/29/2024 17:01	WG2425670
1,3,5-Trimethylbenzene	1.33	J	1.04	5.00	10	12/29/2024 17:01	WG2425670
Vinyl acetate	U		6.92	50.0	10	12/29/2024 17:01	WG2425670
Vinyl chloride	U	J3 J4	2.34	5.00	10	12/29/2024 17:01	WG2425670
Xylenes, Total	U		1.74	15.0	10	12/29/2024 17:01	WG2425670
(S) Toluene-d8	105			80.0-120		12/29/2024 17:01	WG2425670
(S) 4-Bromofluorobenzene	99.0			77.0-126		12/29/2024 17:01	WG2425670
(S) 1,2-Dichloroethane-d4	125			70.0-130		12/29/2024 17:01	WG2425670

Sample Narrative:

L1811434-01 WG2425670: Non-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	12300		209	1800	3	12/30/2024 07:49	WG2423993
Unadjusted C19-C36 Aliphatics	5270		176	1800	3	12/30/2024 07:49	WG2423993
Unadjusted C11-C22 Aromatics	5770		148	1800	3	12/30/2024 07:49	WG2423993
Unadjusted Total Petroleum Hydrocarbons	23300		600	1800	3	12/30/2024 07:49	WG2423993
Adjusted C11-C22 Aromatics	5770		600	1800	3	12/30/2024 07:49	WG2423993
Adjusted Total Petroleum Hydrocarbons	23300		600	1800	3	12/30/2024 07:49	WG2423993
(S) o-Terphenyl	57.4			40.0-140		12/30/2024 07:49	WG2423993
(S) 1-Chloro-octadecane	33.8	J2		40.0-140		12/30/2024 07:49	WG2423993
(S) 2-Fluorobiphenyl	110			40.0-140		12/30/2024 07:49	WG2423993
(S) 2-Bromonaphthalene	96.5			40.0-140		12/30/2024 07:49	WG2423993

Sample Narrative:

L1811434-01 WG2423993: Sample produced emulsion during Extraction process, low surr/spike recoveries due to matrix.

L1811434-01 WG2423993: Dilution due to matrix impact during extraction procedure

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Acenaphthene	U		0.886	10.0	10	12/26/2024 19:32	WG2422674
Acenaphthylene	U		0.921	10.0	10	12/26/2024 19:32	WG2422674
Anthracene	U		0.804	10.0	10	12/26/2024 19:32	WG2422674
Benzidine	U	J4	37.4	100	10	12/26/2024 19:32	WG2422674
Benzo(a)anthracene	U		1.99	10.0	10	12/26/2024 19:32	WG2422674
Benzo(b)fluoranthene	U		1.30	10.0	10	12/26/2024 19:32	WG2422674
Benzo(k)fluoranthene	U		1.20	10.0	10	12/26/2024 19:32	WG2422674
Benzo(g,h,i)perylene	U		1.21	10.0	10	12/26/2024 19:32	WG2422674
Benzo(a)pyrene	U		0.381	10.0	10	12/26/2024 19:32	WG2422674
Bis(2-chloroethoxy)methane	U		1.16	100	10	12/26/2024 19:32	WG2422674
Bis(2-chloroethyl)ether	U		1.37	100	10	12/26/2024 19:32	WG2422674
2,2-Oxybis(1-Chloropropane)	U		2.10	100	10	12/26/2024 19:32	WG2422674
4-Bromophenyl-phenylether	U		0.877	100	10	12/26/2024 19:32	WG2422674
2-Chloronaphthalene	U		0.648	10.0	10	12/26/2024 19:32	WG2422674
4-Chlorophenyl-phenylether	U		0.926	100	10	12/26/2024 19:32	WG2422674
Chrysene	U		1.30	10.0	10	12/26/2024 19:32	WG2422674
Dibenz(a,h)anthracene	U		0.644	10.0	10	12/26/2024 19:32	WG2422674
3,3-Dichlorobenzidine	U		2.12	100	10	12/26/2024 19:32	WG2422674
2,4-Dinitrotoluene	U		0.983	100	10	12/26/2024 19:32	WG2422674
2,6-Dinitrotoluene	U		2.50	100	10	12/26/2024 19:32	WG2422674
Fluoranthene	U		1.02	10.0	10	12/26/2024 19:32	WG2422674
Fluorene	U		0.844	10.0	10	12/26/2024 19:32	WG2422674
Hexachlorobenzene	U		0.755	10.0	10	12/26/2024 19:32	WG2422674
Hexachloro-1,3-butadiene	U		0.968	100	10	12/26/2024 19:32	WG2422674
Hexachlorocyclopentadiene	U	J3	0.598	100	10	12/26/2024 19:32	WG2422674
Hexachloroethane	U		1.27	100	10	12/26/2024 19:32	WG2422674
Indeno(1,2,3-cd)pyrene	U		2.79	10.0	10	12/26/2024 19:32	WG2422674
Isophorone	U		1.43	100	10	12/26/2024 19:32	WG2422674
Naphthalene	1.61	B J	1.59	10.0	10	12/26/2024 19:32	WG2422674
Naphthalene	U	Q	1.59	10.0	10	01/04/2025 22:16	WG2426641
Nitrobenzene	U		2.97	100	10	12/26/2024 19:32	WG2422674
n-Nitrosodimethylamine	U		9.98	100	10	12/26/2024 19:32	WG2422674
n-Nitrosodiphenylamine	U		23.7	100	10	12/26/2024 19:32	WG2422674
n-Nitrosodi-n-propylamine	U		2.61	100	10	12/26/2024 19:32	WG2422674
Phenanthrene	U		1.12	10.0	10	12/26/2024 19:32	WG2422674
Benzylbutyl phthalate	U		7.65	30.0	10	12/26/2024 19:32	WG2422674
Bis(2-Ethylhexyl)phthalate	U		8.95	30.0	10	12/26/2024 19:32	WG2422674
Di-n-butyl phthalate	U		4.53	30.0	10	12/26/2024 19:32	WG2422674
Diethyl phthalate	U		2.87	30.0	10	12/26/2024 19:32	WG2422674
Dimethyl phthalate	U		2.60	30.0	10	12/26/2024 19:32	WG2422674
Di-n-octyl phthalate	U		9.32	30.0	10	12/26/2024 19:32	WG2422674
Pyrene	U		1.07	10.0	10	12/26/2024 19:32	WG2422674
1,2,4-Trichlorobenzene	U		0.698	100	10	12/26/2024 19:32	WG2422674
Aniline	U	J3 J4	16.5	100	10	12/26/2024 19:32	WG2422674
1,2-Diphenylhydrazine	U	N2	1.05	100	10	12/26/2024 19:32	WG2422674
Benzyl alcohol	U	J3	5.63	100	10	12/26/2024 19:32	WG2422674
4-Chloroaniline	U	J3	2.34	100	10	12/26/2024 19:32	WG2422674
4-Chloro-3-methylphenol	U	J3 J4	1.31	100	10	12/26/2024 19:32	WG2422674
2-Chlorophenol	U	J3	1.33	100	10	12/26/2024 19:32	WG2422674
Dibenzofuran	U		0.970	100	10	12/26/2024 19:32	WG2422674
2,4-Dichlorophenol	U	J3	1.02	100	10	12/26/2024 19:32	WG2422674
2,4-Dimethylphenol	6.89	J J3 J4	0.636	100	10	12/26/2024 19:32	WG2422674
4,6-Dinitro-2-methylphenol	U		11.2	100	10	12/26/2024 19:32	WG2422674
2,4-Dinitrophenol	U	J3	59.3	100	10	12/26/2024 19:32	WG2422674
2-Methylnaphthalene	U		1.17	10.0	10	12/26/2024 19:32	WG2422674
2-Methylphenol	U	J3 J4	0.929	100	10	12/26/2024 19:32	WG2422674

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

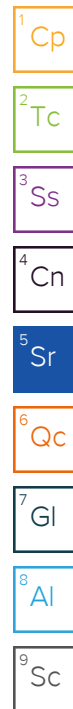
7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
3&4-Methyl Phenol	U	<u>J3</u>	1.68	100	10	12/26/2024 19:32	WG2422674
2-Nitroaniline	U		1.02	100	10	12/26/2024 19:32	WG2422674
3-Nitroaniline	U	<u>J3</u>	0.869	100	10	12/26/2024 19:32	WG2422674
4-Nitroaniline	U		0.910	100	10	12/26/2024 19:32	WG2422674
2-Nitrophenol	U		1.17	100	10	12/26/2024 19:32	WG2422674
4-Nitrophenol	U	<u>J3</u>	1.43	100	10	12/26/2024 19:32	WG2422674
Pentachlorophenol	U	<u>J3</u>	3.13	100	10	12/26/2024 19:32	WG2422674
Phenol	U		43.3	100	10	12/26/2024 19:32	WG2422674
Pyridine	U	<u>J3 J4</u>	6.27	100	10	12/26/2024 19:32	WG2422674
2,4,6-Trichlorophenol	U	<u>J3</u>	1.00	100	10	12/26/2024 19:32	WG2422674
Acetophenone	U		2.08	100	10	12/26/2024 19:32	WG2422674
2-Acetylaminofluorene	U		2.53	100	10	01/04/2025 09:38	WG2422674
4-Aminobiphenyl	U		4.61	100	10	01/04/2025 09:38	WG2422674
Chlorobenzilate	U		38.4	500	10	01/04/2025 09:38	WG2422674
Diallate	U		5.24	100	10	01/04/2025 09:38	WG2422674
2,6-Dichlorophenol	U		1.02	100	10	01/04/2025 09:38	WG2422674
Dimethoate	U		50.5	500	10	01/04/2025 09:38	WG2422674
P-(Dimethylamino) Azobenzene	U		36.9	100	10	01/04/2025 09:38	WG2422674
Dimethylbenz (A) Anthracene	U		17.1	100	10	01/04/2025 09:38	WG2422674
3,3-Dimethylbenzidine	U		33.9	100	10	01/04/2025 09:38	WG2422674
a,a-Dimethylphenethylamine	U	<u>J4</u>	31.3	500	10	01/04/2025 09:38	WG2422674
1,3-Dinitrobenzene	U		3.59	100	10	01/04/2025 09:38	WG2422674
Diphenylamine	U	<u>J4</u>	23.7	100	10	12/26/2024 19:32	WG2422674
Dinoseb	U		80.1	500	10	01/04/2025 09:38	WG2422674
Disulfoton	U		2.67	100	10	01/04/2025 09:38	WG2422674
Ethyl methanesulfonate	U		3.26	100	10	01/04/2025 09:38	WG2422674
Ethyl Parathion	U	<u>J4</u>	3.79	100	10	01/04/2025 09:38	WG2422674
Famphur	U	<u>J4</u>	39.2	200	10	01/04/2025 09:38	WG2422674
Hexachloropropene	U		1.49	500	10	01/04/2025 09:38	WG2422674
Hexachlorophene	U	<u>J4</u>	14.4	500	10	01/04/2025 09:38	WG2422674
Isodrin	U		41.1	100	10	01/04/2025 09:38	WG2422674
Isosafrole	U		38.8	100	10	01/04/2025 09:38	WG2422674
Kepone	U	<u>J4</u>	26.6	200	10	01/04/2025 09:38	WG2422674
Methapyrilene	U		100	500	10	01/04/2025 09:38	WG2422674
3-Methylcholanthrene	U		1.64	100	10	01/04/2025 09:38	WG2422674
Methyl methanesulfonate	U		34.0	500	10	01/04/2025 09:38	WG2422674
Methyl parathion	U	<u>J4</u>	2.13	100	10	01/04/2025 09:38	WG2422674
1,4-Naphthoquinone	U	<u>J4</u>	55.6	500	10	01/04/2025 09:38	WG2422674
1-Naphthylamine	U		2.89	100	10	01/04/2025 09:38	WG2422674
2-Naphthylamine	U		44.8	100	10	01/04/2025 09:38	WG2422674
5-Nitro-o-toluidine	U		19.9	100	10	01/04/2025 09:38	WG2422674
4-Nitroquinoline 1-oxide	U		20.3	100	10	01/04/2025 09:38	WG2422674
n-Nitrosodiethylamine	U		35.7	100	10	01/04/2025 09:38	WG2422674
n-Nitrosodi-n-butylamine	U		39.1	100	10	01/04/2025 09:38	WG2422674
n-Nitrosomethylethylamine	U		32.5	100	10	01/04/2025 09:38	WG2422674
n-Nitrosomorpholine	U		32.5	100	10	01/04/2025 09:38	WG2422674
n-Nitrosopiperidine	U		37.2	100	10	01/04/2025 09:38	WG2422674
n-Nitrosopyrrolidine	U		33.9	100	10	01/04/2025 09:38	WG2422674
Pentachlorobenzene	U		41.5	100	10	01/04/2025 09:38	WG2422674
Pentachloroethane	U		28.3	500	10	01/04/2025 09:38	WG2422674
Pentachloronitrobenzene	U		41.5	100	10	01/04/2025 09:38	WG2422674
Phenacetin	U		46.6	100	10	01/04/2025 09:38	WG2422674
p-Phenylenediamine	U	<u>J4</u>	3870	69000	10	01/04/2025 09:38	WG2422674
Phorate	U		48.6	500	10	01/04/2025 09:38	WG2422674
2-Picoline	U		68.3	500	10	01/04/2025 09:38	WG2422674
Pronamide	U		42.1	100	10	01/04/2025 09:38	WG2422674



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
Safrole	U		36.8	100	10	01/04/2025 09:38	WG2422674
Sulfotep	U	J4	39.9	500	10	01/04/2025 09:38	WG2422674
1,2,4,5-Tetrachlorobenzene	U		0.647	100	10	12/26/2024 19:32	WG2422674
2,3,4,6-Tetrachlorophenol	U	J3	2.31	100	10	12/26/2024 19:32	WG2422674
Thionazin	U		40.7	100	10	01/04/2025 09:38	WG2422674
o-Toluidine	U		35.3	100	10	01/04/2025 09:38	WG2422674
2,4,5-Trichlorophenol	U	J3	1.09	100	10	12/26/2024 19:32	WG2422674
O,O,O-Triethyl Phosphorothioate	U		29.3	100	10	01/04/2025 09:38	WG2422674
1,3,5-Trinitrobenzene	U		13.2	100	10	01/04/2025 09:38	WG2422674
(S) 2-Fluorophenol	23.4			10.0-120		12/26/2024 19:32	WG2422674
(S) 2-Fluorophenol	27.8			10.0-120		01/04/2025 22:16	WG2426641
(S) Phenol-d5	22.5			10.0-120		12/26/2024 19:32	WG2422674
(S) Phenol-d5	17.0			10.0-120		01/04/2025 22:16	WG2426641
(S) Nitrobenzene-d5	57.4			10.0-127		12/26/2024 19:32	WG2422674
(S) Nitrobenzene-d5	53.2			10.0-127		01/04/2025 22:16	WG2426641
(S) 2-Fluorobiphenyl	44.6			10.0-130		12/26/2024 19:32	WG2422674
(S) 2-Fluorobiphenyl	45.1			10.0-130		01/04/2025 22:16	WG2426641
(S) 2,4,6-Tribromophenol	62.1			10.0-155		12/26/2024 19:32	WG2422674
(S) 2,4,6-Tribromophenol	59.9			10.0-155		01/04/2025 22:16	WG2426641
(S) p-Terphenyl-d14	54.4			10.0-128		12/26/2024 19:32	WG2422674
(S) p-Terphenyl-d14	54.2			10.0-128		01/04/2025 22:16	WG2426641

Sample Narrative:

L1811434-01 WG2422674, WG2426641: Dilution due to matrix.

L1811434-01 WG2422674, WG2426641: Duplicate Analysis performed due to QC failure. Results don't confirm; both analyses reported

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

TRIP BLANK

Collected date/time: 12/18/24 00:00

SAMPLE RESULTS - 02

L1811434

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	12/24/2024 01:36	WG2424147
Unadjusted C9-C12 Aliphatics	U		33.3	100	1	12/24/2024 01:36	WG2424147
Unadjusted C9-C10 Aromatics	U		33.3	100	1	12/24/2024 01:36	WG2424147
Adjusted C5-C8 Aliphatics	U		33.3	100	1	12/24/2024 01:36	WG2424147
Adjusted C9-C12 Aliphatics	U		33.3	100	1	12/24/2024 01:36	WG2424147
Total VPH	U		66.7	200	1	12/24/2024 01:36	WG2424147
(S) 2,5-Dibromotoluene(FID)	82.8			70.0-130		12/24/2024 01:36	WG2424147
(S) 2,5-Dibromotoluene(PID)	77.4			70.0-130		12/24/2024 01:36	WG2424147

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	12/29/2024 10:50	WG2425670
Acrylonitrile	U		0.671	5.00	1	12/29/2024 10:50	WG2425670
Benzene	U		0.0941	0.500	1	12/29/2024 10:50	WG2425670
Bromobenzene	U		0.118	0.500	1	12/29/2024 10:50	WG2425670
Bromodichloromethane	U		0.136	0.500	1	12/29/2024 10:50	WG2425670
Bromochloromethane	U		0.128	0.500	1	12/29/2024 10:50	WG2425670
Bromoform	U		0.129	0.500	1	12/29/2024 10:50	WG2425670
Bromomethane	U	J3	0.605	2.50	1	12/29/2024 10:50	WG2425670
n-Butylbenzene	U		0.157	0.500	1	12/29/2024 10:50	WG2425670
sec-Butylbenzene	U		0.125	0.500	1	12/29/2024 10:50	WG2425670
tert-Butylbenzene	U		0.127	0.500	1	12/29/2024 10:50	WG2425670
Carbon disulfide	U		0.0962	0.500	1	12/29/2024 10:50	WG2425670
Carbon tetrachloride	U		0.128	0.500	1	12/29/2024 10:50	WG2425670
Chlorobenzene	U		0.117	0.500	1	12/29/2024 10:50	WG2425670
Chlorodibromomethane	U		0.140	0.500	1	12/29/2024 10:50	WG2425670
Chloroethane	U		0.192	2.50	1	12/29/2024 10:50	WG2425670
2-Chloroethyl vinyl ether	U		0.575	50.0	1	12/29/2024 10:50	WG2425670
Chloroform	U		0.111	0.500	1	12/29/2024 10:50	WG2425670
Chloromethane	U	J3	0.960	1.25	1	12/29/2024 10:50	WG2425670
2-Chlorotoluene	U		0.106	0.500	1	12/29/2024 10:50	WG2425670
4-Chlorotoluene	U		0.114	0.500	1	12/29/2024 10:50	WG2425670
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	12/29/2024 10:50	WG2425670
1,2-Dibromoethane	U		0.126	0.500	1	12/29/2024 10:50	WG2425670
Dibromomethane	U		0.122	0.500	1	12/29/2024 10:50	WG2425670
1,2-Dichlorobenzene	U		0.107	0.500	1	12/29/2024 10:50	WG2425670
1,3-Dichlorobenzene	U		0.299	0.500	1	12/29/2024 10:50	WG2425670
1,4-Dichlorobenzene	U		0.120	0.500	1	12/29/2024 10:50	WG2425670
Dichlorodifluoromethane	U		0.374	2.50	1	12/29/2024 10:50	WG2425670
1,1-Dichloroethane	U		0.100	0.500	1	12/29/2024 10:50	WG2425670
1,2-Dichloroethane	U		0.0819	0.500	1	12/29/2024 10:50	WG2425670
1,1-Dichloroethene	U	J3	0.188	0.500	1	12/29/2024 10:50	WG2425670
cis-1,2-Dichloroethene	U		0.126	0.500	1	12/29/2024 10:50	WG2425670
trans-1,2-Dichloroethene	U		0.149	0.500	1	12/29/2024 10:50	WG2425670
1,2-Dichloropropane	U		0.149	0.500	1	12/29/2024 10:50	WG2425670
1,1-Dichloropropene	U		0.142	0.500	1	12/29/2024 10:50	WG2425670
1,3-Dichloropropane	U		0.109	1.00	1	12/29/2024 10:50	WG2425670
cis-1,3-Dichloropropene	U		0.111	0.500	1	12/29/2024 10:50	WG2425670
trans-1,3-Dichloropropene	U		0.118	0.500	1	12/29/2024 10:50	WG2425670
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	12/29/2024 10:50	WG2425670
2,2-Dichloropropane	U		0.161	0.500	1	12/29/2024 10:50	WG2425670
Di-isopropyl ether	U		0.105	0.500	1	12/29/2024 10:50	WG2425670
Ethylbenzene	U		0.137	0.500	1	12/29/2024 10:50	WG2425670
Hexachloro-1,3-butadiene	U		0.337	1.00	1	12/29/2024 10:50	WG2425670

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

SDG:

L1811434

DATE/TIME:

01/06/25 15:56

PAGE:

10 of 30

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	12/29/2024 10:50	WG2425670
n-Hexane	U		0.749	5.00	1	12/29/2024 10:50	WG2425670
Iodomethane	U		0.554	5.00	1	12/29/2024 10:50	WG2425670
Isopropylbenzene	U		0.105	0.500	1	12/29/2024 10:50	WG2425670
p-Isopropyltoluene	U		0.120	0.500	1	12/29/2024 10:50	WG2425670
2-Butanone (MEK)	U	J4	1.19	5.00	1	12/29/2024 10:50	WG2425670
Methylene Chloride	U		0.430	2.50	1	12/29/2024 10:50	WG2425670
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	12/29/2024 10:50	WG2425670
Methyl tert-butyl ether	U		0.101	0.500	1	12/29/2024 10:50	WG2425670
Naphthalene	U		0.174	2.50	1	12/29/2024 10:50	WG2425670
n-Propylbenzene	U		0.0993	0.500	1	12/29/2024 10:50	WG2425670
Styrene	U		0.118	0.500	1	12/29/2024 10:50	WG2425670
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	12/29/2024 10:50	WG2425670
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	12/29/2024 10:50	WG2425670
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	12/29/2024 10:50	WG2425670
Tetrachloroethene	U		0.300	0.500	1	12/29/2024 10:50	WG2425670
Toluene	U		0.278	0.500	1	12/29/2024 10:50	WG2425670
1,2,3-Trichlorobenzene	U		0.164	0.500	1	12/29/2024 10:50	WG2425670
1,2,4-Trichlorobenzene	U		0.481	1.00	1	12/29/2024 10:50	WG2425670
1,1,1-Trichloroethane	U		0.149	0.500	1	12/29/2024 10:50	WG2425670
1,1,2-Trichloroethane	U		0.158	0.500	1	12/29/2024 10:50	WG2425670
Trichloroethene	U		0.190	0.500	1	12/29/2024 10:50	WG2425670
Trichlorofluoromethane	U		0.160	2.50	1	12/29/2024 10:50	WG2425670
1,2,3-Trichloropropane	U		0.237	2.50	1	12/29/2024 10:50	WG2425670
1,2,4-Trimethylbenzene	U		0.322	0.500	1	12/29/2024 10:50	WG2425670
1,2,3-Trimethylbenzene	U		0.104	0.500	1	12/29/2024 10:50	WG2425670
1,3,5-Trimethylbenzene	U		0.104	0.500	1	12/29/2024 10:50	WG2425670
Vinyl acetate	U		0.692	5.00	1	12/29/2024 10:50	WG2425670
Vinyl chloride	U	J3 J4	0.234	0.500	1	12/29/2024 10:50	WG2425670
Xylenes, Total	U		0.174	1.50	1	12/29/2024 10:50	WG2425670
(S) Toluene-d8	102			80.0-120		12/29/2024 10:50	WG2425670
(S) 4-Bromofluorobenzene	99.3			77.0-126		12/29/2024 10:50	WG2425670
(S) 1,2-Dichloroethane-d4	128			70.0-130		12/29/2024 10:50	WG2425670

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4161821-3 12/23/24 19:29

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)	84.0			70.0-130
(S) 2,5-Dibromotoluene(PID)	78.0			70.0-130

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

(LCS) R4161821-1 12/23/24 17:02 • (LCSD) R4161821-2 12/23/24 17:39

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	1350	1340	113	112	70.0-130			0.743	50
Unadjusted C9-C12 Aliphatics	1400	1690	1690	121	121	70.0-130			0.000	50
Unadjusted C9-C10 Aromatics	200	221	222	111	111	70.0-130			0.451	50
Total VPH	2800	3260	3250	116	116	70.0-130			0.307	50
(S) 2,5-Dibromotoluene(FID)				79.7	86.8	70.0-130				
(S) 2,5-Dibromotoluene(PID)				75.0	81.6	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4162799-3 12/26/24 18:32

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)	89.7			70.0-130
(S) 2,5-Dibromotoluene(PID)	82.4			70.0-130

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

(LCS) R4162799-1 12/26/24 16:05 • (LCSD) R4162799-2 12/26/24 16:41

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	1170	1170	97.5	97.5	70.0-130			0.000	50
Unadjusted C9-C12 Aliphatics	1400	1640	1650	117	118	70.0-130			0.608	50
Unadjusted C9-C10 Aromatics	200	218	220	109	110	70.0-130			0.913	50
Total VPH	2800	3030	3040	108	109	70.0-130			0.329	50
(S) 2,5-Dibromotoluene(FID)				97.9	97.5	70.0-130				
(S) 2,5-Dibromotoluene(PID)				90.3	90.0	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4163431-3 12/29/24 10:16

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4163431-3 12/29/24 10:16

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	104			80.0-120
(S) 4-Bromofluorobenzene	93.3			77.0-126
(S) 1,2-Dichloroethane-d4	117			70.0-130

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R4163431-1 12/29/24 09:19 • (LCSD) R4163431-2 12/29/24 09:38

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 %
Acetone	25.0	31.2	32.6	125	130	19.0-160			4.39	27
Acrylonitrile	25.0	33.2	33.3	133	133	55.0-149			0.301	20
Benzene	5.00	4.11	4.31	82.2	86.2	70.0-123			4.75	20
Bromobenzene	5.00	4.94	5.40	98.8	108	73.0-121			8.90	20
Bromodichloromethane	5.00	4.10	4.31	82.0	86.2	75.0-120			4.99	20
Bromochloromethane	5.00	4.33	4.58	86.6	91.6	76.0-122			5.61	20
Bromoform	5.00	4.63	5.07	92.6	101	68.0-132			9.07	20
Bromomethane	5.00	2.64	1.80	52.8	36.0	10.0-160		J J3	37.8	25
n-Butylbenzene	5.00	4.49	4.83	89.8	96.6	73.0-125			7.30	20
sec-Butylbenzene	5.00	4.87	5.26	97.4	105	75.0-125			7.70	20
tert-Butylbenzene	5.00	4.63	4.92	92.6	98.4	76.0-124			6.07	20
Carbon disulfide	5.00	4.91	5.85	98.2	117	61.0-128			17.5	20
Carbon tetrachloride	5.00	4.56	4.79	91.2	95.8	68.0-126			4.92	20
Chlorobenzene	5.00	4.59	5.05	91.8	101	80.0-121			9.54	20
Chlorodibromomethane	5.00	4.41	4.60	88.2	92.0	77.0-125			4.22	20
Chloroethane	5.00	4.59	3.94	91.8	78.8	47.0-150			15.2	20
2-Chloroethyl vinyl ether	25.0	25.0	26.3	100	105	51.0-160	J	J	5.07	20
Chloroform	5.00	4.38	4.53	87.6	90.6	73.0-120			3.37	20
Chloromethane	5.00	4.06	2.96	81.2	59.2	41.0-142		J3	31.3	20
2-Chlorotoluene	5.00	4.50	4.93	90.0	98.6	76.0-123			9.12	20
4-Chlorotoluene	5.00	4.84	5.10	96.8	102	75.0-122			5.23	20
1,2-Dibromo-3-Chloropropane	5.00	4.92	5.72	98.4	114	58.0-134			15.0	20
1,2-Dibromoethane	5.00	4.81	5.10	96.2	102	80.0-122			5.85	20
Dibromomethane	5.00	4.10	4.33	82.0	86.6	80.0-120			5.46	20
1,2-Dichlorobenzene	5.00	4.69	5.12	93.8	102	79.0-121			8.77	20
1,3-Dichlorobenzene	5.00	4.73	4.92	94.6	98.4	79.0-120			3.94	20
1,4-Dichlorobenzene	5.00	4.92	4.99	98.4	99.8	79.0-120			1.41	20
Dichlorodifluoromethane	5.00	4.57	3.86	91.4	77.2	51.0-149			16.8	20
1,1-Dichloroethane	5.00	4.47	4.41	89.4	88.2	70.0-126			1.35	20
1,2-Dichloroethane	5.00	4.69	4.93	93.8	98.6	70.0-128			4.99	20
1,1-Dichloroethene	5.00	4.14	5.10	82.8	102	71.0-124		J3	20.8	20
cis-1,2-Dichloroethene	5.00	4.18	4.43	83.6	88.6	73.0-120			5.81	20
trans-1,2-Dichloroethene	5.00	3.91	4.18	78.2	83.6	73.0-120			6.67	20
1,2-Dichloropropane	5.00	4.12	4.31	82.4	86.2	77.0-125			4.51	20
1,1-Dichloropropene	5.00	4.70	4.38	94.0	87.6	74.0-126			7.05	20
1,3-Dichloropropane	5.00	5.14	5.12	103	102	80.0-120			0.390	20
cis-1,3-Dichloropropene	5.00	4.06	4.17	81.2	83.4	80.0-123			2.67	20
trans-1,3-Dichloropropene	5.00	4.53	4.82	90.6	96.4	78.0-124			6.20	20
trans-1,4-Dichloro-2-butene	5.00	4.47	4.58	89.4	91.6	33.0-144	J	J	2.43	20
2,2-Dichloropropane	5.00	4.12	4.42	82.4	88.4	58.0-130			7.03	20

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

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Qc

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Gl

8
Al

9
Sc

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

(LCS) R4163431-1 12/29/24 09:19 • (LCSD) R4163431-2 12/29/24 09:38

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Di-isopropyl ether	5.00	4.00	4.41	80.0	88.2	58.0-138			9.75	20
Ethylbenzene	5.00	4.39	4.76	87.8	95.2	79.0-123			8.09	20
Hexachloro-1,3-butadiene	5.00	3.96	4.57	79.2	91.4	54.0-138			14.3	20
2-Hexanone	25.0	26.2	30.2	105	121	67.0-149			14.2	20
n-Hexane	5.00	4.37	5.30	87.4	106	57.0-133	J		19.2	20
Iodomethane	25.0	20.4	23.5	81.6	94.0	33.0-147			14.1	26
Isopropylbenzene	5.00	4.05	4.82	81.0	96.4	76.0-127			17.4	20
p-Isopropyltoluene	5.00	4.55	4.86	91.0	97.2	76.0-125			6.59	20
2-Butanone (MEK)	25.0	43.0	37.8	172	151	44.0-160	J4		12.9	20
Methylene Chloride	5.00	3.41	3.78	68.2	75.6	67.0-120			10.3	20
4-Methyl-2-pentanone (MIBK)	25.0	30.1	34.0	120	136	68.0-142			12.2	20
Methyl tert-butyl ether	5.00	3.92	4.09	78.4	81.8	68.0-125			4.24	20
Naphthalene	5.00	3.47	3.95	69.4	79.0	54.0-135			12.9	20
n-Propylbenzene	5.00	4.88	5.22	97.6	104	77.0-124			6.73	20
Styrene	5.00	4.14	4.30	82.8	86.0	73.0-130			3.79	20
1,1,1,2-Tetrachloroethane	5.00	4.28	4.61	85.6	92.2	75.0-125			7.42	20
1,1,2,2-Tetrachloroethane	5.00	4.96	5.56	99.2	111	65.0-130			11.4	20
1,1,2-Trichlorotrifluoroethane	5.00	4.13	4.92	82.6	98.4	69.0-132			17.5	20
Tetrachloroethene	5.00	4.81	5.31	96.2	106	72.0-132			9.88	20
Toluene	5.00	4.57	4.85	91.4	97.0	79.0-120			5.94	20
1,2,3-Trichlorobenzene	5.00	3.73	4.19	74.6	83.8	50.0-138			11.6	20
1,2,4-Trichlorobenzene	5.00	3.91	4.02	78.2	80.4	57.0-137			2.77	20
1,1,1-Trichloroethane	5.00	4.05	4.43	81.0	88.6	73.0-124			8.96	20
1,1,2-Trichloroethane	5.00	4.71	4.75	94.2	95.0	80.0-120			0.846	20
Trichloroethene	5.00	3.96	4.32	79.2	86.4	78.0-124			8.70	20
Trichlorofluoromethane	5.00	3.40	3.20	68.0	64.0	59.0-147			6.06	20
1,2,3-Trichloropropane	5.00	5.38	6.29	108	126	73.0-130			15.6	20
1,2,4-Trimethylbenzene	5.00	4.46	5.02	89.2	100	76.0-121			11.8	20
1,2,3-Trimethylbenzene	5.00	4.66	4.79	93.2	95.8	77.0-120			2.75	20
1,3,5-Trimethylbenzene	5.00	4.84	5.08	96.8	102	76.0-122			4.84	20
Vinyl acetate	25.0	27.4	29.5	110	118	11.0-160			7.38	20
Vinyl chloride	5.00	4.09	3.17	81.8	63.4	67.0-131		J3 J4	25.3	20
Xylenes, Total	15.0	13.6	13.9	90.7	92.7	79.0-123			2.18	20
(S) Toluene-d8				102	105	80.0-120				
(S) 4-Bromofluorobenzene				94.1	96.4	77.0-126				
(S) 1,2-Dichloroethane-d4				118	118	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4162847-1 12/29/24 14:46

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C9-C18 Aliphatics	91.2	J	69.6	600
Unadjusted C19-C36 Aliphatics	U		58.5	600
(S) 1-Chloro-octadecane	76.0			40.0-140

Method Blank (MB)

(MB) R4162847-1 12/29/24 14:46

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C11-C22 Aromatics	U		49.2	600
(S) o-Terphenyl	114			40.0-140
(S) 2-Fluorobiphenyl	124			40.0-140
(S) 2-Bromonaphthalene	123			40.0-140

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

(LCS) R4162847-2 12/29/24 15:29 • (LCSD) R4162847-3 12/29/24 15:51

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C9-C18 Aliphatics	600	395	379	65.8	63.2	40.0-140	J	J	4.13	25
Unadjusted C19-C36 Aliphatics	800	668	690	83.5	86.3	40.0-140			3.24	25
(S) 1-Chloro-octadecane				80.4	82.1	40.0-140				

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

(LCS) R4162847-2 12/29/24 15:29 • (LCSD) R4162847-3 12/29/24 15:51

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C11-C22 Aromatics	1700	1600	1430	94.1	84.1	40.0-140			11.2	25
(S) o-Terphenyl				98.3	86.9	40.0-140				
(S) 2-Fluorobiphenyl				109	97.9	40.0-140				
(S) 2-Bromonaphthalene				110	97.8	40.0-140				

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

L1809666-10 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1809666-10 12/29/24 16:56 • (MS) R4162847-4 12/29/24 17:17 • (MSD) R4162847-5 12/29/24 17:39

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 C11-C22 Aromatics	1700	113	1580	1780	86.3	99.8	1	40.0-140			11.9	50
(S) o-Terphenyl					88.8	102		40.0-140				
(S) 2-Fluorobiphenyl					103	113		40.0-140				
(S) 2-Bromonaphthalene					103	113		40.0-140				

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4163573-3 12/26/24 13:13

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	0.678	U	0.159	1.00
Nitrobenzene	U		0.297	10.0
n-Nitrosodimethylamine	U		0.998	10.0
n-Nitrosodiphenylamine	U		2.37	10.0
n-Nitrosodi-n-propylamine	U		0.261	10.0
Phenanthrene	U		0.112	1.00
Benzylbutyl phthalate	U		0.765	3.00
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00
Di-n-butyl phthalate	U		0.453	3.00
Diethyl phthalate	U		0.287	3.00
Dimethyl phthalate	U		0.260	3.00
Di-n-octyl phthalate	U		0.932	3.00

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4163573-3 12/26/24 13:13

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	0.101	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	31.1			10.0-120
(S) Phenol-d5	20.9			10.0-120
(S) Nitrobenzene-d5	46.8			10.0-127
(S) 2-Fluorobiphenyl	54.2			10.0-130
(S) 2,4,6-Tribromophenol	32.4			10.0-155
(S) p-Terphenyl-d14	55.4			10.0-128

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Sr

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Gl

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Al

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Sc

Method Blank (MB)

(MB) R4164816-2 01/04/25 01:50

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4164816-2 01/04/25 01:50

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) R4163573-1 12/26/24 12:10 • (LCSD) R4163573-2 12/26/24 12:31

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acenaphthene	50.0	31.5	33.9	63.0	67.8	41.0-120			7.34	22
Acenaphthylene	50.0	28.6	32.2	57.2	64.4	43.0-120			11.8	22
Anthracene	50.0	33.1	34.7	66.2	69.4	45.0-120			4.72	20
Benzdine	100	4.31	4.49	4.31	4.49	10.0-120	J J4	J J4	4.09	36
Benzo(a)anthracene	50.0	35.7	35.7	71.4	71.4	47.0-120			0.000	20
Benzo(b)fluoranthene	50.0	33.5	34.5	67.0	69.0	46.0-120			2.94	20
Benzo(k)fluoranthene	50.0	32.2	33.9	64.4	67.8	46.0-120			5.14	21
Benzo(g,h,i)perylene	50.0	27.1	28.7	54.2	57.4	48.0-121			5.73	20
Benzo(a)pyrene	50.0	33.2	34.4	66.4	68.8	47.0-120			3.55	20
Bis(2-chlorethoxy)methane	50.0	26.4	29.3	52.8	58.6	33.0-120			10.4	24
Bis(2-chloroethyl)ether	50.0	25.3	30.0	50.6	60.0	23.0-120			17.0	33
2,2-Oxybis(1-Chloropropane)	50.0	23.9	28.0	47.8	56.0	28.0-120			15.8	31
4-Bromophenyl-phenylether	50.0	32.9	36.3	65.8	72.6	45.0-120			9.83	20
2-Chloronaphthalene	50.0	27.3	30.4	54.6	60.8	37.0-120			10.7	25
4-Chlorophenyl-phenylether	50.0	33.7	35.0	67.4	70.0	44.0-120			3.78	20
Chrysene	50.0	30.9	31.3	61.8	62.6	48.0-120			1.29	20
Dibenz(a,h)anthracene	50.0	30.8	33.2	61.6	66.4	47.0-120			7.50	20
3,3-Dichlorobenzidine	100	65.9	76.1	65.9	76.1	44.0-120			14.4	20
2,4-Dinitrotoluene	50.0	36.9	38.7	73.8	77.4	49.0-124			4.76	20
2,6-Dinitrotoluene	50.0	32.7	35.9	65.4	71.8	46.0-120			9.33	21
Fluoranthene	50.0	38.3	39.0	76.6	78.0	51.0-120			1.81	20
Fluorene	50.0	33.6	35.7	67.2	71.4	47.0-120			6.06	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4163573-1 12/26/24 12:10 • (LCSD) R4163573-2 12/26/24 12:31

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Hexachlorobenzene	50.0	32.1	34.7	64.2	69.4	44.0-120			7.78	20
Hexachloro-1,3-butadiene	50.0	24.0	27.4	48.0	54.8	19.0-120			13.2	32
Hexachlorocyclopentadiene	50.0	8.85	12.5	17.7	25.0	15.0-120	J	J3	34.2	31
Hexachloroethane	50.0	23.3	27.7	46.6	55.4	15.0-120			17.3	37
Indeno(1,2,3-cd)pyrene	50.0	30.0	34.1	60.0	68.2	49.0-122			12.8	20
Isophorone	50.0	26.9	29.0	53.8	58.0	36.0-120			7.51	23
Naphthalene	50.0	27.5	30.6	55.0	61.2	27.0-120			10.7	27
Nitrobenzene	50.0	23.7	27.0	47.4	54.0	27.0-120			13.0	29
n-Nitrosodimethylamine	50.0	14.3	19.0	28.6	38.0	10.0-120			28.2	40
n-Nitrosodiphenylamine	50.0	30.7	33.7	61.4	67.4	47.0-120			9.32	20
n-Nitrosodi-n-propylamine	50.0	24.8	29.1	49.6	58.2	31.0-120			16.0	28
Phenanthrene	50.0	33.8	36.2	67.6	72.4	46.0-120			6.86	20
Benzylbutyl phthalate	50.0	40.5	40.3	81.0	80.6	43.0-121			0.495	20
Bis(2-Ethylhexyl)phthalate	50.0	32.8	33.7	65.6	67.4	43.0-122			2.71	20
Di-n-butyl phthalate	50.0	39.9	41.7	79.8	83.4	49.0-121			4.41	20
Diethyl phthalate	50.0	33.7	35.5	67.4	71.0	48.0-122			5.20	20
Dimethyl phthalate	50.0	32.0	34.7	64.0	69.4	48.0-120			8.10	20
Di-n-octyl phthalate	50.0	36.3	35.6	72.6	71.2	42.0-125			1.95	20
Pyrene	50.0	32.0	32.4	64.0	64.8	47.0-120			1.24	20
1,2,4-Trichlorobenzene	50.0	24.1	28.1	48.2	56.2	24.0-120			15.3	29
Aniline	50.0	3.28	9.43	6.56	18.9	13.0-120	J J4	J J3	96.8	31
1,2-Diphenylhydrazine	50.0	33.4	35.5	66.8	71.0	41.0-126	N2	N2	6.10	20
Benzyl alcohol	50.0	16.0	21.1	32.0	42.2	25.0-120		J3	27.5	26
4-Chloroaniline	50.0	12.7	19.1	25.4	38.2	25.0-120		J3	40.3	25
4-Chloro-3-methylphenol	50.0	18.4	28.3	36.8	56.6	40.0-120	J4	J3	42.4	21
2-Chlorophenol	50.0	16.6	27.5	33.2	55.0	25.0-120		J3	49.4	35
Dibenzofuran	50.0	31.6	34.3	63.2	68.6	44.0-120			8.19	22
2,4-Dichlorophenol	50.0	19.6	30.7	39.2	61.4	36.0-120		J3	44.1	26
2,4-Dimethylphenol	50.0	11.2	19.9	22.4	39.8	33.0-120	J4	J3	55.9	26
4,6-Dinitro-2-methylphenol	50.0	24.8	31.8	49.6	63.6	38.0-138			24.7	25
2,4-Dinitrophenol	50.0	21.1	32.5	42.2	65.0	10.0-120		J3	42.5	39
2-Methylnaphthalene	50.0	30.9	34.1	61.8	68.2	33.0-120			9.85	25
2-Methylphenol	50.0	13.9	23.3	27.8	46.6	28.0-120	J4	J3	50.5	29
3&4-Methyl Phenol	50.0	15.6	25.0	31.2	50.0	31.0-120		J3	46.3	30
2-Nitroaniline	50.0	32.4	36.0	64.8	72.0	43.0-120			10.5	22
3-Nitroaniline	50.0	26.8	33.2	53.6	66.4	38.0-120		J3	21.3	21
4-Nitroaniline	50.0	30.2	35.7	60.4	71.4	18.0-160			16.7	21
2-Nitrophenol	50.0	24.0	31.6	48.0	63.2	31.0-120			27.3	29
4-Nitrophenol	50.0	9.53	14.8	19.1	29.6	10.0-120	J	J3	43.3	33
Pentachlorophenol	50.0	16.7	23.6	33.4	47.2	23.0-120		J3	34.2	25

¹Cp

²Tc

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

(LCS) R4163573-1 12/26/24 12:10 • (LCSD) R4163573-2 12/26/24 12:31

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Phenol	50.0	9.38	13.2	18.8	26.4	10.0-120	J		33.8	36
Pyridine	50.0	3.41	8.25	6.82	16.5	10.0-120	J J4	J J3	83.0	38
2,4,6-Trichlorophenol	50.0	25.2	32.8	50.4	65.6	42.0-120		J3	26.2	23
Acetophenone	50.0	27.0	31.3	54.0	62.6	29.0-120			14.8	28
Diphenylamine	50.0	30.7	33.7	61.4	67.4	35.0-120			9.32	20
1,2,4,5-Tetrachlorobenzene	50.0	33.2	37.8	66.4	75.6	31.0-121			13.0	27
2,3,4,6-Tetrachlorophenol	50.0	30.9	39.9	61.8	79.8	42.0-132		J3	25.4	22
2,4,5-Trichlorophenol	50.0	25.8	34.2	51.6	68.4	44.0-120		J3	28.0	22
(S) 2-Fluorophenol				21.9	34.8	10.0-120				
(S) Phenol-d5				17.3	23.6	10.0-120				
(S) Nitrobenzene-d5				42.3	49.3	10.0-127				
(S) 2-Fluorobiphenyl				50.1	55.9	10.0-130				
(S) 2,4,6-Tribromophenol				51.0	63.0	10.0-155				
(S) p-Terphenyl-d14				56.1	57.2	10.0-128				

Laboratory Control Sample (LCS)

(LCS) R4164816-1 01/04/25 01:29

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Acetylaminofluorene	50.0	51.9	104	32.0-120	
4-Aminobiphenyl	50.0	30.2	60.4	20.0-120	
Chlorobenzilate	50.0	50.6	101	29.0-128	
Diallate	50.0	45.7	91.4	30.0-120	
2,6-Dichlorophenol	50.0	36.6	73.2	19.0-136	
Dimethoate	50.0	49.7	99.4	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	47.7	95.4	27.0-120	
Dimethylbenz (A) Anthracene	50.0	26.5	53.0	14.0-124	
3,3-Dimethylbenzidine	50.0	8.34	16.7	13.0-120	J
a,a-Dimethylphenethylamine	50.0	0.000	0.000	10.0-129	J4
1,3-Dinitrobenzene	50.0	47.5	95.0	34.0-120	
Diphenylamine	50.0	49.2	98.4	35.0-120	
Dinoseb	50.0	41.1	82.2	39.0-120	J
Disulfoton	50.0	56.1	112	32.0-120	
Ethyl methanesulfonate	50.0	39.9	79.8	10.0-120	
Ethyl Parathion	50.0	65.3	131	46.0-130	J4
Famphur	50.0	62.5	125	32.0-120	J4
Hexachloropropene	50.0	26.3	52.6	10.0-120	J
Hexachlorophene	100	0.000	0.000	10.0-120	J4

Cp

Tc

Ss

Cn

Sr

Qc

Gl

Al

Sc

Laboratory Control Sample (LCS)

(LCS) R4164816-1 01/04/25 01:29

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Isodrin	50.0	39.8	79.6	22.0-157	
Isosafrole	50.0	43.5	87.0	25.0-133	
Kepone	50.0	1.36	2.72	10.0-120	J J4
Methapyrilene	50.0	13.4	26.8	10.0-120	J
3-Methylcholanthrene	50.0	39.5	79.0	30.0-160	
Methyl methanesulfonate	50.0	29.9	59.8	10.0-120	J
Methyl parathion	50.0	62.5	125	42.0-120	J4
1,4-Naphthoquinone	50.0	3.64	7.28	50.0-150	J J4
1-Naphthylamine	50.0	26.8	53.6	19.0-120	
2-Naphthylamine	50.0	15.0	30.0	10.0-120	
5-Nitro-o-toluidine	50.0	51.3	103	34.0-120	
4-Nitroquinoline 1-oxide	50.0	28.7	57.4	10.0-159	
n-Nitrosodiethylamine	50.0	42.9	85.8	10.0-120	
n-Nitrosodi-n-butylamine	50.0	46.0	92.0	13.0-143	
n-Nitrosomethylethylamine	50.0	38.4	76.8	10.0-120	
n-Nitrosomorpholine	50.0	34.1	68.2	10.0-120	
n-Nitrosopiperidine	50.0	36.0	72.0	10.0-160	
n-Nitrosopyrrolidine	50.0	40.4	80.8	10.0-124	
Pentachlorobenzene	50.0	40.8	81.6	25.0-120	
Pentachloroethane	50.0	39.1	78.2	10.0-120	J
Pentachloronitrobenzene	50.0	42.9	85.8	34.0-132	
Phenacetin	50.0	48.6	97.2	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	61.7	123	13.0-160	
2-Picoline	50.0	16.5	33.0	10.0-120	J
Pronamide	50.0	51.5	103	38.0-130	
Safrole	50.0	41.4	82.8	21.0-120	
Sulfotep	50.0	60.8	122	52.0-120	J4
Thionazin	50.0	59.8	120	38.0-121	
o-Toluidine	50.0	33.3	66.6	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	47.0	94.0	11.0-135	
1,3,5-Trinitrobenzene	50.0	36.2	72.4	37.0-147	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4164821-2 01/04/25 16:36

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Naphthalene	U		0.159	1.00
(S) 2-Fluorophenol	39.6			10.0-120
(S) Phenol-d5	24.0			10.0-120
(S) Nitrobenzene-d5	73.5			10.0-127
(S) 2-Fluorobiphenyl	64.6			10.0-130
(S) 2,4,6-Tribromophenol	58.0			10.0-155
(S) p-Terphenyl-d14	68.0			10.0-128

Laboratory Control Sample (LCS)

(LCS) R4164821-1 01/04/25 16:15

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Naphthalene	50.0	34.0	68.0	27.0-120	
(S) 2-Fluorophenol			43.4	10.0-120	
(S) Phenol-d5			25.5	10.0-120	
(S) Nitrobenzene-d5			79.8	10.0-127	
(S) 2-Fluorobiphenyl			68.5	10.0-130	
(S) 2,4,6-Tribromophenol			76.5	10.0-155	
(S) p-Terphenyl-d14			76.5	10.0-128	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

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

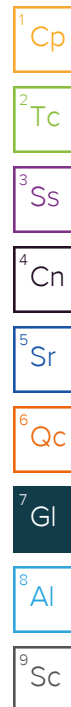
Results Disclaimer - Information that may be provided by the customer, and contained within this report, include Permit Limits, Project Name, Sample ID, Sample Matrix, Sample Preservation, Field Blanks, Field Spikes, Field Duplicates, On-Site Data, Sampling Collection Dates/Times, and Sampling Location.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

Abbreviations and Definitions

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

Qualifier Description

B	The same analyte is found in the associated blank.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
N2	Analyte reported using a calibration and validation based on Azobenzene (CAS 103-33-3). 1,2-Diphenylhydrazine decomposes into Azobenzene during the analysis.
Q	Sample was prepared and/or analyzed past holding time as defined in the method. Concentrations should be considered minimum values.



ACCREDITATIONS & LOCATIONS

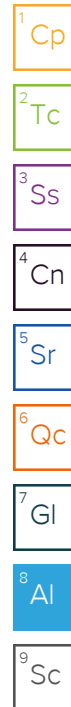
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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

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

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

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



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

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

Report to:
Abby Small

Project Description:
CMR Great Falls - 2023 RFI Soil Sampling

City/State Collected:
Great Falls MT

Please Circle:
PT **MT** CT ET

Phone: **303-382-5474**

Client Project #

Lab Project #
ENVIRONCO-CALU MONTH

Collected by (print):
Kyle Croner

Site/Facility ID #
GREAT FALLS, MT

P.O. #

Collected by (signature):
[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 **Y**

No. of Cntrs

Sample ID

Comp/Grab

Matrix *

Depth

Date

Time

Analysis / Container / Preservative

Pres Chk

8270AP9 100ml Amb NoPres

SVEPHMT 1L-Amb-Add HCl

V8260LL 40mlAmb-HCl

V8260LL 40mlAmb-HCl-Bik

VPHMT 40mlAmb HCl

VPHMT 40mlAmb-HCl-Bik

CMR-SP200-241218

TRIP BLANK

grab

GW

GW

-

12/18/24

12 10

9

pH ____ Temp ____

Flow ____ Other ____

Sample Receipt Checklist

Remarks:

Samples returned via:
____ UPS ____ FedEx ____ Courier

Tracking #
4171 6905 0809

Relinquished by: (Signature)
[Signature]

Date:
12/18/24

Time:
1500

Received by: (Signature)

Trip Blank Received: Yes / No
Yes

HCl / MeOH TBR

Temp: **7.6** °C

Bottles Received: **3.6 + 0 = 3.6 9**

If preservation required by Login: Date/Time

Relinquished by: (Signature)

Date:

Time:

Received by: (Signature)

Date:

Time:

Hold:

Condition:
NCF / **OK**

Relinquished by: (Signature)

Date:

Time:

Received for lab by: (Signature)
[Signature]

Date:
12.18.24

Time:
0900

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 # **1811434**

E043

Acctnum: **ENVIRONCO**

Template: **T245953**

Prelogin: **P1111076**

PM: **841 - Kelly Mercer**

PB: **N 1111124**

Shipped Via: **FedEX Ground**

Remarks

Sample # (lab only)

01

02

APPENDIX A3

PASSIVE TREATMENT TRENCH GROUNDWATER ANALYTICAL RESULTS

Pace Project Number:

L1806484, L1806680

Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1806484
Samples Received: 12/06/2024
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 National12065 Lebanon Rd Mount Juliet, TN 37122 615-758-5858 800-767-5859 mydata.pacelabs.com

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

SAMPLE SUMMARY

CMR-MW-106-241204 L1806484-01 GW

Collected by
Kyle Groves

Collected date/time
12/04/24 15:13

Received date/time
12/06/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 4500CO2 D-2011	WG2415669	1	12/10/24 13:18	12/10/24 13:18	BJM	Mt. Juliet, TN
Wet Chemistry by Method 5210 B-2016	WG2414063	1	12/06/24 11:51	12/11/24 09:32	RLS	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG2414228	1	12/06/24 13:39	12/06/24 13:39	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG2415457	1	12/11/24 23:29	12/13/24 03:14	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG2415457	10	12/11/24 23:29	12/13/24 13:22	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG2415477	1	12/11/24 09:40	12/12/24 04:07	JPD	Mt. Juliet, TN
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2419269	1	12/16/24 00:08	12/16/24 00:08	JHH	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG2414378	1	12/08/24 15:12	12/08/24 15:12	CCM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2417654	1	12/12/24 15:32	12/12/24 15:32	DWR	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2415943	1	12/09/24 09:30	12/10/24 17:01	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2414917	1	12/10/24 09:39	12/14/24 15:54	DSH	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2414917	1	12/10/24 09:39	12/19/24 03:35	JDJ	Mt. Juliet, TN

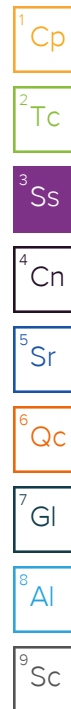
CMR-MW-415-241204 L1806484-02 GW

Collected by
Kyle Groves

Collected date/time
12/04/24 14:08

Received date/time
12/06/24 09:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 4500CO2 D-2011	WG2415669	1	12/10/24 13:22	12/10/24 13:22	BJM	Mt. Juliet, TN
Wet Chemistry by Method 5210 B-2016	WG2414063	1	12/06/24 11:55	12/11/24 09:36	RLS	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG2414228	1	12/06/24 13:56	12/06/24 13:56	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG2415457	1	12/11/24 23:29	12/13/24 03:17	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG2415457	10	12/11/24 23:29	12/13/24 13:25	JPD	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG2415477	1	12/11/24 09:40	12/12/24 04:10	JPD	Mt. Juliet, TN
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2419269	1	12/16/24 00:45	12/16/24 00:45	JHH	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG2414378	1	12/08/24 15:25	12/08/24 15:25	CCM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2417654	25	12/12/24 18:42	12/12/24 18:42	DWR	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2415943	3	12/09/24 09:30	12/10/24 17:23	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2415743	1	12/10/24 15:55	12/11/24 15:29	LS	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2415743	1	12/10/24 15:55	12/18/24 06:46	DSH	Mt. Juliet, TN



CASE NARRATIVE

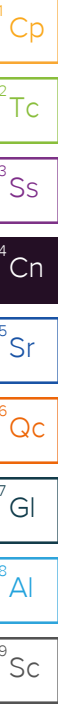
All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times, unless qualified or notated within the report. Where applicable, all MDL (LOD) and RDL (LOQ) values reported for environmental samples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



Kelly Mercer
Project Manager

Project Narrative

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



Wet Chemistry by Method 4500CO2 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Free Carbon Dioxide	90200	B T8	20000	1	12/10/2024 13:18	WG2415669

Sample Narrative:

L1806484-01 WG2415669: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 5210 B-2016

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
BOD	8.89		3.33	1	12/11/2024 09:32	WG2414063

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Nitrate as (N)	U		88.4	100	1	12/06/2024 13:39	WG2414228
Sulfate	80800		637	5000	1	12/06/2024 13:39	WG2414228

Metals (ICPMS) by Method 6020B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Iron	3420		22.6	100	1	12/12/2024 04:07	WG2415477
Iron,Dissolved	3550		22.6	100	1	12/13/2024 03:14	WG2415457
Manganese	1920		0.700	5.00	1	12/12/2024 04:07	WG2415477
Manganese,Dissolved	1970		7.00	50.0	10	12/13/2024 13:22	WG2415457

Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Unadjusted C5-C8 Aliphatics	163		33.3	100	1	12/16/2024 00:08	WG2419269
Unadjusted C9-C12 Aliphatics	U		33.3	100	1	12/16/2024 00:08	WG2419269
Unadjusted C9-C10 Aromatics	U		33.3	100	1	12/16/2024 00:08	WG2419269
Adjusted C5-C8 Aliphatics	135		33.3	100	1	12/16/2024 00:08	WG2419269
Adjusted C9-C12 Aliphatics	U		33.3	100	1	12/16/2024 00:08	WG2419269
Total VPH	194	J	66.7	200	1	12/16/2024 00:08	WG2419269
(S) 2,5-Dibromotoluene(FID)	82.3			70.0-130		12/16/2024 00:08	WG2419269
(S) 2,5-Dibromotoluene(PID)	77.5			70.0-130		12/16/2024 00:08	WG2419269

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Methane	2350		5.10	10.0	1	12/08/2024 15:12	WG2414378

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

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		11.3	25.0	1	12/12/2024 15:32	WG2417654
Acrylonitrile	U		0.671	5.00	1	12/12/2024 15:32	WG2417654
Benzene	27.6		0.0941	0.500	1	12/12/2024 15:32	WG2417654
Bromobenzene	U		0.118	0.500	1	12/12/2024 15:32	WG2417654
Bromodichloromethane	U		0.136	0.500	1	12/12/2024 15:32	WG2417654
Bromochloromethane	U		0.128	0.500	1	12/12/2024 15:32	WG2417654
Bromoform	U		0.129	0.500	1	12/12/2024 15:32	WG2417654
Bromomethane	U		0.605	2.50	1	12/12/2024 15:32	WG2417654
n-Butylbenzene	U		0.157	0.500	1	12/12/2024 15:32	WG2417654

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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	12/12/2024 15:32	WG2417654
tert-Butylbenzene	U		0.127	0.500	1	12/12/2024 15:32	WG2417654
Carbon disulfide	U		0.0962	0.500	1	12/12/2024 15:32	WG2417654
Carbon tetrachloride	U		0.128	0.500	1	12/12/2024 15:32	WG2417654
Chlorobenzene	U		0.117	0.500	1	12/12/2024 15:32	WG2417654
Chlorodibromomethane	U		0.140	0.500	1	12/12/2024 15:32	WG2417654
Chloroethane	U		0.192	2.50	1	12/12/2024 15:32	WG2417654
2-Chloroethyl vinyl ether	U		0.575	50.0	1	12/12/2024 15:32	WG2417654
Chloroform	U		0.111	0.500	1	12/12/2024 15:32	WG2417654
Chloromethane	U		0.960	1.25	1	12/12/2024 15:32	WG2417654
2-Chlorotoluene	U		0.106	0.500	1	12/12/2024 15:32	WG2417654
4-Chlorotoluene	U		0.114	0.500	1	12/12/2024 15:32	WG2417654
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	12/12/2024 15:32	WG2417654
1,2-Dibromoethane	U		0.126	0.500	1	12/12/2024 15:32	WG2417654
Dibromomethane	U	J4	0.122	0.500	1	12/12/2024 15:32	WG2417654
1,2-Dichlorobenzene	U		0.107	0.500	1	12/12/2024 15:32	WG2417654
1,3-Dichlorobenzene	U		0.299	0.500	1	12/12/2024 15:32	WG2417654
1,4-Dichlorobenzene	U		0.120	0.500	1	12/12/2024 15:32	WG2417654
Dichlorodifluoromethane	U		0.374	2.50	1	12/12/2024 15:32	WG2417654
1,1-Dichloroethane	U		0.100	0.500	1	12/12/2024 15:32	WG2417654
1,2-Dichloroethane	U		0.0819	0.500	1	12/12/2024 15:32	WG2417654
1,1-Dichloroethene	U		0.188	0.500	1	12/12/2024 15:32	WG2417654
cis-1,2-Dichloroethene	U		0.126	0.500	1	12/12/2024 15:32	WG2417654
trans-1,2-Dichloroethene	U		0.149	0.500	1	12/12/2024 15:32	WG2417654
1,2-Dichloropropane	U		0.149	0.500	1	12/12/2024 15:32	WG2417654
1,1-Dichloropropene	U		0.142	0.500	1	12/12/2024 15:32	WG2417654
1,3-Dichloropropane	U		0.109	1.00	1	12/12/2024 15:32	WG2417654
cis-1,3-Dichloropropene	U		0.111	0.500	1	12/12/2024 15:32	WG2417654
trans-1,3-Dichloropropene	U		0.118	0.500	1	12/12/2024 15:32	WG2417654
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	12/12/2024 15:32	WG2417654
2,2-Dichloropropane	U		0.161	0.500	1	12/12/2024 15:32	WG2417654
Di-isopropyl ether	U		0.105	0.500	1	12/12/2024 15:32	WG2417654
Ethylbenzene	U		0.137	0.500	1	12/12/2024 15:32	WG2417654
Hexachloro-1,3-butadiene	U		0.337	1.00	1	12/12/2024 15:32	WG2417654
2-Hexanone	U		0.787	5.00	1	12/12/2024 15:32	WG2417654
n-Hexane	U		0.749	5.00	1	12/12/2024 15:32	WG2417654
Iodomethane	U		0.554	5.00	1	12/12/2024 15:32	WG2417654
Isopropylbenzene	U		0.105	0.500	1	12/12/2024 15:32	WG2417654
p-Isopropyltoluene	U		0.120	0.500	1	12/12/2024 15:32	WG2417654
2-Butanone (MEK)	U		1.19	5.00	1	12/12/2024 15:32	WG2417654
Methylene Chloride	U		0.430	2.50	1	12/12/2024 15:32	WG2417654
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	12/12/2024 15:32	WG2417654
Methyl tert-butyl ether	U		0.101	0.500	1	12/12/2024 15:32	WG2417654
Naphthalene	U		0.174	2.50	1	12/12/2024 15:32	WG2417654
n-Propylbenzene	U		0.0993	0.500	1	12/12/2024 15:32	WG2417654
Styrene	U		0.118	0.500	1	12/12/2024 15:32	WG2417654
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	12/12/2024 15:32	WG2417654
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	12/12/2024 15:32	WG2417654
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	12/12/2024 15:32	WG2417654
Tetrachloroethene	U		0.300	0.500	1	12/12/2024 15:32	WG2417654
Toluene	U		0.278	0.500	1	12/12/2024 15:32	WG2417654
1,2,3-Trichlorobenzene	U		0.164	0.500	1	12/12/2024 15:32	WG2417654
1,2,4-Trichlorobenzene	U		0.481	1.00	1	12/12/2024 15:32	WG2417654
1,1,1-Trichloroethane	U		0.149	0.500	1	12/12/2024 15:32	WG2417654
1,1,2-Trichloroethane	U		0.158	0.500	1	12/12/2024 15:32	WG2417654
Trichloroethene	U		0.190	0.500	1	12/12/2024 15:32	WG2417654

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Trichlorofluoromethane	U		0.160	2.50	1	12/12/2024 15:32	WG2417654
1,2,3-Trichloropropane	U		0.237	2.50	1	12/12/2024 15:32	WG2417654
1,2,4-Trimethylbenzene	U		0.322	0.500	1	12/12/2024 15:32	WG2417654
1,2,3-Trimethylbenzene	U		0.104	0.500	1	12/12/2024 15:32	WG2417654
1,3,5-Trimethylbenzene	U		0.104	0.500	1	12/12/2024 15:32	WG2417654
Vinyl acetate	U		0.692	5.00	1	12/12/2024 15:32	WG2417654
Vinyl chloride	U		0.234	0.500	1	12/12/2024 15:32	WG2417654
Xylenes, Total	U		0.174	1.50	1	12/12/2024 15:32	WG2417654
(S) Toluene-d8	103			80.0-120		12/12/2024 15:32	WG2417654
(S) 4-Bromofluorobenzene	102			77.0-126		12/12/2024 15:32	WG2417654
(S) 1,2-Dichloroethane-d4	92.6			70.0-130		12/12/2024 15:32	WG2417654

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		69.6	600	1	12/10/2024 17:01	WG2415943
Unadjusted C19-C36 Aliphatics	U		58.5	600	1	12/10/2024 17:01	WG2415943
Unadjusted C11-C22 Aromatics	U		49.2	600	1	12/10/2024 17:01	WG2415943
Unadjusted Total Petroleum Hydrocarbons	U		200	600	1	12/10/2024 17:01	WG2415943
Adjusted C11-C22 Aromatics	U		200	600	1	12/10/2024 17:01	WG2415943
Adjusted Total Petroleum Hydrocarbons	U		200	600	1	12/10/2024 17:01	WG2415943
(S) o-Terphenyl	72.2			40.0-140		12/10/2024 17:01	WG2415943
(S) 1-Chloro-octadecane	30.0	J2		40.0-140		12/10/2024 17:01	WG2415943
(S) 2-Fluorobiphenyl	94.8			40.0-140		12/10/2024 17:01	WG2415943
(S) 2-Bromonaphthalene	94.6			40.0-140		12/10/2024 17:01	WG2415943

Sample Narrative:

L1806484-01 WG2415943: 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	U		0.0886	1.00	1	12/14/2024 15:54	WG2414917
Acenaphthylene	U		0.0921	1.00	1	12/14/2024 15:54	WG2414917
Anthracene	U		0.0804	1.00	1	12/14/2024 15:54	WG2414917
Benidine	U	J4	3.74	10.0	1	12/14/2024 15:54	WG2414917
Benzo(a)anthracene	U		0.199	1.00	1	12/14/2024 15:54	WG2414917
Benzo(b)fluoranthene	U		0.130	1.00	1	12/14/2024 15:54	WG2414917
Benzo(k)fluoranthene	U		0.120	1.00	1	12/14/2024 15:54	WG2414917
Benzo(g,h,i)perylene	U		0.121	1.00	1	12/14/2024 15:54	WG2414917
Benzo(a)pyrene	U		0.0381	1.00	1	12/14/2024 15:54	WG2414917
Bis(2-chlorethoxy)methane	U		0.116	10.0	1	12/14/2024 15:54	WG2414917
Bis(2-chloroethyl)ether	U		0.137	10.0	1	12/14/2024 15:54	WG2414917
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0	1	12/14/2024 15:54	WG2414917
4-Bromophenyl-phenylether	U		0.0877	10.0	1	12/14/2024 15:54	WG2414917
2-Chloronaphthalene	U		0.0648	1.00	1	12/14/2024 15:54	WG2414917
4-Chlorophenyl-phenylether	U		0.0926	10.0	1	12/14/2024 15:54	WG2414917
Chrysene	U		0.130	1.00	1	12/14/2024 15:54	WG2414917
Dibenz(a,h)anthracene	U		0.0644	1.00	1	12/14/2024 15:54	WG2414917
3,3-Dichlorobenzidine	U		0.212	10.0	1	12/14/2024 15:54	WG2414917
2,4-Dinitrotoluene	U		0.0983	10.0	1	12/14/2024 15:54	WG2414917
2,6-Dinitrotoluene	U		0.250	10.0	1	12/14/2024 15:54	WG2414917
Fluoranthene	U		0.102	1.00	1	12/14/2024 15:54	WG2414917
Fluorene	U		0.0844	1.00	1	12/14/2024 15:54	WG2414917

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

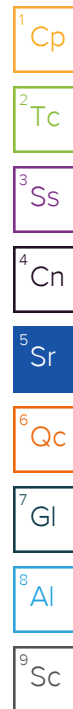
7Gl

8Al

9Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Hexachlorobenzene	U		0.0755	1.00	1	12/14/2024 15:54	WG2414917
Hexachloro-1,3-butadiene	U		0.0968	10.0	1	12/14/2024 15:54	WG2414917
Hexachlorocyclopentadiene	U		0.0598	10.0	1	12/14/2024 15:54	WG2414917
Hexachloroethane	U		0.127	10.0	1	12/14/2024 15:54	WG2414917
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	12/14/2024 15:54	WG2414917
Isophorone	U		0.143	10.0	1	12/14/2024 15:54	WG2414917
Naphthalene	U		0.159	1.00	1	12/14/2024 15:54	WG2414917
Nitrobenzene	U		0.297	10.0	1	12/14/2024 15:54	WG2414917
n-Nitrosodimethylamine	U		0.998	10.0	1	12/14/2024 15:54	WG2414917
n-Nitrosodiphenylamine	U		2.37	10.0	1	12/14/2024 15:54	WG2414917
n-Nitrosodi-n-propylamine	U		0.261	10.0	1	12/14/2024 15:54	WG2414917
Phenanthrene	U		0.112	1.00	1	12/14/2024 15:54	WG2414917
Benzylbutyl phthalate	U		0.765	3.00	1	12/14/2024 15:54	WG2414917
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00	1	12/14/2024 15:54	WG2414917
Di-n-butyl phthalate	U		0.453	3.00	1	12/14/2024 15:54	WG2414917
Diethyl phthalate	U		0.287	3.00	1	12/14/2024 15:54	WG2414917
Dimethyl phthalate	U		0.260	3.00	1	12/14/2024 15:54	WG2414917
Di-n-octyl phthalate	U		0.932	3.00	1	12/14/2024 15:54	WG2414917
Pyrene	U		0.107	1.00	1	12/14/2024 15:54	WG2414917
1,2,4-Trichlorobenzene	U		0.0698	10.0	1	12/14/2024 15:54	WG2414917
Aniline	U		1.65	10.0	1	12/14/2024 15:54	WG2414917
1,2-Diphenylhydrazine	U	N2	0.105	10.0	1	12/14/2024 15:54	WG2414917
Benzyl alcohol	U		0.563	10.0	1	12/14/2024 15:54	WG2414917
4-Chloroaniline	U		0.234	10.0	1	12/14/2024 15:54	WG2414917
4-Chloro-3-methylphenol	U		0.131	10.0	1	12/14/2024 15:54	WG2414917
2-Chlorophenol	U		0.133	10.0	1	12/14/2024 15:54	WG2414917
Dibenzofuran	U		0.0970	10.0	1	12/14/2024 15:54	WG2414917
2,4-Dichlorophenol	U		0.102	10.0	1	12/14/2024 15:54	WG2414917
2,4-Dimethylphenol	U		0.0636	10.0	1	12/14/2024 15:54	WG2414917
4,6-Dinitro-2-methylphenol	U		1.12	10.0	1	12/14/2024 15:54	WG2414917
2,4-Dinitrophenol	U		5.93	10.0	1	12/14/2024 15:54	WG2414917
2-Methylnaphthalene	U		0.117	1.00	1	12/14/2024 15:54	WG2414917
2-Methylphenol	U		0.0929	10.0	1	12/14/2024 15:54	WG2414917
3&4-Methyl Phenol	U		0.168	10.0	1	12/14/2024 15:54	WG2414917
2-Nitroaniline	U		0.102	10.0	1	12/14/2024 15:54	WG2414917
3-Nitroaniline	U		0.0869	10.0	1	12/14/2024 15:54	WG2414917
4-Nitroaniline	U		0.0910	10.0	1	12/14/2024 15:54	WG2414917
2-Nitrophenol	U		0.117	10.0	1	12/14/2024 15:54	WG2414917
4-Nitrophenol	U		0.143	10.0	1	12/14/2024 15:54	WG2414917
Pentachlorophenol	U		0.313	10.0	1	12/14/2024 15:54	WG2414917
Phenol	U		4.33	10.0	1	12/14/2024 15:54	WG2414917
Pyridine	U		0.627	10.0	1	12/14/2024 15:54	WG2414917
2,4,6-Trichlorophenol	U		0.100	10.0	1	12/14/2024 15:54	WG2414917
Acetophenone	U		0.208	10.0	1	12/14/2024 15:54	WG2414917
2-Acetylaminofluorene	U		0.253	10.0	1	12/19/2024 03:35	WG2414917
4-Aminobiphenyl	U	J4	0.461	10.0	1	12/19/2024 03:35	WG2414917
Chlorobenzilate	U		3.84	50.0	1	12/19/2024 03:35	WG2414917
Diallate	U		0.524	10.0	1	12/19/2024 03:35	WG2414917
2,6-Dichlorophenol	U		0.102	10.0	1	12/19/2024 03:35	WG2414917
Dimethoate	U		5.05	50.0	1	12/19/2024 03:35	WG2414917
P-(Dimethylamino) Azobenzene	U		3.69	10.0	1	12/19/2024 03:35	WG2414917
Dimethylbenz (A) Anthracene	U		1.71	10.0	1	12/19/2024 03:35	WG2414917
3,3-Dimethylbenzidine	U	J4	3.39	10.0	1	12/19/2024 03:35	WG2414917
a,a-Dimethylphenethylamine	U	J4	3.13	50.0	1	12/19/2024 03:35	WG2414917
1,3-Dinitrobenzene	U		0.359	10.0	1	12/19/2024 03:35	WG2414917
Diphenylamine	U		2.37	10.0	1	12/14/2024 15:54	WG2414917



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	12/19/2024 03:35	WG2414917
Disulfoton	U		0.267	10.0	1	12/19/2024 03:35	WG2414917
Ethyl methanesulfonate	U		0.326	10.0	1	12/19/2024 03:35	WG2414917
Ethyl Parathion	U		0.379	10.0	1	12/19/2024 03:35	WG2414917
Famphur	U	C6	3.92	20.0	1	12/19/2024 03:35	WG2414917
Hexachloropropene	U		0.149	50.0	1	12/19/2024 03:35	WG2414917
Hexachlorophene	U		1.44	50.0	1	12/19/2024 03:35	WG2414917
Isodrin	U		4.11	10.0	1	12/19/2024 03:35	WG2414917
Isosafrole	U		3.88	10.0	1	12/19/2024 03:35	WG2414917
Kepone	U	C6	2.66	20.0	1	12/19/2024 03:35	WG2414917
Methapyrilene	U	J4	10.0	50.0	1	12/19/2024 03:35	WG2414917
3-Methylcholanthrene	U		0.164	10.0	1	12/19/2024 03:35	WG2414917
Methyl methanesulfonate	U		3.40	50.0	1	12/19/2024 03:35	WG2414917
Methyl parathion	U		0.213	10.0	1	12/19/2024 03:35	WG2414917
1,4-Naphthoquinone	U	J4	5.56	50.0	1	12/19/2024 03:35	WG2414917
1-Naphthylamine	U	J4	0.289	10.0	1	12/19/2024 03:35	WG2414917
2-Naphthylamine	U	J4	4.48	10.0	1	12/19/2024 03:35	WG2414917
5-Nitro-o-toluidine	U		1.99	10.0	1	12/19/2024 03:35	WG2414917
4-Nitroquinoline 1-oxide	U		2.03	10.0	1	12/19/2024 03:35	WG2414917
n-Nitrosodiethylamine	U		3.57	10.0	1	12/19/2024 03:35	WG2414917
n-Nitrosodi-n-butylamine	U		3.91	10.0	1	12/19/2024 03:35	WG2414917
n-Nitrosomethylethylamine	U		3.25	10.0	1	12/19/2024 03:35	WG2414917
n-Nitrosomorpholine	U		3.25	10.0	1	12/19/2024 03:35	WG2414917
n-Nitrosopiperidine	U		3.72	10.0	1	12/19/2024 03:35	WG2414917
n-Nitrosopyrrolidine	U		3.39	10.0	1	12/19/2024 03:35	WG2414917
Pentachlorobenzene	U		4.15	10.0	1	12/19/2024 03:35	WG2414917
Pentachloroethane	U		2.83	50.0	1	12/19/2024 03:35	WG2414917
Pentachloronitrobenzene	U		4.15	10.0	1	12/19/2024 03:35	WG2414917
Phenacetin	U		4.66	10.0	1	12/19/2024 03:35	WG2414917
p-Phenylenediamine	U	J4	387	6900	1	12/19/2024 03:35	WG2414917
Phorate	U		4.86	50.0	1	12/19/2024 03:35	WG2414917
2-Picoline	U		6.83	50.0	1	12/19/2024 03:35	WG2414917
Pronamide	U		4.21	10.0	1	12/19/2024 03:35	WG2414917
Safrole	U		3.68	10.0	1	12/19/2024 03:35	WG2414917
Sulfotep	U		3.99	50.0	1	12/19/2024 03:35	WG2414917
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0	1	12/14/2024 15:54	WG2414917
2,3,4,6-Tetrachlorophenol	U		0.231	10.0	1	12/14/2024 15:54	WG2414917
Thionazin	U		4.07	10.0	1	12/19/2024 03:35	WG2414917
o-Toluidine	U		3.53	10.0	1	12/19/2024 03:35	WG2414917
2,4,5-Trichlorophenol	U		0.109	10.0	1	12/14/2024 15:54	WG2414917
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0	1	12/19/2024 03:35	WG2414917
1,3,5-Trinitrobenzene	U		1.32	10.0	1	12/19/2024 03:35	WG2414917
(S) 2-Fluorophenol	16.4			10.0-120		12/14/2024 15:54	WG2414917
(S) Phenol-d5	12.5			10.0-120		12/14/2024 15:54	WG2414917
(S) Nitrobenzene-d5	23.2			10.0-127		12/14/2024 15:54	WG2414917
(S) 2-Fluorobiphenyl	20.4			10.0-130		12/14/2024 15:54	WG2414917
(S) 2,4,6-Tribromophenol	20.0			10.0-155		12/14/2024 15:54	WG2414917
(S) p-Terphenyl-d14	23.7			10.0-128		12/14/2024 15:54	WG2414917

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Wet Chemistry by Method 4500CO2 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Free Carbon Dioxide	135000	T8	20000	1	12/10/2024 13:22	WG2415669

Sample Narrative:

L1806484-02 WG2415669: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 5210 B-2016

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
BOD	17.3		10.0	1	12/11/2024 09:36	WG2414063

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Nitrate as (N)	U		88.4	100	1	12/06/2024 13:56	WG2414228
Sulfate	U		637	5000	1	12/06/2024 13:56	WG2414228

Metals (ICPMS) by Method 6020B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Iron	3840		22.6	100	1	12/12/2024 04:10	WG2415477
Iron,Dissolved	4080		22.6	100	1	12/13/2024 03:17	WG2415457
Manganese	1730		0.700	5.00	1	12/12/2024 04:10	WG2415477
Manganese,Dissolved	1810		7.00	50.0	10	12/13/2024 13:25	WG2415457

Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

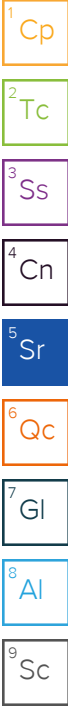
Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Unadjusted C5-C8 Aliphatics	1690		33.3	100	1	12/16/2024 00:45	WG2419269
Unadjusted C9-C12 Aliphatics	2450		33.3	100	1	12/16/2024 00:45	WG2419269
Unadjusted C9-C10 Aromatics	1450		33.3	100	1	12/16/2024 00:45	WG2419269
Adjusted C5-C8 Aliphatics	1240		33.3	100	1	12/16/2024 00:45	WG2419269
Adjusted C9-C12 Aliphatics	1750		33.3	100	1	12/16/2024 00:45	WG2419269
Total VPH	7220		66.7	200	1	12/16/2024 00:45	WG2419269
(S) 2,5-Dibromotoluene(FID)	91.8			70.0-130		12/16/2024 00:45	WG2419269
(S) 2,5-Dibromotoluene(PID)	77.9			70.0-130		12/16/2024 00:45	WG2419269

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Methane	6080		5.10	10.0	1	12/08/2024 15:25	WG2414378

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

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	U		282	625	25	12/12/2024 18:42	WG2417654
Acrylonitrile	U		16.8	125	25	12/12/2024 18:42	WG2417654
Benzene	447		2.35	12.5	25	12/12/2024 18:42	WG2417654
Bromobenzene	U		2.95	12.5	25	12/12/2024 18:42	WG2417654
Bromodichloromethane	U		3.40	12.5	25	12/12/2024 18:42	WG2417654
Bromochloromethane	U		3.20	12.5	25	12/12/2024 18:42	WG2417654
Bromoform	U		3.22	12.5	25	12/12/2024 18:42	WG2417654
Bromomethane	U		15.1	62.5	25	12/12/2024 18:42	WG2417654
n-Butylbenzene	U		3.93	12.5	25	12/12/2024 18:42	WG2417654



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		3.13	12.5	25	12/12/2024 18:42	WG2417654
tert-Butylbenzene	U		3.18	12.5	25	12/12/2024 18:42	WG2417654
Carbon disulfide	U		2.41	12.5	25	12/12/2024 18:42	WG2417654
Carbon tetrachloride	U		3.20	12.5	25	12/12/2024 18:42	WG2417654
Chlorobenzene	U		2.93	12.5	25	12/12/2024 18:42	WG2417654
Chlorodibromomethane	U		3.50	12.5	25	12/12/2024 18:42	WG2417654
Chloroethane	U		4.80	62.5	25	12/12/2024 18:42	WG2417654
2-Chloroethyl vinyl ether	U		14.4	1250	25	12/12/2024 18:42	WG2417654
Chloroform	U		2.78	12.5	25	12/12/2024 18:42	WG2417654
Chloromethane	U		24.0	31.3	25	12/12/2024 18:42	WG2417654
2-Chlorotoluene	U		2.65	12.5	25	12/12/2024 18:42	WG2417654
4-Chlorotoluene	U		2.85	12.5	25	12/12/2024 18:42	WG2417654
1,2-Dibromo-3-Chloropropane	U		6.90	62.5	25	12/12/2024 18:42	WG2417654
1,2-Dibromoethane	U		3.15	12.5	25	12/12/2024 18:42	WG2417654
Dibromomethane	U	J4	3.05	12.5	25	12/12/2024 18:42	WG2417654
1,2-Dichlorobenzene	U		2.68	12.5	25	12/12/2024 18:42	WG2417654
1,3-Dichlorobenzene	U		7.48	12.5	25	12/12/2024 18:42	WG2417654
1,4-Dichlorobenzene	U		3.00	12.5	25	12/12/2024 18:42	WG2417654
Dichlorodifluoromethane	U		9.35	62.5	25	12/12/2024 18:42	WG2417654
1,1-Dichloroethane	U		2.50	12.5	25	12/12/2024 18:42	WG2417654
1,2-Dichloroethane	U		2.05	12.5	25	12/12/2024 18:42	WG2417654
1,1-Dichloroethene	U		4.70	12.5	25	12/12/2024 18:42	WG2417654
cis-1,2-Dichloroethene	U		3.15	12.5	25	12/12/2024 18:42	WG2417654
trans-1,2-Dichloroethene	U		3.73	12.5	25	12/12/2024 18:42	WG2417654
1,2-Dichloropropane	U		3.73	12.5	25	12/12/2024 18:42	WG2417654
1,1-Dichloropropene	U		3.55	12.5	25	12/12/2024 18:42	WG2417654
1,3-Dichloropropane	U		2.73	25.0	25	12/12/2024 18:42	WG2417654
cis-1,3-Dichloropropene	U		2.78	12.5	25	12/12/2024 18:42	WG2417654
trans-1,3-Dichloropropene	U		2.95	12.5	25	12/12/2024 18:42	WG2417654
trans-1,4-Dichloro-2-butene	U		11.7	125	25	12/12/2024 18:42	WG2417654
2,2-Dichloropropane	U		4.03	12.5	25	12/12/2024 18:42	WG2417654
Di-isopropyl ether	U		2.63	12.5	25	12/12/2024 18:42	WG2417654
Ethylbenzene	101		3.43	12.5	25	12/12/2024 18:42	WG2417654
Hexachloro-1,3-butadiene	U		8.43	25.0	25	12/12/2024 18:42	WG2417654
2-Hexanone	U		19.7	125	25	12/12/2024 18:42	WG2417654
n-Hexane	U		18.7	125	25	12/12/2024 18:42	WG2417654
Iodomethane	U		13.9	125	25	12/12/2024 18:42	WG2417654
Isopropylbenzene	3.13	IC	2.63	12.5	25	12/12/2024 18:42	WG2417654
p-Isopropyltoluene	4.20	IC	3.00	12.5	25	12/12/2024 18:42	WG2417654
2-Butanone (MEK)	U		29.8	125	25	12/12/2024 18:42	WG2417654
Methylene Chloride	U		10.7	62.5	25	12/12/2024 18:42	WG2417654
4-Methyl-2-pentanone (MIBK)	U		12.0	125	25	12/12/2024 18:42	WG2417654
Methyl tert-butyl ether	U		2.53	12.5	25	12/12/2024 18:42	WG2417654
Naphthalene	30.8	IC	4.35	62.5	25	12/12/2024 18:42	WG2417654
n-Propylbenzene	6.98	IC	2.48	12.5	25	12/12/2024 18:42	WG2417654
Styrene	U		2.95	12.5	25	12/12/2024 18:42	WG2417654
1,1,1,2-Tetrachloroethane	U		3.68	12.5	25	12/12/2024 18:42	WG2417654
1,1,2,2-Tetrachloroethane	U		3.33	12.5	25	12/12/2024 18:42	WG2417654
1,1,2-Trichlorotrifluoroethane	U		4.50	12.5	25	12/12/2024 18:42	WG2417654
Tetrachloroethene	U		7.50	12.5	25	12/12/2024 18:42	WG2417654
Toluene	U		6.95	12.5	25	12/12/2024 18:42	WG2417654
1,2,3-Trichlorobenzene	U		4.10	12.5	25	12/12/2024 18:42	WG2417654
1,2,4-Trichlorobenzene	U		12.0	25.0	25	12/12/2024 18:42	WG2417654
1,1,1-Trichloroethane	U		3.73	12.5	25	12/12/2024 18:42	WG2417654
1,1,2-Trichloroethane	U		3.95	12.5	25	12/12/2024 18:42	WG2417654
Trichloroethene	U		4.75	12.5	25	12/12/2024 18:42	WG2417654

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Trichlorofluoromethane	U		4.00	62.5	25	12/12/2024 18:42	WG2417654
1,2,3-Trichloropropane	U		5.93	62.5	25	12/12/2024 18:42	WG2417654
1,2,4-Trimethylbenzene	383		8.05	12.5	25	12/12/2024 18:42	WG2417654
1,2,3-Trimethylbenzene	158		2.60	12.5	25	12/12/2024 18:42	WG2417654
1,3,5-Trimethylbenzene	24.6		2.60	12.5	25	12/12/2024 18:42	WG2417654
Vinyl acetate	U		17.3	125	25	12/12/2024 18:42	WG2417654
Vinyl chloride	U		5.85	12.5	25	12/12/2024 18:42	WG2417654
Xylenes, Total	603		4.35	37.5	25	12/12/2024 18:42	WG2417654
(S) Toluene-d8	102			80.0-120		12/12/2024 18:42	WG2417654
(S) 4-Bromofluorobenzene	101			77.0-126		12/12/2024 18:42	WG2417654
(S) 1,2-Dichloroethane-d4	99.0			70.0-130		12/12/2024 18:42	WG2417654

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	336	J	209	1800	3	12/10/2024 17:23	WG2415943
Unadjusted C19-C36 Aliphatics	U		176	1800	3	12/10/2024 17:23	WG2415943
Unadjusted C11-C22 Aromatics	720	J	148	1800	3	12/10/2024 17:23	WG2415943
Unadjusted Total Petroleum Hydrocarbons	1060	J	600	1800	3	12/10/2024 17:23	WG2415943
Adjusted C11-C22 Aromatics	687	J	600	1800	3	12/10/2024 17:23	WG2415943
Adjusted Total Petroleum Hydrocarbons	1020	J	600	1800	3	12/10/2024 17:23	WG2415943
(S) o-Terphenyl	61.2			40.0-140		12/10/2024 17:23	WG2415943
(S) 1-Chloro-octadecane	28.1	J2		40.0-140		12/10/2024 17:23	WG2415943
(S) 2-Fluorobiphenyl	88.9			40.0-140		12/10/2024 17:23	WG2415943
(S) 2-Bromonaphthalene	87.5			40.0-140		12/10/2024 17:23	WG2415943

Sample Narrative:

L1806484-02 WG2415943: Dilution and surrogate failure due to matrix interference during extraction procedure.
L1806484-02 WG2415943: Dilution due to matrix impact 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	0.374	J	0.0886	1.00	1	12/11/2024 15:29	WG2415743
Acenaphthylene	U		0.0921	1.00	1	12/11/2024 15:29	WG2415743
Anthracene	U		0.0804	1.00	1	12/11/2024 15:29	WG2415743
Benidine	U	J4	3.74	10.0	1	12/11/2024 15:29	WG2415743
Benzo(a)anthracene	U		0.199	1.00	1	12/11/2024 15:29	WG2415743
Benzo(b)fluoranthene	U		0.130	1.00	1	12/11/2024 15:29	WG2415743
Benzo(k)fluoranthene	U		0.120	1.00	1	12/11/2024 15:29	WG2415743
Benzo(g,h,i)perylene	U		0.121	1.00	1	12/11/2024 15:29	WG2415743
Benzo(a)pyrene	U		0.0381	1.00	1	12/11/2024 15:29	WG2415743
Bis(2-chlorethoxy)methane	U		0.116	10.0	1	12/11/2024 15:29	WG2415743
Bis(2-chloroethyl)ether	U		0.137	10.0	1	12/11/2024 15:29	WG2415743
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0	1	12/11/2024 15:29	WG2415743
4-Bromophenyl-phenylether	U		0.0877	10.0	1	12/11/2024 15:29	WG2415743
2-Chloronaphthalene	U		0.0648	1.00	1	12/11/2024 15:29	WG2415743
4-Chlorophenyl-phenylether	U		0.0926	10.0	1	12/11/2024 15:29	WG2415743
Chrysene	U		0.130	1.00	1	12/11/2024 15:29	WG2415743
Dibenz(a,h)anthracene	U		0.0644	1.00	1	12/11/2024 15:29	WG2415743
3,3-Dichlorobenzidine	U		0.212	10.0	1	12/11/2024 15:29	WG2415743
2,4-Dinitrotoluene	U		0.0983	10.0	1	12/11/2024 15:29	WG2415743
2,6-Dinitrotoluene	U		0.250	10.0	1	12/11/2024 15:29	WG2415743
Fluoranthene	U		0.102	1.00	1	12/11/2024 15:29	WG2415743

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Fluorene	0.531	<u>J</u>	0.0844	1.00	1	12/11/2024 15:29	WG2415743
Hexachlorobenzene	U		0.0755	1.00	1	12/11/2024 15:29	WG2415743
Hexachloro-1,3-butadiene	U		0.0968	10.0	1	12/11/2024 15:29	WG2415743
Hexachlorocyclopentadiene	U		0.0598	10.0	1	12/11/2024 15:29	WG2415743
Hexachloroethane	U		0.127	10.0	1	12/11/2024 15:29	WG2415743
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	12/11/2024 15:29	WG2415743
Isophorone	U		0.143	10.0	1	12/11/2024 15:29	WG2415743
Naphthalene	20.1		0.159	1.00	1	12/11/2024 15:29	WG2415743
Nitrobenzene	U		0.297	10.0	1	12/11/2024 15:29	WG2415743
n-Nitrosodimethylamine	U		0.998	10.0	1	12/11/2024 15:29	WG2415743
n-Nitrosodiphenylamine	U		2.37	10.0	1	12/11/2024 15:29	WG2415743
n-Nitrosodi-n-propylamine	U		0.261	10.0	1	12/11/2024 15:29	WG2415743
Phenanthrene	0.283	<u>J</u>	0.112	1.00	1	12/11/2024 15:29	WG2415743
Benzylbutyl phthalate	U		0.765	3.00	1	12/11/2024 15:29	WG2415743
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00	1	12/11/2024 15:29	WG2415743
Di-n-butyl phthalate	U		0.453	3.00	1	12/11/2024 15:29	WG2415743
Diethyl phthalate	2.13	<u>J</u>	0.287	3.00	1	12/11/2024 15:29	WG2415743
Dimethyl phthalate	U		0.260	3.00	1	12/11/2024 15:29	WG2415743
Di-n-octyl phthalate	U		0.932	3.00	1	12/11/2024 15:29	WG2415743
Pyrene	U		0.107	1.00	1	12/11/2024 15:29	WG2415743
1,2,4-Trichlorobenzene	U		0.0698	10.0	1	12/11/2024 15:29	WG2415743
Aniline	U	<u>J4</u>	1.65	10.0	1	12/11/2024 15:29	WG2415743
1,2-Diphenylhydrazine	U	<u>N2</u>	0.105	10.0	1	12/11/2024 15:29	WG2415743
Benzyl alcohol	U		0.563	10.0	1	12/11/2024 15:29	WG2415743
4-Chloroaniline	U		0.234	10.0	1	12/11/2024 15:29	WG2415743
4-Chloro-3-methylphenol	U		0.131	10.0	1	12/11/2024 15:29	WG2415743
2-Chlorophenol	U		0.133	10.0	1	12/11/2024 15:29	WG2415743
Dibenzofuran	U		0.0970	10.0	1	12/11/2024 15:29	WG2415743
2,4-Dichlorophenol	U		0.102	10.0	1	12/11/2024 15:29	WG2415743
2,4-Dimethylphenol	6.17	<u>J</u>	0.0636	10.0	1	12/11/2024 15:29	WG2415743
4,6-Dinitro-2-methylphenol	U		1.12	10.0	1	12/11/2024 15:29	WG2415743
2,4-Dinitrophenol	U		5.93	10.0	1	12/11/2024 15:29	WG2415743
2-Methylnaphthalene	11.7		0.117	1.00	1	12/11/2024 15:29	WG2415743
2-Methylphenol	U		0.0929	10.0	1	12/11/2024 15:29	WG2415743
3&4-Methyl Phenol	U		0.168	10.0	1	12/11/2024 15:29	WG2415743
2-Nitroaniline	U		0.102	10.0	1	12/11/2024 15:29	WG2415743
3-Nitroaniline	U		0.0869	10.0	1	12/11/2024 15:29	WG2415743
4-Nitroaniline	U		0.0910	10.0	1	12/11/2024 15:29	WG2415743
2-Nitrophenol	U		0.117	10.0	1	12/11/2024 15:29	WG2415743
4-Nitrophenol	U		0.143	10.0	1	12/11/2024 15:29	WG2415743
Pentachlorophenol	U		0.313	10.0	1	12/11/2024 15:29	WG2415743
Phenol	U		4.33	10.0	1	12/11/2024 15:29	WG2415743
Pyridine	U	<u>J4</u>	0.627	10.0	1	12/11/2024 15:29	WG2415743
2,4,6-Trichlorophenol	U		0.100	10.0	1	12/11/2024 15:29	WG2415743
Acetophenone	U		0.208	10.0	1	12/11/2024 15:29	WG2415743
2-Acetylaminofluorene	U		0.253	10.0	1	12/18/2024 06:46	WG2415743
4-Aminobiphenyl	U	<u>J4</u>	0.461	10.0	1	12/18/2024 06:46	WG2415743
Chlorobenzilate	U		3.84	50.0	1	12/18/2024 06:46	WG2415743
Diallate	U		0.524	10.0	1	12/18/2024 06:46	WG2415743
2,6-Dichlorophenol	U		0.102	10.0	1	12/18/2024 06:46	WG2415743
Dimethoate	U		5.05	50.0	1	12/18/2024 06:46	WG2415743
P-(Dimethylamino) Azobenzene	U		3.69	10.0	1	12/18/2024 06:46	WG2415743
Dimethylbenz (A) Anthracene	U		1.71	10.0	1	12/18/2024 06:46	WG2415743
3,3-Dimethylbenzidine	U	<u>J4</u>	3.39	10.0	1	12/18/2024 06:46	WG2415743
a,a-Dimethylphenethylamine	U	<u>J4</u>	3.13	50.0	1	12/18/2024 06:46	WG2415743
1,3-Dinitrobenzene	U		0.359	10.0	1	12/18/2024 06:46	WG2415743

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Diphenylamine	U		2.37	10.0	1	12/11/2024 15:29	WG2415743
Dinoseb	U		8.01	50.0	1	12/18/2024 06:46	WG2415743
Disulfoton	U		0.267	10.0	1	12/18/2024 06:46	WG2415743
Ethyl methanesulfonate	U		0.326	10.0	1	12/18/2024 06:46	WG2415743
Ethyl Parathion	U		0.379	10.0	1	12/18/2024 06:46	WG2415743
Famphur	U	C6	3.92	20.0	1	12/18/2024 06:46	WG2415743
Hexachloropropene	U		0.149	50.0	1	12/18/2024 06:46	WG2415743
Hexachlorophene	U	J4	1.44	50.0	1	12/18/2024 06:46	WG2415743
Isodrin	U		4.11	10.0	1	12/18/2024 06:46	WG2415743
Isosafrole	U		3.88	10.0	1	12/18/2024 06:46	WG2415743
Kepone	U		2.66	20.0	1	12/18/2024 06:46	WG2415743
Methapyrilene	U	J4	10.0	50.0	1	12/18/2024 06:46	WG2415743
3-Methylcholanthrene	U		0.164	10.0	1	12/18/2024 06:46	WG2415743
Methyl methanesulfonate	U		3.40	50.0	1	12/18/2024 06:46	WG2415743
Methyl parathion	U		0.213	10.0	1	12/18/2024 06:46	WG2415743
1,4-Naphthoquinone	U	J4	5.56	50.0	1	12/18/2024 06:46	WG2415743
1-Naphthylamine	U	J4	0.289	10.0	1	12/18/2024 06:46	WG2415743
2-Naphthylamine	U		4.48	10.0	1	12/18/2024 06:46	WG2415743
5-Nitro-o-toluidine	U		1.99	10.0	1	12/18/2024 06:46	WG2415743
4-Nitroquinoline 1-oxide	U		2.03	10.0	1	12/18/2024 06:46	WG2415743
n-Nitrosodiethylamine	U		3.57	10.0	1	12/18/2024 06:46	WG2415743
n-Nitrosodi-n-butylamine	U		3.91	10.0	1	12/18/2024 06:46	WG2415743
n-Nitrosomethylethylamine	U		3.25	10.0	1	12/18/2024 06:46	WG2415743
n-Nitrosomorpholine	U		3.25	10.0	1	12/18/2024 06:46	WG2415743
n-Nitrosopiperidine	U		3.72	10.0	1	12/18/2024 06:46	WG2415743
n-Nitrosopyrrolidine	U		3.39	10.0	1	12/18/2024 06:46	WG2415743
Pentachlorobenzene	U		4.15	10.0	1	12/18/2024 06:46	WG2415743
Pentachloroethane	U		2.83	50.0	1	12/18/2024 06:46	WG2415743
Pentachloronitrobenzene	U		4.15	10.0	1	12/18/2024 06:46	WG2415743
Phenacetin	U		4.66	10.0	1	12/18/2024 06:46	WG2415743
p-Phenylenediamine	U	J4	387	6900	1	12/18/2024 06:46	WG2415743
Phorate	U		4.86	50.0	1	12/18/2024 06:46	WG2415743
2-Picoline	U	J4	6.83	50.0	1	12/18/2024 06:46	WG2415743
Pronamide	U		4.21	10.0	1	12/18/2024 06:46	WG2415743
Safrole	U		3.68	10.0	1	12/18/2024 06:46	WG2415743
Sulfotep	U		3.99	50.0	1	12/18/2024 06:46	WG2415743
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0	1	12/11/2024 15:29	WG2415743
2,3,4,6-Tetrachlorophenol	U		0.231	10.0	1	12/11/2024 15:29	WG2415743
Thionazin	U		4.07	10.0	1	12/18/2024 06:46	WG2415743
o-Toluidine	U		3.53	10.0	1	12/18/2024 06:46	WG2415743
2,4,5-Trichlorophenol	U		0.109	10.0	1	12/11/2024 15:29	WG2415743
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0	1	12/18/2024 06:46	WG2415743
1,3,5-Trinitrobenzene	U		1.32	10.0	1	12/18/2024 06:46	WG2415743
(S) 2-Fluorophenol	0.000	J2		10.0-120		12/11/2024 15:29	WG2415743
(S) Phenol-d5	14.6			10.0-120		12/11/2024 15:29	WG2415743
(S) Nitrobenzene-d5	38.8			10.0-127		12/11/2024 15:29	WG2415743
(S) 2-Fluorobiphenyl	47.6			10.0-130		12/11/2024 15:29	WG2415743
(S) 2,4,6-Tribromophenol	36.6			10.0-155		12/11/2024 15:29	WG2415743
(S) p-Terphenyl-d14	29.2			10.0-128		12/11/2024 15:29	WG2415743

Sample Narrative:

L1806484-02 WG2415743: Surrogate failure due to matrix interference.

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4156108-3 12/10/24 12:57

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Free Carbon Dioxide	12100	⬇	6670	20000

Sample Narrative:

BLANK: Endpoint pH 4.5

L1806688-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1806688-03 12/10/24 13:05 • (DUP) R4156108-5 12/10/24 13:09

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Free Carbon Dioxide	182000	181000	1	0.340		20

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

L1807398-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1807398-03 12/10/24 15:16 • (DUP) R4156108-7 12/10/24 15:24

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

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4156429-1 12/11/24 08:27

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

L1806072-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1806072-01 12/11/24 08:46 • (DUP) R4156429-3 12/11/24 08:48

Analyte	Original Result mg/l	DUP Result mg/l	Dilution	DUP RPD %	DUP Qualifier	DUP RPD Limits %
BOD	41.2	42.2	1	2.4	K9	30

L1806376-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1806376-01 12/11/24 09:16 • (DUP) R4156429-4 12/11/24 09:18

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

Laboratory Control Sample (LCS)

(LCS) R4156429-2 12/11/24 08:36

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
BOD	198	187	94.6	84.6-115	

Laboratory Control Sample (LCS)

(LCS) R4156429-5 12/11/24 09:38

Analyte	Spike Amount mg/l	LCS Result mg/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
BOD	198	173	87.3	84.6-115	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4155068-1 12/06/24 12:16

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Nitrate as (N)	U		88.4	100
Sulfate	U		637	5000

L1806376-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1806376-01 12/06/24 23:12 • (DUP) R4155068-3 12/06/24 23:29

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Nitrate as (N)	U	U	1	0.000		15
Sulfate	49000	49000	1	0.119		15

L1806406-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1806406-01 12/06/24 16:08 • (DUP) R4155068-6 12/07/24 00:20

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Nitrate as (N)	4410	4420	1	0.333		15
Sulfate	10700	10800	1	0.454		15

Laboratory Control Sample (LCS)

(LCS) R4155068-2 12/06/24 12:32

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Nitrate as (N)	8000	8110	101	80.0-120	
Sulfate	40000	40500	101	80.0-120	

L1806376-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806376-01 12/06/24 23:12 • (MS) R4155068-4 12/06/24 23:46 • (MSD) R4155068-5 12/07/24 00:03

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Nitrate as (N)	8000	U	7750	7720	96.9	96.4	1	80.0-120			0.471	15
Sulfate	40000	49000	78800	78700	74.4	74.1	1	80.0-120	J6	J6	0.161	15

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1806406-01 Original Sample (OS) • Matrix Spike (MS)

(OS) L1806406-01 12/06/24 16:08 • (MS) R4155068-7 12/07/24 00:37

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MS Rec. %	Dilution	Rec. Limits %	<u>MS Qualifier</u>
Nitrate as (N)	8000	4410	11500	88.3	1	80.0-120	E
Sulfate	40000	10700	48000	93.1	1	80.0-120	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4157476-1 12/13/24 02:55

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Iron,Dissolved	U		22.6	100
Manganese,Dissolved	U		0.700	5.00

Laboratory Control Sample (LCS)

(LCS) R4157476-2 12/13/24 02:58

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Iron,Dissolved	1000	915	91.5	80.0-120	
Manganese,Dissolved	50.0	47.9	95.8	80.0-120	

L1806567-21 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806567-21 12/13/24 03:01 • (MS) R4157476-4 12/13/24 03:08 • (MSD) R4157476-5 12/13/24 03:11

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Iron,Dissolved	1000	U	890	899	89.0	89.9	1	75.0-125			0.958	20
Manganese,Dissolved	50.0	0.764	47.2	47.7	92.9	94.0	1	75.0-125			1.09	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4156971-1 12/12/24 02:55

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Iron	U		22.6	100
Manganese	U		0.700	5.00

Laboratory Control Sample (LCS)

(LCS) R4156971-2 12/12/24 02:58

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Iron	1000	952	95.2	80.0-120	
Manganese	50.0	49.9	99.9	80.0-120	

L1805928-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1805928-01 12/12/24 03:01 • (MS) R4156971-4 12/12/24 03:08 • (MSD) R4156971-5 12/12/24 03:11

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Iron	1000	159	1090	1080	92.7	92.1	1	75.0-125			0.556	20
Manganese	50.0	26.9	77.0	75.3	100	96.7	1	75.0-125			2.34	20

L1806221-11 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806221-11 12/12/24 03:14 • (MS) R4156971-6 12/12/24 03:17 • (MSD) R4156971-7 12/12/24 03:20

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Iron	1000	U	945	961	94.5	96.1	1	75.0-125			1.66	20
Manganese	50.0	373	422	422	98.3	98.6	1	75.0-125			0.0345	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4158337-3 12/15/24 21:41

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)	81.0			70.0-130
(S) 2,5-Dibromotoluene(PID)	76.1			70.0-130

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

(LCS) R4158337-1 12/15/24 19:14 • (LCSD) R4158337-2 12/15/24 19:51

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C5-C8 Aliphatics	1200	1430	1440	119	120	70.0-130			0.697	50
Unadjusted C9-C12 Aliphatics	1400	1670	1670	119	119	70.0-130			0.000	50
Unadjusted C9-C10 Aromatics	200	232	231	116	116	70.0-130			0.432	50
Total VPH	2800	3330	3340	119	119	70.0-130			0.300	50
(S) 2,5-Dibromotoluene(FID)				80.5	83.4	70.0-130				
(S) 2,5-Dibromotoluene(PID)				75.9	78.8	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4155072-2 12/08/24 11:26

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Methane	U		5.10	10.0

L1806235-04 Original Sample (OS) • Duplicate (DUP)

(OS) L1806235-04 12/08/24 11:52 • (DUP) R4155072-3 12/08/24 13:43

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

L1806453-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1806453-03 12/08/24 14:51 • (DUP) R4155072-4 12/08/24 16:30

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

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

(LCS) R4155072-1 12/08/24 11:11 • (LCSD) R4155072-7 12/08/24 16:49

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	%	%	%			%	%
Methane	67.8	64.7	62.6	95.4	92.3	85.0-115			3.30	20

L1805718-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1805718-03 12/08/24 11:29 • (MS) R4155072-5 12/08/24 16:36 • (MSD) R4155072-6 12/08/24 16:44

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Methane	67.8	20.9	113	92.4	136	105	1	50.0-150		J3	20.1	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4157630-2 12/12/24 11:17

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

¹Cp

²Tc

³Ss

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⁶Qc

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Method Blank (MB)

(MB) R4157630-2 12/12/24 11:17

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	103			80.0-120
(S) 4-Bromofluorobenzene	103			77.0-126
(S) 1,2-Dichloroethane-d4	94.5			70.0-130

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

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⁷Gl

⁸Al

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Laboratory Control Sample (LCS)

(LCS) R4157630-1 12/12/24 10:01

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Acetone	25.0	18.3	73.2	19.0-160	J
Acrylonitrile	25.0	21.8	87.2	55.0-149	
Benzene	5.00	4.55	91.0	70.0-123	
Bromobenzene	5.00	4.28	85.6	73.0-121	
Bromodichloromethane	5.00	4.13	82.6	75.0-120	
Bromochloromethane	5.00	4.78	95.6	76.0-122	
Bromoform	5.00	3.76	75.2	68.0-132	
Bromomethane	5.00	4.08	81.6	10.0-160	
n-Butylbenzene	5.00	4.56	91.2	73.0-125	
sec-Butylbenzene	5.00	4.62	92.4	75.0-125	
tert-Butylbenzene	5.00	4.55	91.0	76.0-124	
Carbon disulfide	5.00	6.13	123	61.0-128	
Carbon tetrachloride	5.00	4.78	95.6	68.0-126	
Chlorobenzene	5.00	4.83	96.6	80.0-121	
Chlorodibromomethane	5.00	3.99	79.8	77.0-125	
Chloroethane	5.00	4.24	84.8	47.0-150	
2-Chloroethyl vinyl ether	25.0	21.4	85.6	51.0-160	J
Chloroform	5.00	4.28	85.6	73.0-120	
Chloromethane	5.00	4.44	88.8	41.0-142	
2-Chlorotoluene	5.00	4.49	89.8	76.0-123	
4-Chlorotoluene	5.00	4.11	82.2	75.0-122	
1,2-Dibromo-3-Chloropropane	5.00	3.38	67.6	58.0-134	
1,2-Dibromoethane	5.00	4.20	84.0	80.0-122	
Dibromomethane	5.00	3.98	79.6	80.0-120	J4
1,2-Dichlorobenzene	5.00	4.44	88.8	79.0-121	
1,3-Dichlorobenzene	5.00	4.43	88.6	79.0-120	
1,4-Dichlorobenzene	5.00	4.41	88.2	79.0-120	
Dichlorodifluoromethane	5.00	5.06	101	51.0-149	
1,1-Dichloroethane	5.00	4.98	99.6	70.0-126	
1,2-Dichloroethane	5.00	3.93	78.6	70.0-128	
1,1-Dichloroethene	5.00	5.96	119	71.0-124	
cis-1,2-Dichloroethene	5.00	4.55	91.0	73.0-120	
trans-1,2-Dichloroethene	5.00	5.21	104	73.0-120	
1,2-Dichloropropane	5.00	4.37	87.4	77.0-125	
1,1-Dichloropropene	5.00	4.72	94.4	74.0-126	
1,3-Dichloropropane	5.00	4.34	86.8	80.0-120	
cis-1,3-Dichloropropene	5.00	4.10	82.0	80.0-123	
trans-1,3-Dichloropropene	5.00	4.17	83.4	78.0-124	
trans-1,4-Dichloro-2-butene	5.00	4.34	86.8	33.0-144	J
2,2-Dichloropropane	5.00	5.63	113	58.0-130	

1
Cp

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Tc

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Ss

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Cn

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Sr

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Gl

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Al

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Sc

Laboratory Control Sample (LCS)

(LCS) R4157630-1 12/12/24 10:01

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Di-isopropyl ether	5.00	4.85	97.0	58.0-138	
Ethylbenzene	5.00	4.79	95.8	79.0-123	
Hexachloro-1,3-butadiene	5.00	4.84	96.8	54.0-138	
2-Hexanone	25.0	22.3	89.2	67.0-149	
n-Hexane	5.00	5.38	108	57.0-133	
Iodomethane	25.0	31.2	125	33.0-147	
Isopropylbenzene	5.00	4.81	96.2	76.0-127	
p-Isopropyltoluene	5.00	4.60	92.0	76.0-125	
2-Butanone (MEK)	25.0	19.7	78.8	44.0-160	
Methylene Chloride	5.00	5.33	107	67.0-120	
4-Methyl-2-pentanone (MIBK)	25.0	19.6	78.4	68.0-142	
Methyl tert-butyl ether	5.00	4.12	82.4	68.0-125	
Naphthalene	5.00	4.20	84.0	54.0-135	
n-Propylbenzene	5.00	4.31	86.2	77.0-124	
Styrene	5.00	4.73	94.6	73.0-130	
1,1,1,2-Tetrachloroethane	5.00	4.27	85.4	75.0-125	
1,1,2,2-Tetrachloroethane	5.00	3.99	79.8	65.0-130	
1,1,2-Trichlorotrifluoroethane	5.00	5.99	120	69.0-132	
Tetrachloroethene	5.00	5.11	102	72.0-132	
Toluene	5.00	4.54	90.8	79.0-120	
1,2,3-Trichlorobenzene	5.00	4.75	95.0	50.0-138	
1,2,4-Trichlorobenzene	5.00	5.00	100	57.0-137	
1,1,1-Trichloroethane	5.00	5.08	102	73.0-124	
1,1,2-Trichloroethane	5.00	4.34	86.8	80.0-120	
Trichloroethene	5.00	4.96	99.2	78.0-124	
Trichlorofluoromethane	5.00	4.49	89.8	59.0-147	
1,2,3-Trichloropropane	5.00	4.09	81.8	73.0-130	
1,2,4-Trimethylbenzene	5.00	4.22	84.4	76.0-121	
1,2,3-Trimethylbenzene	5.00	4.22	84.4	77.0-120	
1,3,5-Trimethylbenzene	5.00	4.12	82.4	76.0-122	
Vinyl acetate	25.0	21.1	84.4	11.0-160	
Vinyl chloride	5.00	4.43	88.6	67.0-131	
Xylenes, Total	15.0	14.2	94.7	79.0-123	
(S) Toluene-d8			101	80.0-120	
(S) 4-Bromofluorobenzene			105	77.0-126	
(S) 1,2-Dichloroethane-d4			89.1	70.0-130	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

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L1806308-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806308-01 12/12/24 14:35 • (MS) R4157630-3 12/12/24 19:01 • (MSD) R4157630-4 12/12/24 19:20

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	49.5	48.9	198	196	1	10.0-160	J5	J5	1.22	35
Acrylonitrile	25.0	U	24.3	22.4	97.2	89.6	1	21.0-160			8.14	32
Benzene	5.00	84.5	81.7	87.5	0.000	60.0	1	17.0-158	V		6.86	27
Bromobenzene	5.00	U	3.51	3.97	70.2	79.4	1	30.0-149			12.3	28
Bromodichloromethane	5.00	U	3.86	4.31	77.2	86.2	1	31.0-150			11.0	27
Bromochloromethane	5.00	U	3.96	4.75	79.2	95.0	1	38.0-142			18.1	26
Bromoform	5.00	U	3.69	4.11	73.8	82.2	1	29.0-150			10.8	29
Bromomethane	5.00	U	2.65	3.41	53.0	68.2	1	10.0-160			25.1	38
n-Butylbenzene	5.00	1.57	4.17	4.90	52.0	66.6	1	31.0-150			16.1	30
sec-Butylbenzene	5.00	2.09	4.80	5.50	54.2	68.2	1	33.0-155			13.6	29
tert-Butylbenzene	5.00	0.200	3.43	4.58	64.6	87.6	1	34.0-153		J3	28.7	28
Carbon disulfide	5.00	U	4.69	6.22	93.8	124	1	10.0-156			28.0	28
Carbon tetrachloride	5.00	U	3.54	4.54	70.8	90.8	1	23.0-159			24.8	28
Chlorobenzene	5.00	U	3.83	4.60	76.6	92.0	1	33.0-152			18.3	27
Chlorodibromomethane	5.00	U	3.75	4.10	75.0	82.0	1	37.0-149			8.92	27
Chloroethane	5.00	U	3.14	4.12	62.8	82.4	1	10.0-160			27.0	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	3.55	4.13	71.0	82.6	1	29.0-154			15.1	28
Chloromethane	5.00	U	2.67	3.85	53.4	77.0	1	10.0-160		J3	36.2	29
2-Chlorotoluene	5.00	U	3.41	4.14	68.2	82.8	1	32.0-153			19.3	28
4-Chlorotoluene	5.00	U	3.14	3.67	62.8	73.4	1	32.0-150			15.6	28
1,2-Dibromo-3-Chloropropane	5.00	U	3.69	3.72	73.8	74.4	1	22.0-151			0.810	34
1,2-Dibromoethane	5.00	U	3.88	4.27	77.6	85.4	1	34.0-147			9.57	27
Dibromomethane	5.00	U	4.08	4.22	81.6	84.4	1	30.0-151			3.37	27
1,2-Dichlorobenzene	5.00	U	3.61	4.19	72.2	83.8	1	34.0-149			14.9	28
1,3-Dichlorobenzene	5.00	U	3.52	4.14	70.4	82.8	1	36.0-146			16.2	27
1,4-Dichlorobenzene	5.00	U	3.52	4.12	70.4	82.4	1	35.0-142			15.7	27
Dichlorodifluoromethane	5.00	U	3.62	5.00	72.4	100	1	10.0-160		J3	32.0	29
1,1-Dichloroethane	5.00	U	4.00	4.87	80.0	97.4	1	25.0-158			19.6	27
1,2-Dichloroethane	5.00	U	3.74	4.08	74.8	81.6	1	29.0-151			8.70	27
1,1-Dichloroethene	5.00	U	4.25	5.39	85.0	108	1	11.0-160			23.7	29
cis-1,2-Dichloroethene	5.00	U	3.65	4.31	73.0	86.2	1	10.0-160			16.6	27
trans-1,2-Dichloroethene	5.00	U	3.83	4.60	76.6	92.0	1	17.0-153			18.3	27
1,2-Dichloropropane	5.00	U	3.84	4.37	76.8	87.4	1	30.0-156			12.9	27
1,1-Dichloropropene	5.00	U	3.69	4.60	73.8	92.0	1	25.0-158			22.0	27
1,3-Dichloropropane	5.00	U	3.86	4.21	77.2	84.2	1	38.0-147			8.67	27
cis-1,3-Dichloropropene	5.00	U	3.57	3.97	71.4	79.4	1	34.0-149			10.6	28
trans-1,3-Dichloropropene	5.00	U	3.64	4.05	72.8	81.0	1	32.0-149			10.7	28
trans-1,4-Dichloro-2-butene	5.00	U	4.43	3.89	88.6	77.8	1	10.0-157	J	J	13.0	37
2,2-Dichloropropane	5.00	U	4.14	5.37	82.8	107	1	24.0-152			25.9	29

Cp

Tc

Ss

Cn

Sr

Qc

Gl

Al

Sc

L1806308-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806308-01 12/12/24 14:35 • (MS) R4157630-3 12/12/24 19:01 • (MSD) R4157630-4 12/12/24 19:20

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	4.04	4.46	80.8	89.2	1	21.0-160			9.88	28
Ethylbenzene	5.00	0.687	4.38	5.14	73.9	89.1	1	30.0-155			16.0	27
Hexachloro-1,3-butadiene	5.00	U	3.39	4.33	67.8	86.6	1	20.0-154			24.4	34
2-Hexanone	25.0	U	25.3	24.7	101	98.8	1	21.0-160			2.40	29
n-Hexane	5.00	U	4.06	5.32	81.2	106	1	10.0-153	J		26.9	28
Iodomethane	25.0	U	22.3	27.4	89.2	110	1	10.0-160			20.5	40
Isopropylbenzene	5.00	8.28	10.5	11.8	44.4	70.4	1	28.0-157			11.7	27
p-Isopropyltoluene	5.00	U	3.36	4.12	67.2	82.4	1	30.0-154			20.3	29
2-Butanone (MEK)	25.0	U	26.5	22.4	106	89.6	1	10.0-160			16.8	32
Methylene Chloride	5.00	U	3.84	4.62	76.8	92.4	1	23.0-144			18.4	28
4-Methyl-2-pentanone (MIBK)	25.0	U	22.5	21.7	90.0	86.8	1	29.0-160			3.62	29
Methyl tert-butyl ether	5.00	U	4.06	4.15	81.2	83.0	1	28.0-150			2.19	29
Naphthalene	5.00	23.9	25.0	27.5	22.0	72.0	1	12.0-156		E	9.52	35
n-Propylbenzene	5.00	10.9	11.2	11.8	6.00	18.0	1	31.0-154	J6	J6	5.22	28
Styrene	5.00	U	3.89	4.69	77.8	93.8	1	33.0-155			18.6	28
1,1,1,2-Tetrachloroethane	5.00	U	3.71	4.26	74.2	85.2	1	36.0-151			13.8	29
1,1,2,2-Tetrachloroethane	5.00	U	4.12	4.06	82.4	81.2	1	33.0-150			1.47	28
1,1,2-Trichlorotrifluoroethane	5.00	U	4.10	5.92	82.0	118	1	23.0-160		J3	36.3	30
Tetrachloroethene	5.00	U	3.79	4.64	75.8	92.8	1	10.0-160			20.2	27
Toluene	5.00	0.521	3.95	4.69	68.6	83.4	1	26.0-154			17.1	28
1,2,3-Trichlorobenzene	5.00	U	3.43	4.05	68.6	81.0	1	17.0-150			16.6	36
1,2,4-Trichlorobenzene	5.00	U	3.99	4.75	79.8	95.0	1	24.0-150			17.4	33
1,1,1-Trichloroethane	5.00	U	3.86	4.68	77.2	93.6	1	23.0-160			19.2	28
1,1,2-Trichloroethane	5.00	U	3.92	4.35	78.4	87.0	1	35.0-147			10.4	27
Trichloroethene	5.00	U	3.88	4.69	77.6	93.8	1	10.0-160			18.9	25
Trichlorofluoromethane	5.00	U	2.53	3.53	50.6	70.6	1	17.0-160		J3	33.0	31
1,2,3-Trichloropropane	5.00	U	4.34	4.42	86.8	88.4	1	34.0-151			1.83	29
1,2,4-Trimethylbenzene	5.00	U	3.42	3.93	68.4	78.6	1	26.0-154			13.9	27
1,2,3-Trimethylbenzene	5.00	0.348	3.29	3.73	58.8	67.6	1	32.0-149			12.5	28
1,3,5-Trimethylbenzene	5.00	U	2.08	2.82	41.6	56.4	1	28.0-153		J3	30.2	27
Vinyl acetate	25.0	U	21.7	22.4	86.8	89.6	1	12.0-160			3.17	31
Vinyl chloride	5.00	U	3.13	4.05	62.6	81.0	1	10.0-160			25.6	27
Xylenes, Total	15.0	2.04	12.9	15.2	72.4	87.7	1	29.0-154			16.4	28
(S) Toluene-d8					99.1	100		80.0-120				
(S) 4-Bromofluorobenzene					104	105		77.0-126				
(S) 1,2-Dichloroethane-d4					97.4	96.9		70.0-130				

¹Cp

²Tc

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⁷Gl

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Method Blank (MB)

(MB) R4156271-1 12/10/24 14:30

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C9-C18 Aliphatics	U		69.6	600
Unadjusted C19-C36 Aliphatics	U		58.5	600
Unadjusted Total Petroleum Hydrocarbons	U		200	600
(S) 1-Chloro-octadecane	65.1			40.0-140

Method Blank (MB)

(MB) R4156271-1 12/10/24 14:30

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C11-C22 Aromatics	U	U	49.2	600
(S) o-Terphenyl	75.6			40.0-140
(S) 2-Fluorobiphenyl	93.0			40.0-140
(S) 2-Bromonaphthalene	92.8			40.0-140

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

(LCS) R4156271-2 12/10/24 14:51 • (LCSD) R4156271-3 12/10/24 15:13

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C9-C18 Aliphatics	600	307	263	51.2	43.8	40.0-140	J	J	15.4	25
Unadjusted C19-C36 Aliphatics	800	595	509	74.4	63.6	40.0-140	J	J	15.6	25
(S) 1-Chloro-octadecane				67.4	62.1	40.0-140				

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

(LCS) R4156271-2 12/10/24 14:51 • (LCSD) R4156271-3 12/10/24 15:13

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C11-C22 Aromatics	1700	1390	1250	81.8	73.5	40.0-140			10.6	25
(S) o-Terphenyl				84.3	75.9	40.0-140				
(S) 2-Fluorobiphenyl				93.3	95.3	40.0-140				
(S) 2-Bromonaphthalene				93.4	95.3	40.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4159298-2 12/14/24 14:05

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4159298-2 12/14/24 14:05

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	11.5			10.0-120
(S) Phenol-d5	9.65	J2		10.0-120
(S) Nitrobenzene-d5	37.1			10.0-127
(S) 2-Fluorobiphenyl	38.2			10.0-130
(S) 2,4,6-Tribromophenol	10.0			10.0-155
(S) p-Terphenyl-d14	33.8			10.0-128

1
Cp

2
Tc

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Ss

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Cn

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Sr

6
Qc

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Gl

8
Al

9
Sc

Method Blank (MB)

(MB) R4160100-2 12/19/24 01:49

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4160100-2 12/19/24 01:49

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) R4159298-1 12/14/24 13:43

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	50.0	29.3	58.6	41.0-120	
Acenaphthylene	50.0	26.4	52.8	43.0-120	
Anthracene	50.0	27.9	55.8	45.0-120	
Benzidine	100	9.61	9.61	10.0-120	J J4
Benzo(a)anthracene	50.0	28.2	56.4	47.0-120	
Benzo(b)fluoranthene	50.0	28.0	56.0	46.0-120	
Benzo(k)fluoranthene	50.0	27.5	55.0	46.0-120	
Benzo(g,h,i)perylene	50.0	27.4	54.8	48.0-121	
Benzo(a)pyrene	50.0	27.7	55.4	47.0-120	
Bis(2-chlorethoxy)methane	50.0	24.4	48.8	33.0-120	
Bis(2-chloroethyl)ether	50.0	24.8	49.6	23.0-120	
2,2-Oxybis(1-Chloropropane)	50.0	24.7	49.4	28.0-120	
4-Bromophenyl-phenylether	50.0	25.9	51.8	45.0-120	
2-Chloronaphthalene	50.0	26.7	53.4	37.0-120	
4-Chlorophenyl-phenylether	50.0	26.4	52.8	44.0-120	
Chrysene	50.0	27.5	55.0	48.0-120	
Dibenz(a,h)anthracene	50.0	28.9	57.8	47.0-120	
3,3-Dichlorobenzidine	100	53.4	53.4	44.0-120	
2,4-Dinitrotoluene	50.0	31.2	62.4	49.0-124	
2,6-Dinitrotoluene	50.0	29.1	58.2	46.0-120	
Fluoranthene	50.0	30.5	61.0	51.0-120	
Fluorene	50.0	28.9	57.8	47.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4159298-1 12/14/24 13:43

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Hexachlorobenzene	50.0	24.7	49.4	44.0-120	
Hexachloro-1,3-butadiene	50.0	19.5	39.0	19.0-120	
Hexachlorocyclopentadiene	50.0	10.6	21.2	15.0-120	
Hexachloroethane	50.0	21.9	43.8	15.0-120	
Indeno(1,2,3-cd)pyrene	50.0	28.1	56.2	49.0-122	
Isophorone	50.0	26.7	53.4	36.0-120	
Naphthalene	50.0	22.1	44.2	27.0-120	
Nitrobenzene	50.0	23.7	47.4	27.0-120	
n-Nitrosodimethylamine	50.0	22.4	44.8	10.0-120	
n-Nitrosodiphenylamine	50.0	27.3	54.6	47.0-120	
n-Nitrosodi-n-propylamine	50.0	28.8	57.6	31.0-120	
Phenanthrene	50.0	27.8	55.6	46.0-120	
Benzylbutyl phthalate	50.0	32.3	64.6	43.0-121	
Bis(2-Ethylhexyl)phthalate	50.0	31.3	62.6	43.0-122	
Di-n-butyl phthalate	50.0	32.1	64.2	49.0-121	
Diethyl phthalate	50.0	30.5	61.0	48.0-122	
Dimethyl phthalate	50.0	28.3	56.6	48.0-120	
Di-n-octyl phthalate	50.0	30.0	60.0	42.0-125	
Pyrene	50.0	28.4	56.8	47.0-120	
1,2,4-Trichlorobenzene	50.0	20.3	40.6	24.0-120	
Aniline	50.0	15.1	30.2	13.0-120	
1,2-Diphenylhydrazine	50.0	31.3	62.6	41.0-126	N2
Benzyl alcohol	50.0	23.1	46.2	25.0-120	
4-Chloroaniline	50.0	19.3	38.6	25.0-120	
4-Chloro-3-methylphenol	50.0	25.1	50.2	40.0-120	
2-Chlorophenol	50.0	21.9	43.8	25.0-120	
Dibenzofuran	50.0	28.0	56.0	44.0-120	
2,4-Dichlorophenol	50.0	23.2	46.4	36.0-120	
2,4-Dimethylphenol	50.0	22.1	44.2	33.0-120	
4,6-Dinitro-2-methylphenol	50.0	28.3	56.6	38.0-138	
2,4-Dinitrophenol	50.0	28.0	56.0	10.0-120	
2-Methylnaphthalene	50.0	24.9	49.8	33.0-120	
2-Methylphenol	50.0	22.6	45.2	28.0-120	
3&4-Methyl Phenol	50.0	24.7	49.4	31.0-120	
2-Nitroaniline	50.0	30.7	61.4	43.0-120	
3-Nitroaniline	50.0	26.7	53.4	38.0-120	
4-Nitroaniline	50.0	31.0	62.0	18.0-160	
2-Nitrophenol	50.0	22.1	44.2	31.0-120	
4-Nitrophenol	50.0	12.2	24.4	10.0-120	
Pentachlorophenol	50.0	12.6	25.2	23.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4159298-1 12/14/24 13:43

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Phenol	50.0	10.8	21.6	10.0-120	
Pyridine	50.0	14.2	28.4	10.0-120	
2,4,6-Trichlorophenol	50.0	25.2	50.4	42.0-120	
Acetophenone	50.0	24.4	48.8	29.0-120	
Diphenylamine	50.0	27.3	54.6	35.0-120	
1,2,4,5-Tetrachlorobenzene	50.0	24.8	49.6	31.0-121	
2,3,4,6-Tetrachlorophenol	50.0	24.8	49.6	42.0-132	
2,4,5-Trichlorophenol	50.0	26.5	53.0	44.0-120	
(S) 2-Fluorophenol			28.5	10.0-120	
(S) Phenol-d5			20.1	10.0-120	
(S) Nitrobenzene-d5			42.8	10.0-127	
(S) 2-Fluorobiphenyl			47.9	10.0-130	
(S) 2,4,6-Tribromophenol			38.7	10.0-155	
(S) p-Terphenyl-d14			46.3	10.0-128	

Laboratory Control Sample (LCS)

(LCS) R4160100-1 12/19/24 01:28

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Acetylaminofluorene	50.0	32.6	65.2	32.0-120	
4-Aminobiphenyl	50.0	4.70	9.40	20.0-120	J J4
Chlorobenzilate	50.0	32.1	64.2	29.0-128	J
Diallate	50.0	31.2	62.4	30.0-120	
2,6-Dichlorophenol	50.0	26.5	53.0	19.0-136	
Dimethoate	50.0	37.0	74.0	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	31.2	62.4	27.0-120	
Dimethylbenz (A) Anthracene	50.0	8.54	17.1	14.0-124	J
3,3-Dimethylbenzidine	50.0	0.188	0.376	13.0-120	J J4
a,a-Dimethylphenethylamine	50.0	0.0110	0.0220	10.0-129	J J4
1,3-Dinitrobenzene	50.0	28.2	56.4	34.0-120	
Diphenylamine	50.0	27.0	54.0	35.0-120	
Dinoseb	50.0	32.0	64.0	39.0-120	J
Disulfoton	50.0	34.1	68.2	32.0-120	
Ethyl methanesulfonate	50.0	23.1	46.2	10.0-120	
Ethyl Parathion	50.0	40.4	80.8	46.0-130	
Famphur	50.0	39.9	79.8	32.0-120	
Hexachloropropene	50.0	18.4	36.8	10.0-120	J
Hexachlorophene	100	16.6	16.6	10.0-120	J

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4160100-1 12/19/24 01:28

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Isodrin	50.0	28.1	56.2	22.0-157	
Isosafrole	50.0	28.0	56.0	25.0-133	
Kepone	50.0	24.4	48.8	10.0-120	
Methapyrilene	50.0	0.812	1.62	10.0-120	J J4
3-Methylcholanthrene	50.0	19.9	39.8	30.0-160	
Methyl methanesulfonate	50.0	17.0	34.0	10.0-120	J
Methyl parathion	50.0	40.2	80.4	42.0-120	
1,4-Naphthoquinone	50.0	1.71	3.42	50.0-150	J J4
1-Naphthylamine	50.0	4.29	8.58	19.0-120	J J4
2-Naphthylamine	50.0	3.78	0.000	10.0-120	J J4
5-Nitro-o-toluidine	50.0	25.8	51.6	34.0-120	
4-Nitroquinoline 1-oxide	50.0	24.1	48.2	10.0-159	
n-Nitrosodiethylamine	50.0	24.9	49.8	10.0-120	
n-Nitrosodi-n-butylamine	50.0	29.8	59.6	13.0-143	
n-Nitrosomethylethylamine	50.0	21.3	42.6	10.0-120	
n-Nitrosomorpholine	50.0	21.8	43.6	10.0-120	
n-Nitrosopiperidine	50.0	28.8	57.6	10.0-160	
n-Nitrosopyrrolidine	50.0	22.9	45.8	10.0-124	
Pentachlorobenzene	50.0	24.7	49.4	25.0-120	
Pentachloroethane	50.0	25.4	50.8	10.0-120	J
Pentachloronitrobenzene	50.0	27.6	55.2	34.0-132	
Phenacetin	50.0	30.5	61.0	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	40.0	80.0	13.0-160	J
2-Picoline	50.0	12.1	24.2	10.0-120	J
Pronamide	50.0	30.4	60.8	38.0-130	
Safrole	50.0	26.1	52.2	21.0-120	
Sulfotep	50.0	40.9	81.8	52.0-120	J
Thionazin	50.0	36.6	73.2	38.0-121	
o-Toluidine	50.0	13.2	26.4	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	30.2	60.4	11.0-135	
1,3,5-Trinitrobenzene	50.0	25.5	51.0	37.0-147	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1805928-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1805928-01 12/14/24 14:49 • (MS) R4159298-3 12/14/24 15:10 • (MSD) R4159298-4 12/14/24 15:32

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 %
Acenaphthene	50.0	U	21.0	28.7	42.0	57.4	1	28.0-120		J3	31.0	25
Acenaphthylene	50.0	U	19.3	26.5	38.6	53.0	1	31.0-121		J3	31.4	25
Anthracene	50.0	U	21.2	29.2	42.4	58.4	1	36.0-120		J3	31.7	23
Benzidine	100	U	7.84	7.54	7.84	7.54	1	10.0-120	J J6	J J6	3.90	37
Benzo(a)anthracene	50.0	U	23.8	29.4	47.6	58.8	1	39.0-120			21.1	23
Benzo(b)fluoranthene	50.0	U	23.6	29.2	47.2	58.4	1	37.0-120			21.2	23
Benzo(k)fluoranthene	50.0	U	23.8	29.1	47.6	58.2	1	37.0-120			20.0	26
Benzo(g,h,i)perylene	50.0	U	23.3	29.2	46.6	58.4	1	37.0-123			22.5	25
Benzo(a)pyrene	50.0	U	23.6	29.1	47.2	58.2	1	37.0-120			20.9	24
Bis(2-chlorethoxy)methane	50.0	U	18.0	23.7	36.0	47.4	1	17.0-120			27.3	31
Bis(2-chloroethyl)ether	50.0	U	19.8	23.5	39.6	47.0	1	14.0-120			17.1	33
2,2-Oxybis(1-Chloropropane)	50.0	U	18.1	22.6	36.2	45.2	1	18.0-120			22.1	34
4-Bromophenyl-phenylether	50.0	U	19.8	27.0	39.6	54.0	1	37.0-120		J3	30.8	24
2-Chloronaphthalene	50.0	U	19.3	27.0	38.6	54.0	1	29.0-120		J3	33.3	28
4-Chlorophenyl-phenylether	50.0	U	20.2	27.5	40.4	55.0	1	36.0-120		J3	30.6	23
Chrysene	50.0	U	23.7	29.0	47.4	58.0	1	38.0-120			20.1	23
Dibenz(a,h)anthracene	50.0	U	24.8	30.8	49.6	61.6	1	36.0-121			21.6	24
3,3-Dichlorobenzidine	100	U	37.4	38.8	37.4	38.8	1	10.0-134			3.67	30
2,4-Dinitrotoluene	50.0	U	22.8	33.5	45.6	67.0	1	39.0-125		J3	38.0	25
2,6-Dinitrotoluene	50.0	U	22.0	31.1	44.0	62.2	1	36.0-120		J3	34.3	27
Fluoranthene	50.0	U	24.0	33.2	48.0	66.4	1	41.0-121		J3	32.2	22
Fluorene	50.0	U	21.3	29.1	42.6	58.2	1	37.0-120		J3	31.0	24
Hexachlorobenzene	50.0	U	20.6	27.4	41.2	54.8	1	35.0-122		J3	28.3	24
Hexachloro-1,3-butadiene	50.0	U	14.7	19.5	29.4	39.0	1	12.0-120			28.1	34
Hexachlorocyclopentadiene	50.0	U	8.26	11.7	16.5	23.4	1	10.0-120	J	J3	34.5	33
Hexachloroethane	50.0	U	16.6	21.0	33.2	42.0	1	10.0-120			23.4	40
Indeno(1,2,3-cd)pyrene	50.0	U	24.1	30.4	48.2	60.8	1	38.0-125			23.1	24
Isophorone	50.0	U	19.7	25.9	39.4	51.8	1	21.0-120		J3	27.2	27
Naphthalene	50.0	U	16.0	21.0	32.0	42.0	1	10.0-120			27.0	31
Nitrobenzene	50.0	U	17.5	22.3	35.0	44.6	1	12.0-120			24.1	30
n-Nitrosodimethylamine	50.0	U	21.5	18.3	43.0	36.6	1	10.0-120			16.1	40
n-Nitrosodiphenylamine	50.0	U	19.8	28.1	39.6	56.2	1	37.0-120		J3	34.7	24
n-Nitrosodi-n-propylamine	50.0	U	21.4	26.7	42.8	53.4	1	16.0-120			22.0	30
Phenanthrene	50.0	U	20.9	29.3	41.8	58.6	1	33.0-120		J3	33.5	22
Benzylbutyl phthalate	50.0	U	25.8	33.8	51.6	67.6	1	34.0-126		J3	26.8	24
Bis(2-Ethylhexyl)phthalate	50.0	U	27.1	31.9	54.2	63.8	1	33.0-126			16.3	25
Di-n-butyl phthalate	50.0	U	25.2	34.0	50.4	68.0	1	35.0-128		J3	29.7	23
Diethyl phthalate	50.0	U	23.0	32.4	46.0	64.8	1	39.0-125		J3	33.9	24
Dimethyl phthalate	50.0	U	21.7	30.2	43.4	60.4	1	37.0-120		J3	32.8	24
Di-n-octyl phthalate	50.0	U	25.9	31.3	51.8	62.6	1	25.0-135			18.9	26

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1805928-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1805928-01 12/14/24 14:49 • (MS) R4159298-3 12/14/24 15:10 • (MSD) R4159298-4 12/14/24 15:32

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 %
Pyrene	50.0	U	22.2	29.2	44.4	58.4	1	39.0-120		J3	27.2	22
1,2,4-Trichlorobenzene	50.0	U	14.8	19.6	29.6	39.2	1	15.0-120			27.9	31
Aniline	50.0	U	11.7	4.46	23.4	8.92	1	10.0-120		J J3 J6	89.6	39
1,2-Diphenylhydrazine	50.0	U	23.4	31.1	46.8	62.2	1	28.0-129	N2	J3 N2	28.3	25
Benzyl alcohol	50.0	U	20.7	20.1	41.4	40.2	1	14.0-120			2.94	38
4-Chloroaniline	50.0	U	19.3	12.6	38.6	25.2	1	10.0-120		J3	42.0	31
4-Chloro-3-methylphenol	50.0	U	21.7	24.8	43.4	49.6	1	26.0-120			13.3	27
2-Chlorophenol	50.0	U	18.0	19.6	36.0	39.2	1	18.0-120			8.51	34
Dibenzofuran	50.0	U	20.3	28.2	40.6	56.4	1	32.0-120		J3	32.6	26
2,4-Dichlorophenol	50.0	U	18.3	22.1	36.6	44.2	1	19.0-120			18.8	27
2,4-Dimethylphenol	50.0	U	14.9	11.6	29.8	23.2	1	15.0-120			24.9	28
4,6-Dinitro-2-methylphenol	50.0	U	22.1	32.9	44.2	65.8	1	10.0-144		J3	39.3	39
2,4-Dinitrophenol	50.0	U	23.4	35.3	46.8	70.6	1	10.0-120		J3	40.5	40
2-Methylnaphthalene	50.0	U	18.0	24.5	36.0	49.0	1	17.0-120		J3	30.6	28
2-Methylphenol	50.0	U	17.4	18.1	34.8	36.2	1	10.0-120			3.94	30
3&4-Methyl Phenol	50.0	U	20.6	20.6	41.2	41.2	1	10.0-120			0.000	36
2-Nitroaniline	50.0	U	24.0	31.6	48.0	63.2	1	33.0-120		J3	27.3	27
3-Nitroaniline	50.0	U	27.4	26.8	54.8	53.6	1	20.0-120			2.21	27
4-Nitroaniline	50.0	U	27.1	29.6	54.2	59.2	1	10.0-160			8.82	26
2-Nitrophenol	50.0	U	17.1	22.1	34.2	44.2	1	20.0-120			25.5	30
4-Nitrophenol	50.0	U	11.8	15.2	23.6	30.4	1	10.0-120			25.2	40
Pentachlorophenol	50.0	U	9.35	18.6	18.7	37.2	1	10.0-128	J	J3	66.2	37
Phenol	50.0	U	9.75	10.4	19.5	20.8	1	10.0-120	J		6.45	40
Pyridine	50.0	U	11.4	11.5	22.8	23.0	1	10.0-120			0.873	37
2,4,6-Trichlorophenol	50.0	U	19.8	27.8	39.6	55.6	1	26.0-120		J3	33.6	31
Acetophenone	50.0	U	17.9	22.6	35.8	45.2	1	20.0-120			23.2	35
Diphenylamine	50.0	U	19.8	28.1	39.6	56.2	1	35.0-120		J3	34.7	30
1,2,4,5-Tetrachlorobenzene	50.0	U	18.1	24.5	36.2	49.0	1	19.0-122			30.0	32
2,3,4,6-Tetrachlorophenol	50.0	U	19.2	28.7	38.4	57.4	1	17.0-142		J3	39.7	34
2,4,5-Trichlorophenol	50.0	U	21.7	29.6	43.4	59.2	1	33.0-120			30.8	31
(S) 2-Fluorophenol					25.9	26.3		10.0-120				
(S) Phenol-d5					18.4	19.4		10.0-120				
(S) Nitrobenzene-d5					33.7	42.9		10.0-127				
(S) 2-Fluorobiphenyl					34.7	48.5		10.0-130				
(S) 2,4,6-Tribromophenol					29.7	48.2		10.0-155				
(S) p-Terphenyl-d14					40.5	48.3		10.0-128				

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4156519-2 12/11/24 11:10

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4156519-2 12/11/24 11:10

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	22.9			10.0-120
(S) Phenol-d5	16.3			10.0-120
(S) Nitrobenzene-d5	48.6			10.0-127
(S) 2-Fluorobiphenyl	61.1			10.0-130
(S) 2,4,6-Tribromophenol	44.9			10.0-155
(S) p-Terphenyl-d14	56.4			10.0-128

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Gl

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Al

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Sc

Method Blank (MB)

(MB) R4159099-2 12/18/24 03:36

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

1
Cp

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Al

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Method Blank (MB)

(MB) R4159099-2 12/18/24 03:36

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	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) R4156519-1 12/11/24 10:48

Analyte	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
	ug/l	ug/l	%	%	
Acenaphthene	50.0	44.3	88.6	41.0-120	
Acenaphthylene	50.0	42.3	84.6	43.0-120	
Anthracene	50.0	44.2	88.4	45.0-120	
Benzidine	100	7.89	7.89	10.0-120	J J4
Benzo(a)anthracene	50.0	44.3	88.6	47.0-120	
Benzo(b)fluoranthene	50.0	45.1	90.2	46.0-120	
Benzo(k)fluoranthene	50.0	43.6	87.2	46.0-120	
Benzo(g,h,i)perylene	50.0	43.8	87.6	48.0-121	
Benzo(a)pyrene	50.0	43.9	87.8	47.0-120	
Bis(2-chlorethoxy)methane	50.0	34.5	69.0	33.0-120	
Bis(2-chloroethyl)ether	50.0	36.9	73.8	23.0-120	
2,2-Oxybis(1-Chloropropane)	50.0	36.0	72.0	28.0-120	
4-Bromophenyl-phenylether	50.0	50.7	101	45.0-120	
2-Chloronaphthalene	50.0	42.6	85.2	37.0-120	
4-Chlorophenyl-phenylether	50.0	48.6	97.2	44.0-120	
Chrysene	50.0	44.3	88.6	48.0-120	
Dibenz(a,h)anthracene	50.0	47.4	94.8	47.0-120	
3,3-Dichlorobenzidine	100	65.5	65.5	44.0-120	
2,4-Dinitrotoluene	50.0	52.4	105	49.0-124	
2,6-Dinitrotoluene	50.0	50.0	100	46.0-120	
Fluoranthene	50.0	51.9	104	51.0-120	
Fluorene	50.0	46.7	93.4	47.0-120	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4156519-1 12/11/24 10:48

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Hexachlorobenzene	50.0	47.6	95.2	44.0-120	
Hexachloro-1,3-butadiene	50.0	42.6	85.2	19.0-120	
Hexachlorocyclopentadiene	50.0	20.1	40.2	15.0-120	
Hexachloroethane	50.0	35.0	70.0	15.0-120	
Indeno(1,2,3-cd)pyrene	50.0	46.6	93.2	49.0-122	
Isophorone	50.0	34.3	68.6	36.0-120	
Naphthalene	50.0	35.9	71.8	27.0-120	
Nitrobenzene	50.0	34.3	68.6	27.0-120	
n-Nitrosodimethylamine	50.0	24.9	49.8	10.0-120	
n-Nitrosodiphenylamine	50.0	42.1	84.2	47.0-120	
n-Nitrosodi-n-propylamine	50.0	34.4	68.8	31.0-120	
Phenanthrene	50.0	43.6	87.2	46.0-120	
Benzylbutyl phthalate	50.0	43.3	86.6	43.0-121	
Bis(2-Ethylhexyl)phthalate	50.0	41.2	82.4	43.0-122	
Di-n-butyl phthalate	50.0	47.5	95.0	49.0-121	
Diethyl phthalate	50.0	48.3	96.6	48.0-122	
Dimethyl phthalate	50.0	47.1	94.2	48.0-120	
Di-n-octyl phthalate	50.0	39.7	79.4	42.0-125	
Pyrene	50.0	42.2	84.4	47.0-120	
1,2,4-Trichlorobenzene	50.0	38.7	77.4	24.0-120	
Aniline	50.0	2.84	5.68	13.0-120	J J4
1,2-Diphenylhydrazine	50.0	41.3	82.6	41.0-126	N2
Benzyl alcohol	50.0	30.4	60.8	25.0-120	
4-Chloroaniline	50.0	18.2	36.4	25.0-120	
4-Chloro-3-methylphenol	50.0	36.0	72.0	40.0-120	
2-Chlorophenol	50.0	32.0	64.0	25.0-120	
Dibenzofuran	50.0	46.0	92.0	44.0-120	
2,4-Dichlorophenol	50.0	39.8	79.6	36.0-120	
2,4-Dimethylphenol	50.0	33.4	66.8	33.0-120	
4,6-Dinitro-2-methylphenol	50.0	47.6	95.2	38.0-138	
2,4-Dinitrophenol	50.0	43.5	87.0	10.0-120	
2-Methylnaphthalene	50.0	41.3	82.6	33.0-120	
2-Methylphenol	50.0	28.6	57.2	28.0-120	
3&4-Methyl Phenol	50.0	29.8	59.6	31.0-120	
2-Nitroaniline	50.0	45.7	91.4	43.0-120	
3-Nitroaniline	50.0	41.1	82.2	38.0-120	
4-Nitroaniline	50.0	46.1	92.2	18.0-160	
2-Nitrophenol	50.0	39.1	78.2	31.0-120	
4-Nitrophenol	50.0	18.7	37.4	10.0-120	
Pentachlorophenol	50.0	28.4	56.8	23.0-120	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R4156519-1 12/11/24 10:48

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Phenol	50.0	14.2	28.4	10.0-120	
Pyridine	50.0	3.02	6.04	10.0-120	J J4
2,4,6-Trichlorophenol	50.0	45.8	91.6	42.0-120	
Acetophenone	50.0	35.1	70.2	29.0-120	
Diphenylamine	50.0	42.1	84.2	35.0-120	
1,2,4,5-Tetrachlorobenzene	50.0	48.9	97.8	31.0-121	
2,3,4,6-Tetrachlorophenol	50.0	51.6	103	42.0-132	
2,4,5-Trichlorophenol	50.0	48.9	97.8	44.0-120	
(S) 2-Fluorophenol			38.9	10.0-120	
(S) Phenol-d5			26.1	10.0-120	
(S) Nitrobenzene-d5			55.1	10.0-127	
(S) 2-Fluorobiphenyl			78.9	10.0-130	
(S) 2,4,6-Tribromophenol			86.0	10.0-155	
(S) p-Terphenyl-d14			77.1	10.0-128	

Laboratory Control Sample (LCS)

(LCS) R4159099-1 12/18/24 03:15

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Acetylaminofluorene	50.0	38.1	76.2	32.0-120	
4-Aminobiphenyl	50.0	8.24	16.5	20.0-120	J J4
Chlorobenzilate	50.0	40.8	81.6	29.0-128	J
Diallate	50.0	40.4	80.8	30.0-120	
2,6-Dichlorophenol	50.0	32.0	64.0	19.0-136	
Dimethoate	50.0	37.2	74.4	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	31.8	63.6	27.0-120	
Dimethylbenz (A) Anthracene	50.0	12.9	25.8	14.0-124	
3,3-Dimethylbenzidine	50.0	0.000	0.000	13.0-120	J4
a,a-Dimethylphenethylamine	50.0	0.000	0.000	10.0-129	J4
1,3-Dinitrobenzene	50.0	40.3	80.6	34.0-120	
Diphenylamine	50.0	37.3	74.6	35.0-120	
Dinoseb	50.0	38.7	77.4	39.0-120	J
Disulfoton	50.0	36.2	72.4	32.0-120	
Ethyl methanesulfonate	50.0	37.6	75.2	10.0-120	
Ethyl Parathion	50.0	50.7	101	46.0-130	
Famphur	50.0	42.1	84.2	32.0-120	
Hexachloropropene	50.0	29.8	59.6	10.0-120	J
Hexachlorophene	100	9.31	9.31	10.0-120	J J4

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4159099-1 12/18/24 03:15

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	<u>LCS Qualifier</u>
Isodrin	50.0	48.5	97.0	22.0-157	
Isosafrole	50.0	36.9	73.8	25.0-133	
Kepone	50.0	48.7	97.4	10.0-120	
Methapyrilene	50.0	1.32	2.64	10.0-120	J J4
3-Methylcholanthrene	50.0	27.7	55.4	30.0-160	
Methyl methanesulfonate	50.0	31.0	62.0	10.0-120	J
Methyl parathion	50.0	49.1	98.2	42.0-120	
1,4-Naphthoquinone	50.0	2.39	4.78	50.0-150	J J4
1-Naphthylamine	50.0	7.95	15.9	19.0-120	J J4
2-Naphthylamine	50.0	7.47	14.9	10.0-120	J
5-Nitro-o-toluidine	50.0	36.7	73.4	34.0-120	
4-Nitroquinoline 1-oxide	50.0	30.6	61.2	10.0-159	
n-Nitrosodiethylamine	50.0	32.8	65.6	10.0-120	
n-Nitrosodi-n-butylamine	50.0	49.0	98.0	13.0-143	
n-Nitrosomethylethylamine	50.0	30.6	61.2	10.0-120	
n-Nitrosomorpholine	50.0	29.4	58.8	10.0-120	
n-Nitrosopiperidine	50.0	39.8	79.6	10.0-160	
n-Nitrosopyrrolidine	50.0	30.3	60.6	10.0-124	
Pentachlorobenzene	50.0	40.1	80.2	25.0-120	
Pentachloroethane	50.0	32.8	65.6	10.0-120	J
Pentachloronitrobenzene	50.0	50.4	101	34.0-132	
Phenacetin	50.0	42.5	85.0	34.0-127	
p-Phenylenediamine	50.0	0.000	0.000	50.0-150	J4
Phorate	50.0	62.1	124	13.0-160	
2-Picoline	50.0	2.37	4.74	10.0-120	J J4
Pronamide	50.0	44.8	89.6	38.0-130	
Safrole	50.0	36.5	73.0	21.0-120	
Sulfotep	50.0	45.3	90.6	52.0-120	J
Thionazin	50.0	47.2	94.4	38.0-121	
o-Toluidine	50.0	13.4	26.8	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	39.9	79.8	11.0-135	
1,3,5-Trinitrobenzene	50.0	68.1	136	37.0-147	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1806706-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806706-01 12/11/24 16:00 • (MS) R4156519-3 12/11/24 16:22 • (MSD) R4156519-4 12/11/24 16:43

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	U	36.1	39.2	72.2	78.4	1	28.0-120			8.23	25
Acenaphthylene	50.0	U	34.3	37.1	68.6	74.2	1	31.0-121			7.84	25
Anthracene	50.0	U	36.1	37.2	72.2	74.4	1	36.0-120			3.00	23
Benzidine	100	U	U	U	0.000	0.000	1	10.0-120	J6	J6	0.000	37
Benzo(a)anthracene	50.0	U	33.0	33.0	66.0	66.0	1	39.0-120			0.000	23
Benzo(b)fluoranthene	50.0	U	31.6	32.2	63.2	64.4	1	37.0-120			1.88	23
Benzo(k)fluoranthene	50.0	U	30.7	31.7	61.4	63.4	1	37.0-120			3.21	26
Benzo(g,h,i)perylene	50.0	U	29.6	30.6	59.2	61.2	1	37.0-123			3.32	25
Benzo(a)pyrene	50.0	U	30.1	30.6	60.2	61.2	1	37.0-120			1.65	24
Bis(2-chlorethoxy)methane	50.0	U	28.8	30.8	57.6	61.6	1	17.0-120			6.71	31
Bis(2-chloroethyl)ether	50.0	U	28.4	30.7	56.8	61.4	1	14.0-120			7.78	33
2,2-Oxybis(1-Chloropropane)	50.0	U	27.3	31.0	54.6	62.0	1	18.0-120			12.7	34
4-Bromophenyl-phenylether	50.0	U	41.3	42.8	82.6	85.6	1	37.0-120			3.57	24
2-Chloronaphthalene	50.0	U	34.0	37.2	68.0	74.4	1	29.0-120			8.99	28
4-Chlorophenyl-phenylether	50.0	U	40.4	43.1	80.8	86.2	1	36.0-120			6.47	23
Chrysene	50.0	U	32.6	32.1	65.2	64.2	1	38.0-120			1.55	23
Dibenz(a,h)anthracene	50.0	U	32.1	32.5	64.2	65.0	1	36.0-121			1.24	24
3,3-Dichlorobenzidine	100	U	27.6	29.1	27.6	29.1	1	10.0-134			5.29	30
2,4-Dinitrotoluene	50.0	U	45.4	46.8	90.8	93.6	1	39.0-125			3.04	25
2,6-Dinitrotoluene	50.0	U	43.8	44.7	87.6	89.4	1	36.0-120			2.03	27
Fluoranthene	50.0	U	41.6	42.4	83.2	84.8	1	41.0-121			1.90	22
Fluorene	50.0	U	38.9	40.8	77.8	81.6	1	37.0-120			4.77	24
Hexachlorobenzene	50.0	U	37.1	38.3	74.2	76.6	1	35.0-122			3.18	24
Hexachloro-1,3-butadiene	50.0	U	34.6	38.7	69.2	77.4	1	12.0-120			11.2	34
Hexachlorocyclopentadiene	50.0	U	15.3	21.0	30.6	42.0	1	10.0-120			31.4	33
Hexachloroethane	50.0	U	27.4	30.8	54.8	61.6	1	10.0-120			11.7	40
Indeno(1,2,3-cd)pyrene	50.0	U	30.7	32.3	61.4	64.6	1	38.0-125			5.08	24
Isophorone	50.0	U	29.3	30.5	58.6	61.0	1	21.0-120			4.01	27
Naphthalene	50.0	U	29.1	31.9	58.2	63.8	1	10.0-120			9.18	31
Nitrobenzene	50.0	U	30.2	32.1	60.4	64.2	1	12.0-120			6.10	30
n-Nitrosodimethylamine	50.0	U	22.2	22.2	44.4	44.4	1	10.0-120			0.000	40
n-Nitrosodiphenylamine	50.0	U	36.4	36.9	72.8	73.8	1	37.0-120			1.36	24
n-Nitrosodi-n-propylamine	50.0	U	26.7	29.5	53.4	59.0	1	16.0-120			9.96	30
Phenanthrene	50.0	U	36.8	37.3	73.6	74.6	1	33.0-120			1.35	22
Benzylbutyl phthalate	50.0	U	35.2	35.6	70.4	71.2	1	34.0-126			1.13	24
Bis(2-Ethylhexyl)phthalate	50.0	U	28.0	28.9	56.0	57.8	1	33.0-126			3.16	25
Di-n-butyl phthalate	50.0	U	37.8	38.6	75.6	77.2	1	35.0-128			2.09	23
Diethyl phthalate	50.0	U	42.1	42.7	84.2	85.4	1	39.0-125			1.42	24
Dimethyl phthalate	50.0	U	40.7	41.9	81.4	83.8	1	37.0-120			2.91	24
Di-n-octyl phthalate	50.0	U	27.3	28.0	54.6	56.0	1	25.0-135			2.53	26

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Cp

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Tc

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Cn

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Sr

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Qc

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Gl

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Al

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Sc

L1806706-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806706-01 12/11/24 16:00 • (MS) R4156519-3 12/11/24 16:22 • (MSD) R4156519-4 12/11/24 16:43

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	34.6	34.7	69.2	69.4	1	39.0-120			0.289	22
1,2,4-Trichlorobenzene	50.0	U	32.2	35.2	64.4	70.4	1	15.0-120			8.90	31
Aniline	50.0	U	3.16	4.49	6.32	8.98	1	10.0-120	J J6	J J6	34.8	39
1,2-Diphenylhydrazine	50.0	U	33.8	35.2	67.6	70.4	1	28.0-129	N2	N2	4.06	25
Benzyl alcohol	50.0	U	25.4	25.6	50.8	51.2	1	14.0-120			0.784	38
4-Chloroaniline	50.0	U	18.2	18.2	36.4	36.4	1	10.0-120			0.000	31
4-Chloro-3-methylphenol	50.0	U	28.2	30.8	56.4	61.6	1	26.0-120			8.81	27
2-Chlorophenol	50.0	U	21.8	24.3	43.6	48.6	1	18.0-120			10.8	34
Dibenzofuran	50.0	U	38.0	41.1	76.0	82.2	1	32.0-120			7.84	26
2,4-Dichlorophenol	50.0	U	29.5	32.5	59.0	65.0	1	19.0-120			9.68	27
2,4-Dimethylphenol	50.0	U	26.7	24.9	53.4	49.8	1	15.0-120			6.98	28
4,6-Dinitro-2-methylphenol	50.0	U	42.3	43.9	84.6	87.8	1	10.0-144			3.71	39
2,4-Dinitrophenol	50.0	U	42.1	45.4	84.2	90.8	1	10.0-120			7.54	40
2-Methylnaphthalene	50.0	U	33.7	37.3	67.4	74.6	1	17.0-120			10.1	28
2-Methylphenol	50.0	U	22.6	23.5	45.2	47.0	1	10.0-120			3.90	30
3&4-Methyl Phenol	50.0	U	23.5	25.0	47.0	50.0	1	10.0-120			6.19	36
2-Nitroaniline	50.0	U	35.8	37.4	71.6	74.8	1	33.0-120			4.37	27
3-Nitroaniline	50.0	U	34.1	33.0	68.2	66.0	1	20.0-120			3.28	27
4-Nitroaniline	50.0	U	31.3	33.9	62.6	67.8	1	10.0-160			7.98	26
2-Nitrophenol	50.0	U	30.4	33.9	60.8	67.8	1	20.0-120			10.9	30
4-Nitrophenol	50.0	U	16.8	17.5	33.6	35.0	1	10.0-120			4.08	40
Pentachlorophenol	50.0	U	36.0	36.1	72.0	72.2	1	10.0-128			0.277	37
Phenol	50.0	U	11.8	11.7	23.6	23.4	1	10.0-120			0.851	40
Pyridine	50.0	U	1.13	7.31	2.26	14.6	1	10.0-120	J J6	J J3	146	37
2,4,6-Trichlorophenol	50.0	U	36.8	40.4	73.6	80.8	1	26.0-120			9.33	31
Acetophenone	50.0	0.997	28.7	30.8	55.4	59.6	1	20.0-120			7.06	35
Diphenylamine	50.0	U	36.4	36.9	72.8	73.8	1	35.0-120			1.36	30
1,2,4,5-Tetrachlorobenzene	50.0	U	40.5	45.5	81.0	91.0	1	19.0-122			11.6	32
2,3,4,6-Tetrachlorophenol	50.0	U	45.8	48.4	91.6	96.8	1	17.0-142			5.52	34
2,4,5-Trichlorophenol	50.0	U	39.1	42.8	78.2	85.6	1	33.0-120			9.04	31
(S) 2-Fluorophenol					27.6	29.9		10.0-120				
(S) Phenol-d5					21.3	22.1		10.0-120				
(S) Nitrobenzene-d5					47.8	52.5		10.0-127				
(S) 2-Fluorobiphenyl					65.2	71.0		10.0-130				
(S) 2,4,6-Tribromophenol					76.5	77.0		10.0-155				
(S) p-Terphenyl-d14					58.2	59.8		10.0-128				

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Cp

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Tc

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GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

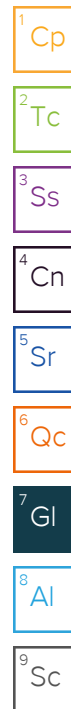
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

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

Abbreviations and Definitions

MDL	Method Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
RDL	Reported Detection Limit.
Rec.	Recovery.
RPD	Relative Percent Difference.
SDG	Sample Delivery Group.
(S)	Surrogate (Surrogate Standard) - Analytes added to every blank, sample, Laboratory Control Sample/Duplicate and Matrix Spike/Duplicate; used to evaluate analytical efficiency by measuring recovery. Surrogates are not expected to be detected in all environmental media.
U	Not detected at the Reporting Limit (or MDL where applicable).
Analyte	The name of the particular compound or analysis performed. Some Analyses and Methods will have multiple analytes reported.
Dilution	If the sample matrix contains an interfering material, the sample preparation volume or weight values differ from the standard, or if concentrations of analytes in the sample are higher than the highest limit of concentration that the laboratory can accurately report, the sample may be diluted for analysis. If a value different than 1 is used in this field, the result reported has already been corrected for this factor.
Limits	These are the target % recovery ranges or % difference value that the laboratory has historically determined as normal for the method and analyte being reported. Successful QC Sample analysis will target all analytes recovered or duplicated within these ranges.
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.
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.
K9	Test replicates show more than 30% difference between high and low values.



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.
T8	Sample(s) received past/too close to holding time expiration.
U	Below Detectable Limits: Indicates that the analyte was not detected.
V	The sample concentration is too high to evaluate accurate spike recoveries.

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

ACCREDITATIONS & LOCATIONS

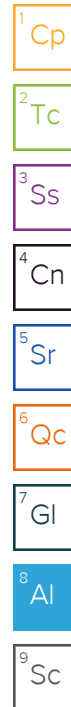
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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

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

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

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



Ramboll US Consulting, Inc. - Denver

Sample Delivery Group: L1806680
Samples Received: 12/06/2024
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

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

ACCOUNT:

Ramboll US Consulting, Inc. - Denver

PROJECT:

1690029619

SDG:

L1806680

DATE/TIME:

12/26/24 09:47

PAGE:

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

SAMPLE SUMMARY

CMR-MW-105-241205 L1806680-01 GW

Collected by
Kyle G

Collected date/time
12/05/24 09:43

Received date/time
12/06/24 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Wet Chemistry by Method 4500CO2 D-2011	WG2415669	1	12/10/24 13:27	12/10/24 13:27	BJM	Mt. Juliet, TN
Wet Chemistry by Method 5210 B-2016	WG2414468	1	12/06/24 16:38	12/11/24 11:38	RLS	Mt. Juliet, TN
Wet Chemistry by Method 9056A	WG2414376	1	12/07/24 02:24	12/07/24 02:24	ZSA	Mt. Juliet, TN
Metals (ICPMS) by Method 6020B	WG2416863	1	12/11/24 19:23	12/12/24 04:48	JPD	Mt. Juliet, TN
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2419269	1	12/16/24 01:22	12/16/24 01:22	JHH	Mt. Juliet, TN
Volatile Organic Compounds (GC) by Method RSK175	WG2415334	1	12/09/24 12:55	12/09/24 12:55	CCM	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2418897	1	12/15/24 05:18	12/15/24 05:18	ACG	Mt. Juliet, TN
TPH by Method MTDEQ EPH	WG2415943	3	12/09/24 09:30	12/10/24 17:44	DMG	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2416538	1	12/12/24 12:55	12/13/24 06:18	JRM	Mt. Juliet, TN
Semi Volatile Organic Compounds (GC/MS) by Method 8270C	WG2416538	1	12/12/24 12:55	12/20/24 06:55	JNJ	Mt. Juliet, TN

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

TRIP BLANK L1806680-02 GW

Collected by
Kyle G

Collected date/time
12/05/24 00:00

Received date/time
12/06/24 15:00

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst	Location
Volatile Petroleum Hydrocarbons by Method MTDEQ VPH	WG2419269	1	12/15/24 22:55	12/15/24 22:55	JHH	Mt. Juliet, TN
Volatile Organic Compounds (GC/MS) by Method 8260B	WG2420107	1	12/18/24 12:24	12/18/24 12:24	JAH	Mt. Juliet, TN

⁷Gl

⁸Al

⁹Sc

CASE NARRATIVE

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



Kelly Mercer
Project Manager

Project Narrative

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

Sample Delivery Group (SDG) Narrative

Analyzed from headspace vial.

<u>Lab Sample ID</u>	<u>Project Sample ID</u>	<u>Method</u>
L1806680-02	TRIP BLANK	MTDEQ VPH, 8260B



Wet Chemistry by Method 4500CO2 D-2011

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	ug/l		ug/l		date / time	
Free Carbon Dioxide	87600	B T8	20000	1	12/10/2024 13:27	WG2415669

Sample Narrative:

L1806680-01 WG2415669: Endpoint pH 4.5 Headspace

Wet Chemistry by Method 5210 B-2016

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/l		mg/l		date / time	
BOD	ND		3.33	1	12/11/2024 11:38	WG2414468

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Nitrate as (N)	368		88.4	100	1	12/07/2024 02:24	WG2414376
Sulfate	73800		637	5000	1	12/07/2024 02:24	WG2414376

Metals (ICPMS) by Method 6020B

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Iron,Dissolved	978		22.6	100	1	12/12/2024 04:48	WG2416863
Manganese,Dissolved	525		0.700	5.00	1	12/12/2024 04:48	WG2416863

Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Unadjusted C5-C8 Aliphatics	495		33.3	100	1	12/16/2024 01:22	WG2419269
Unadjusted C9-C12 Aliphatics	98.5	J	33.3	100	1	12/16/2024 01:22	WG2419269
Unadjusted C9-C10 Aromatics	40.5	J	33.3	100	1	12/16/2024 01:22	WG2419269
Adjusted C5-C8 Aliphatics	469		33.3	100	1	12/16/2024 01:22	WG2419269
Adjusted C9-C12 Aliphatics	61.9	J	33.3	100	1	12/16/2024 01:22	WG2419269
Total VPH	634		66.7	200	1	12/16/2024 01:22	WG2419269
(S) 2,5-Dibromotoluene(FID)	85.3			70.0-130		12/16/2024 01:22	WG2419269
(S) 2,5-Dibromotoluene(PID)	80.5			70.0-130		12/16/2024 01:22	WG2419269

Volatile Organic Compounds (GC) by Method RSK175

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Methane	374		5.10	10.0	1	12/09/2024 12:55	WG2415334

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

Analyte	Result	Qualifier	MDL	RDL	Dilution	Analysis	Batch
	ug/l		ug/l	ug/l		date / time	
Acetone	31.6	J3 J4	11.3	25.0	1	12/15/2024 05:18	WG2418897
Acrylonitrile	U	J4	0.671	5.00	1	12/15/2024 05:18	WG2418897
Benzene	22.9		0.0941	0.500	1	12/15/2024 05:18	WG2418897
Bromobenzene	U		0.118	0.500	1	12/15/2024 05:18	WG2418897
Bromodichloromethane	U		0.136	0.500	1	12/15/2024 05:18	WG2418897
Bromochloromethane	U		0.128	0.500	1	12/15/2024 05:18	WG2418897
Bromoform	U		0.129	0.500	1	12/15/2024 05:18	WG2418897
Bromomethane	U		0.605	2.50	1	12/15/2024 05:18	WG2418897
n-Butylbenzene	0.269	J	0.157	0.500	1	12/15/2024 05:18	WG2418897
sec-Butylbenzene	0.311	J	0.125	0.500	1	12/15/2024 05:18	WG2418897
tert-Butylbenzene	U		0.127	0.500	1	12/15/2024 05:18	WG2418897

1Cp

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5Sr

6Qc

7Gl

8Al

9Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Carbon disulfide	U		0.0962	0.500	1	12/15/2024 05:18	WG2418897
Carbon tetrachloride	U		0.128	0.500	1	12/15/2024 05:18	WG2418897
Chlorobenzene	U		0.117	0.500	1	12/15/2024 05:18	WG2418897
Chlorodibromomethane	U		0.140	0.500	1	12/15/2024 05:18	WG2418897
Chloroethane	U		0.192	2.50	1	12/15/2024 05:18	WG2418897
2-Chloroethyl vinyl ether	U		0.575	50.0	1	12/15/2024 05:18	WG2418897
Chloroform	U		0.111	0.500	1	12/15/2024 05:18	WG2418897
Chloromethane	3.13		0.960	1.25	1	12/15/2024 05:18	WG2418897
2-Chlorotoluene	U		0.106	0.500	1	12/15/2024 05:18	WG2418897
4-Chlorotoluene	U		0.114	0.500	1	12/15/2024 05:18	WG2418897
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	12/15/2024 05:18	WG2418897
1,2-Dibromoethane	U		0.126	0.500	1	12/15/2024 05:18	WG2418897
Dibromomethane	U		0.122	0.500	1	12/15/2024 05:18	WG2418897
1,2-Dichlorobenzene	U		0.107	0.500	1	12/15/2024 05:18	WG2418897
1,3-Dichlorobenzene	U		0.299	0.500	1	12/15/2024 05:18	WG2418897
1,4-Dichlorobenzene	U		0.120	0.500	1	12/15/2024 05:18	WG2418897
Dichlorodifluoromethane	U		0.374	2.50	1	12/15/2024 05:18	WG2418897
1,1-Dichloroethane	U		0.100	0.500	1	12/15/2024 05:18	WG2418897
1,2-Dichloroethane	U		0.0819	0.500	1	12/15/2024 05:18	WG2418897
1,1-Dichloroethene	U		0.188	0.500	1	12/15/2024 05:18	WG2418897
cis-1,2-Dichloroethene	U		0.126	0.500	1	12/15/2024 05:18	WG2418897
trans-1,2-Dichloroethene	U		0.149	0.500	1	12/15/2024 05:18	WG2418897
1,2-Dichloropropane	U		0.149	0.500	1	12/15/2024 05:18	WG2418897
1,1-Dichloropropene	U		0.142	0.500	1	12/15/2024 05:18	WG2418897
1,3-Dichloropropane	U		0.109	1.00	1	12/15/2024 05:18	WG2418897
cis-1,3-Dichloropropene	U		0.111	0.500	1	12/15/2024 05:18	WG2418897
trans-1,3-Dichloropropene	U		0.118	0.500	1	12/15/2024 05:18	WG2418897
trans-1,4-Dichloro-2-butene	U	J3	0.467	5.00	1	12/15/2024 05:18	WG2418897
2,2-Dichloropropane	U		0.161	0.500	1	12/15/2024 05:18	WG2418897
Di-isopropyl ether	U		0.105	0.500	1	12/15/2024 05:18	WG2418897
Ethylbenzene	32.5		0.137	0.500	1	12/15/2024 05:18	WG2418897
Hexachloro-1,3-butadiene	U		0.337	1.00	1	12/15/2024 05:18	WG2418897
2-Hexanone	U		0.787	5.00	1	12/15/2024 05:18	WG2418897
n-Hexane	9.32		0.749	5.00	1	12/15/2024 05:18	WG2418897
Iodomethane	U		0.554	5.00	1	12/15/2024 05:18	WG2418897
Isopropylbenzene	1.31		0.105	0.500	1	12/15/2024 05:18	WG2418897
p-Isopropyltoluene	0.226	J	0.120	0.500	1	12/15/2024 05:18	WG2418897
2-Butanone (MEK)	U		1.19	5.00	1	12/15/2024 05:18	WG2418897
Methylene Chloride	U		0.430	2.50	1	12/15/2024 05:18	WG2418897
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	12/15/2024 05:18	WG2418897
Methyl tert-butyl ether	U		0.101	0.500	1	12/15/2024 05:18	WG2418897
Naphthalene	1.76	J	0.174	2.50	1	12/15/2024 05:18	WG2418897
n-Propylbenzene	3.91		0.0993	0.500	1	12/15/2024 05:18	WG2418897
Styrene	U		0.118	0.500	1	12/15/2024 05:18	WG2418897
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	12/15/2024 05:18	WG2418897
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	12/15/2024 05:18	WG2418897
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	12/15/2024 05:18	WG2418897
Tetrachloroethene	U		0.300	0.500	1	12/15/2024 05:18	WG2418897
Toluene	2.65		0.278	0.500	1	12/15/2024 05:18	WG2418897
1,2,3-Trichlorobenzene	U	J3	0.164	0.500	1	12/15/2024 05:18	WG2418897
1,2,4-Trichlorobenzene	U	J3	0.481	1.00	1	12/15/2024 05:18	WG2418897
1,1,1-Trichloroethane	U		0.149	0.500	1	12/15/2024 05:18	WG2418897
1,1,2-Trichloroethane	U		0.158	0.500	1	12/15/2024 05:18	WG2418897
Trichloroethene	U		0.190	0.500	1	12/15/2024 05:18	WG2418897
Trichlorofluoromethane	U		0.160	2.50	1	12/15/2024 05:18	WG2418897
1,2,3-Trichloropropane	U		0.237	2.50	1	12/15/2024 05:18	WG2418897

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
1,2,4-Trimethylbenzene	2.67		0.322	0.500	1	12/15/2024 05:18	WG2418897
1,2,3-Trimethylbenzene	1.12		0.104	0.500	1	12/15/2024 05:18	WG2418897
1,3,5-Trimethylbenzene	U		0.104	0.500	1	12/15/2024 05:18	WG2418897
Vinyl acetate	3.23	J	0.692	5.00	1	12/15/2024 05:18	WG2418897
Vinyl chloride	U		0.234	0.500	1	12/15/2024 05:18	WG2418897
Xylenes, Total	4.09		0.174	1.50	1	12/15/2024 05:18	WG2418897
(S) Toluene-d8	96.4			80.0-120		12/15/2024 05:18	WG2418897
(S) 4-Bromofluorobenzene	102			77.0-126		12/15/2024 05:18	WG2418897
(S) 1,2-Dichloroethane-d4	95.7			70.0-130		12/15/2024 05:18	WG2418897

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		209	1800	3	12/10/2024 17:44	WG2415943
Unadjusted C19-C36 Aliphatics	253	J	176	1800	3	12/10/2024 17:44	WG2415943
Unadjusted C11-C22 Aromatics	U		148	1800	3	12/10/2024 17:44	WG2415943
Unadjusted Total Petroleum Hydrocarbons	U		600	1800	3	12/10/2024 17:44	WG2415943
Adjusted C11-C22 Aromatics	U		600	1800	3	12/10/2024 17:44	WG2415943
Adjusted Total Petroleum Hydrocarbons	U		600	1800	3	12/10/2024 17:44	WG2415943
(S) o-Terphenyl	81.7			40.0-140		12/10/2024 17:44	WG2415943
(S) 1-Chloro-octadecane	38.5	J2		40.0-140		12/10/2024 17:44	WG2415943
(S) 2-Fluorobiphenyl	95.8			40.0-140		12/10/2024 17:44	WG2415943
(S) 2-Bromonaphthalene	94.7			40.0-140		12/10/2024 17:44	WG2415943

Sample Narrative:

- L1806680-01 WG2415943: Dilution and surrogate failure due to matrix interference during extraction procedure.
- L1806680-01 WG2415943: Dilution due to matrix impact 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	U		0.0886	1.00	1	12/13/2024 06:18	WG2416538
Acenaphthylene	U		0.0921	1.00	1	12/13/2024 06:18	WG2416538
Anthracene	U		0.0804	1.00	1	12/13/2024 06:18	WG2416538
Benzidine	U	J4	3.74	10.0	1	12/13/2024 06:18	WG2416538
Benzo(a)anthracene	U		0.199	1.00	1	12/13/2024 06:18	WG2416538
Benzo(b)fluoranthene	U		0.130	1.00	1	12/13/2024 06:18	WG2416538
Benzo(k)fluoranthene	U		0.120	1.00	1	12/13/2024 06:18	WG2416538
Benzo(g,h,i)perylene	U		0.121	1.00	1	12/13/2024 06:18	WG2416538
Benzo(a)pyrene	U		0.0381	1.00	1	12/13/2024 06:18	WG2416538
Bis(2-chlorethoxy)methane	U		0.116	10.0	1	12/13/2024 06:18	WG2416538
Bis(2-chloroethyl)ether	U		0.137	10.0	1	12/13/2024 06:18	WG2416538
2,2-Oxybis(1-Chloropropane)	U		0.210	10.0	1	12/13/2024 06:18	WG2416538
4-Bromophenyl-phenylether	U		0.0877	10.0	1	12/13/2024 06:18	WG2416538
2-Chloronaphthalene	U		0.0648	1.00	1	12/13/2024 06:18	WG2416538
4-Chlorophenyl-phenylether	U		0.0926	10.0	1	12/13/2024 06:18	WG2416538
Chrysene	U		0.130	1.00	1	12/13/2024 06:18	WG2416538
Dibenz(a,h)anthracene	U		0.0644	1.00	1	12/13/2024 06:18	WG2416538
3,3-Dichlorobenzidine	U		0.212	10.0	1	12/13/2024 06:18	WG2416538
2,4-Dinitrotoluene	U		0.0983	10.0	1	12/13/2024 06:18	WG2416538
2,6-Dinitrotoluene	U		0.250	10.0	1	12/13/2024 06:18	WG2416538
Fluoranthene	U		0.102	1.00	1	12/13/2024 06:18	WG2416538
Fluorene	U		0.0844	1.00	1	12/13/2024 06:18	WG2416538
Hexachlorobenzene	U		0.0755	1.00	1	12/13/2024 06:18	WG2416538

1Cp

2Tc

3Ss

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6Qc

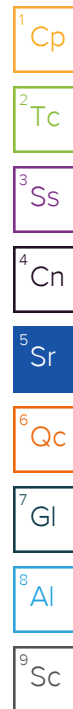
7Gl

8Al

9Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Hexachloro-1,3-butadiene	U		0.0968	10.0	1	12/13/2024 06:18	WG2416538
Hexachlorocyclopentadiene	U		0.0598	10.0	1	12/13/2024 06:18	WG2416538
Hexachloroethane	U		0.127	10.0	1	12/13/2024 06:18	WG2416538
Indeno(1,2,3-cd)pyrene	U		0.279	1.00	1	12/13/2024 06:18	WG2416538
Isophorone	U		0.143	10.0	1	12/13/2024 06:18	WG2416538
Naphthalene	0.226	J	0.159	1.00	1	12/13/2024 06:18	WG2416538
Nitrobenzene	U		0.297	10.0	1	12/13/2024 06:18	WG2416538
n-Nitrosodimethylamine	U		0.998	10.0	1	12/13/2024 06:18	WG2416538
n-Nitrosodiphenylamine	U		2.37	10.0	1	12/13/2024 06:18	WG2416538
n-Nitrosodi-n-propylamine	U		0.261	10.0	1	12/13/2024 06:18	WG2416538
Phenanthrene	U		0.112	1.00	1	12/13/2024 06:18	WG2416538
Benzylbutyl phthalate	U		0.765	3.00	1	12/13/2024 06:18	WG2416538
Bis(2-Ethylhexyl)phthalate	U		0.895	3.00	1	12/13/2024 06:18	WG2416538
Di-n-butyl phthalate	U		0.453	3.00	1	12/13/2024 06:18	WG2416538
Diethyl phthalate	U		0.287	3.00	1	12/13/2024 06:18	WG2416538
Dimethyl phthalate	U		0.260	3.00	1	12/13/2024 06:18	WG2416538
Di-n-octyl phthalate	U		0.932	3.00	1	12/13/2024 06:18	WG2416538
Pyrene	U		0.107	1.00	1	12/13/2024 06:18	WG2416538
1,2,4-Trichlorobenzene	U		0.0698	10.0	1	12/13/2024 06:18	WG2416538
Aniline	U	J4	1.65	10.0	1	12/13/2024 06:18	WG2416538
1,2-Diphenylhydrazine	U	N2	0.105	10.0	1	12/13/2024 06:18	WG2416538
Benzyl alcohol	U		0.563	10.0	1	12/13/2024 06:18	WG2416538
4-Chloroaniline	U		0.234	10.0	1	12/13/2024 06:18	WG2416538
4-Chloro-3-methylphenol	U	J4	0.131	10.0	1	12/13/2024 06:18	WG2416538
2-Chlorophenol	U		0.133	10.0	1	12/13/2024 06:18	WG2416538
Dibenzofuran	U		0.0970	10.0	1	12/13/2024 06:18	WG2416538
2,4-Dichlorophenol	U		0.102	10.0	1	12/13/2024 06:18	WG2416538
2,4-Dimethylphenol	U		0.0636	10.0	1	12/13/2024 06:18	WG2416538
4,6-Dinitro-2-methylphenol	U		1.12	10.0	1	12/13/2024 06:18	WG2416538
2,4-Dinitrophenol	U		5.93	10.0	1	12/13/2024 06:18	WG2416538
2-Methylnaphthalene	U		0.117	1.00	1	12/13/2024 06:18	WG2416538
2-Methylphenol	U		0.0929	10.0	1	12/13/2024 06:18	WG2416538
3&4-Methyl Phenol	U		0.168	10.0	1	12/13/2024 06:18	WG2416538
2-Nitroaniline	U		0.102	10.0	1	12/13/2024 06:18	WG2416538
3-Nitroaniline	U		0.0869	10.0	1	12/13/2024 06:18	WG2416538
4-Nitroaniline	U		0.0910	10.0	1	12/13/2024 06:18	WG2416538
2-Nitrophenol	U		0.117	10.0	1	12/13/2024 06:18	WG2416538
4-Nitrophenol	U		0.143	10.0	1	12/13/2024 06:18	WG2416538
Pentachlorophenol	U		0.313	10.0	1	12/13/2024 06:18	WG2416538
Phenol	U		4.33	10.0	1	12/13/2024 06:18	WG2416538
Pyridine	U		0.627	10.0	1	12/13/2024 06:18	WG2416538
2,4,6-Trichlorophenol	U		0.100	10.0	1	12/13/2024 06:18	WG2416538
Acetophenone	U		0.208	10.0	1	12/13/2024 06:18	WG2416538
2-Acetylaminofluorene	U		0.253	10.0	1	12/20/2024 06:55	WG2416538
4-Aminobiphenyl	U	J4	0.461	10.0	1	12/20/2024 06:55	WG2416538
Chlorobenzilate	U		3.84	50.0	1	12/20/2024 06:55	WG2416538
Diallate	U		0.524	10.0	1	12/20/2024 06:55	WG2416538
2,6-Dichlorophenol	U		0.102	10.0	1	12/20/2024 06:55	WG2416538
Dimethoate	U		5.05	50.0	1	12/20/2024 06:55	WG2416538
P-(Dimethylamino) Azobenzene	U		3.69	10.0	1	12/20/2024 06:55	WG2416538
Dimethylbenz (A) Anthracene	U		1.71	10.0	1	12/20/2024 06:55	WG2416538
3,3-Dimethylbenzidine	U	J4	3.39	10.0	1	12/20/2024 06:55	WG2416538
a,a-Dimethylphenethylamine	U	J4	3.13	50.0	1	12/20/2024 06:55	WG2416538
1,3-Dinitrobenzene	U		0.359	10.0	1	12/20/2024 06:55	WG2416538
Diphenylamine	U		2.37	10.0	1	12/13/2024 06:18	WG2416538
Dinoseb	U		8.01	50.0	1	12/20/2024 06:55	WG2416538



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
Disulfoton	U		0.267	10.0	1	12/20/2024 06:55	WG2416538
Ethyl methanesulfonate	U		0.326	10.0	1	12/20/2024 06:55	WG2416538
Ethyl Parathion	U	J4	0.379	10.0	1	12/20/2024 06:55	WG2416538
Famphur	U		3.92	20.0	1	12/20/2024 06:55	WG2416538
Hexachloropropene	U		0.149	50.0	1	12/20/2024 06:55	WG2416538
Hexachlorophene	U		1.44	50.0	1	12/20/2024 06:55	WG2416538
Isodrin	U		4.11	10.0	1	12/20/2024 06:55	WG2416538
Isosafrole	U		3.88	10.0	1	12/20/2024 06:55	WG2416538
Kepone	U		2.66	20.0	1	12/20/2024 06:55	WG2416538
Methapyrilene	U		10.0	50.0	1	12/20/2024 06:55	WG2416538
3-Methylcholanthrene	U		0.164	10.0	1	12/20/2024 06:55	WG2416538
Methyl methanesulfonate	U		3.40	50.0	1	12/20/2024 06:55	WG2416538
Methyl parathion	U	J4	0.213	10.0	1	12/20/2024 06:55	WG2416538
1,4-Naphthoquinone	U	J4	5.56	50.0	1	12/20/2024 06:55	WG2416538
1-Naphthylamine	U	J4	0.289	10.0	1	12/20/2024 06:55	WG2416538
2-Naphthylamine	U	J4	4.48	10.0	1	12/20/2024 06:55	WG2416538
5-Nitro-o-toluidine	U		1.99	10.0	1	12/20/2024 06:55	WG2416538
4-Nitroquinoline 1-oxide	U		2.03	10.0	1	12/20/2024 06:55	WG2416538
n-Nitrosodiethylamine	U		3.57	10.0	1	12/20/2024 06:55	WG2416538
n-Nitrosodi-n-butylamine	U		3.91	10.0	1	12/20/2024 06:55	WG2416538
n-Nitrosomethylethylamine	U		3.25	10.0	1	12/20/2024 06:55	WG2416538
n-Nitrosomorpholine	U		3.25	10.0	1	12/20/2024 06:55	WG2416538
n-Nitrosopiperidine	U		3.72	10.0	1	12/20/2024 06:55	WG2416538
n-Nitrosopyrrolidine	U		3.39	10.0	1	12/20/2024 06:55	WG2416538
Pentachlorobenzene	U		4.15	10.0	1	12/20/2024 06:55	WG2416538
Pentachloroethane	U		2.83	50.0	1	12/20/2024 06:55	WG2416538
Pentachloronitrobenzene	U		4.15	10.0	1	12/20/2024 06:55	WG2416538
Phenacetin	U		4.66	10.0	1	12/20/2024 06:55	WG2416538
p-Phenylenediamine	U	J4	387	6900	1	12/20/2024 06:55	WG2416538
Phorate	U		4.86	50.0	1	12/20/2024 06:55	WG2416538
2-Picoline	U		6.83	50.0	1	12/20/2024 06:55	WG2416538
Pronamide	U		4.21	10.0	1	12/20/2024 06:55	WG2416538
Safrole	U		3.68	10.0	1	12/20/2024 06:55	WG2416538
Sulfotep	U	J4	3.99	50.0	1	12/20/2024 06:55	WG2416538
1,2,4,5-Tetrachlorobenzene	U		0.0647	10.0	1	12/13/2024 06:18	WG2416538
2,3,4,6-Tetrachlorophenol	U		0.231	10.0	1	12/13/2024 06:18	WG2416538
Thionazin	U		4.07	10.0	1	12/20/2024 06:55	WG2416538
o-Toluidine	U		3.53	10.0	1	12/20/2024 06:55	WG2416538
2,4,5-Trichlorophenol	U		0.109	10.0	1	12/13/2024 06:18	WG2416538
O,O,O-Triethyl Phosphorothioate	U		2.93	10.0	1	12/20/2024 06:55	WG2416538
1,3,5-Trinitrobenzene	U		1.32	10.0	1	12/20/2024 06:55	WG2416538
(S) 2-Fluorophenol	20.7			10.0-120		12/13/2024 06:18	WG2416538
(S) Phenol-d5	14.6			10.0-120		12/13/2024 06:18	WG2416538
(S) Nitrobenzene-d5	53.8			10.0-127		12/13/2024 06:18	WG2416538
(S) 2-Fluorobiphenyl	53.0			10.0-130		12/13/2024 06:18	WG2416538
(S) 2,4,6-Tribromophenol	42.0			10.0-155		12/13/2024 06:18	WG2416538
(S) p-Terphenyl-d14	43.2			10.0-128		12/13/2024 06:18	WG2416538

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Volatile Petroleum Hydrocarbons by Method MTDEQ VPH

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
Unadjusted C5-C8 Aliphatics	U		33.3	100	1	12/15/2024 22:55	WG2419269
Unadjusted C9-C12 Aliphatics	U		33.3	100	1	12/15/2024 22:55	WG2419269
Unadjusted C9-C10 Aromatics	U		33.3	100	1	12/15/2024 22:55	WG2419269
Adjusted C5-C8 Aliphatics	U		33.3	100	1	12/15/2024 22:55	WG2419269
Adjusted C9-C12 Aliphatics	U		33.3	100	1	12/15/2024 22:55	WG2419269
Total VPH	U		66.7	200	1	12/15/2024 22:55	WG2419269
(S) 2,5-Dibromotoluene(FID)	80.9			70.0-130		12/15/2024 22:55	WG2419269
(S) 2,5-Dibromotoluene(PID)	76.0			70.0-130		12/15/2024 22:55	WG2419269

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	12/18/2024 12:24	WG2420107
Acrylonitrile	U		0.671	5.00	1	12/18/2024 12:24	WG2420107
Benzene	U		0.0941	0.500	1	12/18/2024 12:24	WG2420107
Bromobenzene	U		0.118	0.500	1	12/18/2024 12:24	WG2420107
Bromodichloromethane	U		0.136	0.500	1	12/18/2024 12:24	WG2420107
Bromochloromethane	U		0.128	0.500	1	12/18/2024 12:24	WG2420107
Bromoform	U		0.129	0.500	1	12/18/2024 12:24	WG2420107
Bromomethane	U		0.605	2.50	1	12/18/2024 12:24	WG2420107
n-Butylbenzene	U		0.157	0.500	1	12/18/2024 12:24	WG2420107
sec-Butylbenzene	U		0.125	0.500	1	12/18/2024 12:24	WG2420107
tert-Butylbenzene	U		0.127	0.500	1	12/18/2024 12:24	WG2420107
Carbon disulfide	U		0.0962	0.500	1	12/18/2024 12:24	WG2420107
Carbon tetrachloride	U		0.128	0.500	1	12/18/2024 12:24	WG2420107
Chlorobenzene	U		0.117	0.500	1	12/18/2024 12:24	WG2420107
Chlorodibromomethane	U		0.140	0.500	1	12/18/2024 12:24	WG2420107
Chloroethane	U		0.192	2.50	1	12/18/2024 12:24	WG2420107
2-Chloroethyl vinyl ether	U		0.575	50.0	1	12/18/2024 12:24	WG2420107
Chloroform	U		0.111	0.500	1	12/18/2024 12:24	WG2420107
Chloromethane	U		0.960	1.25	1	12/18/2024 12:24	WG2420107
2-Chlorotoluene	U		0.106	0.500	1	12/18/2024 12:24	WG2420107
4-Chlorotoluene	U		0.114	0.500	1	12/18/2024 12:24	WG2420107
1,2-Dibromo-3-Chloropropane	U		0.276	2.50	1	12/18/2024 12:24	WG2420107
1,2-Dibromoethane	U		0.126	0.500	1	12/18/2024 12:24	WG2420107
Dibromomethane	U		0.122	0.500	1	12/18/2024 12:24	WG2420107
1,2-Dichlorobenzene	U		0.107	0.500	1	12/18/2024 12:24	WG2420107
1,3-Dichlorobenzene	U		0.299	0.500	1	12/18/2024 12:24	WG2420107
1,4-Dichlorobenzene	U		0.120	0.500	1	12/18/2024 12:24	WG2420107
Dichlorodifluoromethane	U		0.374	2.50	1	12/18/2024 12:24	WG2420107
1,1-Dichloroethane	U		0.100	0.500	1	12/18/2024 12:24	WG2420107
1,2-Dichloroethane	U		0.0819	0.500	1	12/18/2024 12:24	WG2420107
1,1-Dichloroethene	U		0.188	0.500	1	12/18/2024 12:24	WG2420107
cis-1,2-Dichloroethene	U		0.126	0.500	1	12/18/2024 12:24	WG2420107
trans-1,2-Dichloroethene	U		0.149	0.500	1	12/18/2024 12:24	WG2420107
1,2-Dichloropropane	U		0.149	0.500	1	12/18/2024 12:24	WG2420107
1,1-Dichloropropene	U		0.142	0.500	1	12/18/2024 12:24	WG2420107
1,3-Dichloropropane	U		0.109	1.00	1	12/18/2024 12:24	WG2420107
cis-1,3-Dichloropropene	U		0.111	0.500	1	12/18/2024 12:24	WG2420107
trans-1,3-Dichloropropene	U		0.118	0.500	1	12/18/2024 12:24	WG2420107
trans-1,4-Dichloro-2-butene	U		0.467	5.00	1	12/18/2024 12:24	WG2420107
2,2-Dichloropropane	U		0.161	0.500	1	12/18/2024 12:24	WG2420107
Di-isopropyl ether	U		0.105	0.500	1	12/18/2024 12:24	WG2420107
Ethylbenzene	U		0.137	0.500	1	12/18/2024 12:24	WG2420107
Hexachloro-1,3-butadiene	U		0.337	1.00	1	12/18/2024 12:24	WG2420107

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

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

Analyte	Result ug/l	Qualifier	MDL ug/l	RDL ug/l	Dilution	Analysis date / time	Batch
2-Hexanone	U		0.787	5.00	1	12/18/2024 12:24	WG2420107
n-Hexane	U		0.749	5.00	1	12/18/2024 12:24	WG2420107
Iodomethane	U		0.554	5.00	1	12/18/2024 12:24	WG2420107
Isopropylbenzene	U		0.105	0.500	1	12/18/2024 12:24	WG2420107
p-Isopropyltoluene	U		0.120	0.500	1	12/18/2024 12:24	WG2420107
2-Butanone (MEK)	U		1.19	5.00	1	12/18/2024 12:24	WG2420107
Methylene Chloride	U		0.430	2.50	1	12/18/2024 12:24	WG2420107
4-Methyl-2-pentanone (MIBK)	U		0.478	5.00	1	12/18/2024 12:24	WG2420107
Methyl tert-butyl ether	U		0.101	0.500	1	12/18/2024 12:24	WG2420107
Naphthalene	U		0.174	2.50	1	12/18/2024 12:24	WG2420107
n-Propylbenzene	U		0.0993	0.500	1	12/18/2024 12:24	WG2420107
Styrene	U		0.118	0.500	1	12/18/2024 12:24	WG2420107
1,1,1,2-Tetrachloroethane	U		0.147	0.500	1	12/18/2024 12:24	WG2420107
1,1,2,2-Tetrachloroethane	U		0.133	0.500	1	12/18/2024 12:24	WG2420107
1,1,2-Trichlorotrifluoroethane	U		0.180	0.500	1	12/18/2024 12:24	WG2420107
Tetrachloroethene	U		0.300	0.500	1	12/18/2024 12:24	WG2420107
Toluene	U		0.278	0.500	1	12/18/2024 12:24	WG2420107
1,2,3-Trichlorobenzene	U		0.164	0.500	1	12/18/2024 12:24	WG2420107
1,2,4-Trichlorobenzene	U		0.481	1.00	1	12/18/2024 12:24	WG2420107
1,1,1-Trichloroethane	U		0.149	0.500	1	12/18/2024 12:24	WG2420107
1,1,2-Trichloroethane	U		0.158	0.500	1	12/18/2024 12:24	WG2420107
Trichloroethene	U		0.190	0.500	1	12/18/2024 12:24	WG2420107
Trichlorofluoromethane	U		0.160	2.50	1	12/18/2024 12:24	WG2420107
1,2,3-Trichloropropane	U		0.237	2.50	1	12/18/2024 12:24	WG2420107
1,2,4-Trimethylbenzene	U		0.322	0.500	1	12/18/2024 12:24	WG2420107
1,2,3-Trimethylbenzene	U		0.104	0.500	1	12/18/2024 12:24	WG2420107
1,3,5-Trimethylbenzene	U		0.104	0.500	1	12/18/2024 12:24	WG2420107
Vinyl acetate	U		0.692	5.00	1	12/18/2024 12:24	WG2420107
Vinyl chloride	U		0.234	0.500	1	12/18/2024 12:24	WG2420107
Xylenes, Total	U		0.174	1.50	1	12/18/2024 12:24	WG2420107
(S) Toluene-d8	104			80.0-120		12/18/2024 12:24	WG2420107
(S) 4-Bromofluorobenzene	95.1			77.0-126		12/18/2024 12:24	WG2420107
(S) 1,2-Dichloroethane-d4	107			70.0-130		12/18/2024 12:24	WG2420107

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4156108-3 12/10/24 12:57

Analyte	MB Result	MB Qualifier	MB MDL	MB RDL
	ug/l		ug/l	ug/l
Free Carbon Dioxide	12100	⬇	6670	20000

Sample Narrative:

BLANK: Endpoint pH 4.5

L1806688-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1806688-03 12/10/24 13:05 • (DUP) R4156108-5 12/10/24 13:09

Analyte	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
	ug/l	ug/l		%		%
Free Carbon Dioxide	182000	181000	1	0.340		20

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

L1807398-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1807398-03 12/10/24 15:16 • (DUP) R4156108-7 12/10/24 15:24

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

Sample Narrative:

OS: Endpoint pH 4.5 Headspace

DUP: Endpoint pH 4.5

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4156432-1 12/11/24 08:27

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

L1806541-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1806541-02 12/11/24 11:15 • (DUP) R4156432-3 12/11/24 11:17

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/l	mg/l		%		%
BOD	21.7	20.0	1	8.34		30

Laboratory Control Sample (LCS)

(LCS) R4156432-2 12/11/24 10:48

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
BOD	198	200	101	84.6-115	

Laboratory Control Sample (LCS)

(LCS) R4156432-4 12/11/24 11:41

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	mg/l	mg/l	%	%	
BOD	198	198	100	84.6-115	

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

Method Blank (MB)

(MB) R4155117-1 12/06/24 21:02

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Nitrate as (N)	U		88.4	100
Sulfate	U		637	5000

L1806597-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1806597-02 12/06/24 22:35 • (DUP) R4155117-3 12/06/24 22:47

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Nitrate as (N)	U	U	1	0.000		15
Sulfate	5690	5740	1	0.753		15

L1806611-03 Original Sample (OS) • Duplicate (DUP)

(OS) L1806611-03 12/07/24 00:16 • (DUP) R4155117-6 12/07/24 00:29

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	ug/l	ug/l		%		%
Nitrate as (N)	U	U	1	0.000		15
Sulfate	34200	34600	1	1.36		15

Laboratory Control Sample (LCS)

(LCS) R4155117-2 12/06/24 21:15

	Spike Amount	LCS Result	LCS Rec.	Rec. Limits	LCS Qualifier
Analyte	ug/l	ug/l	%	%	
Nitrate as (N)	8000	8080	101	80.0-120	
Sulfate	40000	39100	97.6	80.0-120	

L1806597-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806597-02 12/06/24 22:35 • (MS) R4155117-4 12/06/24 23:00 • (MSD) R4155117-5 12/06/24 23:13

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Nitrate as (N)	8000	U	8330	8310	104	104	1	80.0-120			0.191	15
Sulfate	40000	5690	45800	45400	100	99.3	1	80.0-120			0.828	15

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1806611-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1806611-03 12/07/24 00:16 • (MS) R4155117-7 12/07/24 00:42

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Nitrate as (N)	8000	U	8140	102	1	80.0-120	
Sulfate	40000	34200	68000	84.6	1	80.0-120	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4156986-1 12/12/24 04:29

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Iron,Dissolved	27.8	U	22.6	100
Manganese,Dissolved	4.36	U	0.700	5.00

Laboratory Control Sample (LCS)

(LCS) R4156986-2 12/12/24 04:32

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Iron,Dissolved	1000	913	91.3	80.0-120	
Manganese,Dissolved	50.0	47.6	95.2	80.0-120	

L1805569-07 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1805569-07 12/12/24 04:35 • (MS) R4156986-4 12/12/24 04:41 • (MSD) R4156986-5 12/12/24 04:45

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MSD Result ug/l	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Iron,Dissolved	1000	57.8	936	948	87.8	89.0	1	75.0-125			1.29	20
Manganese,Dissolved	50.0	64.3	111	110	93.9	91.9	1	75.0-125			0.906	20

1
Cp

2
Tc

3
Ss

4
Cn

5
Sr

6
Qc

7
Gl

8
Al

9
Sc

Method Blank (MB)

(MB) R4158337-3 12/15/24 21:41

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)	81.0			70.0-130
(S) 2,5-Dibromotoluene(PID)	76.1			70.0-130

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

(LCS) R4158337-1 12/15/24 19:14 • (LCSD) R4158337-2 12/15/24 19:51

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C5-C8 Aliphatics	1200	1430	1440	119	120	70.0-130			0.697	50
Unadjusted C9-C12 Aliphatics	1400	1670	1670	119	119	70.0-130			0.000	50
Unadjusted C9-C10 Aromatics	200	232	231	116	116	70.0-130			0.432	50
Total VPH	2800	3330	3340	119	119	70.0-130			0.300	50
(S) 2,5-Dibromotoluene(FID)				80.5	83.4	70.0-130				
(S) 2,5-Dibromotoluene(PID)				75.9	78.8	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4155467-2 12/09/24 12:52

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	ug/l		ug/l	ug/l
Methane	U		5.10	10.0

L1806692-02 Original Sample (OS) • Duplicate (DUP)

(OS) L1806692-02 12/09/24 13:24 • (DUP) R4155467-3 12/09/24 14:55

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

L1806897-01 Original Sample (OS) • Duplicate (DUP)

(OS) L1806897-01 12/09/24 15:25 • (DUP) R4155467-4 12/09/24 15:58

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

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

(LCS) R4155467-1 12/09/24 12:47 • (LCSD) R4155467-7 12/09/24 16:12

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	%	%	%			%	%
Methane	67.8	63.0	65.1	92.9	96.0	85.0-115			3.28	20

L1806692-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806692-01 12/09/24 13:05 • (MS) R4155467-5 12/09/24 16:02 • (MSD) R4155467-6 12/09/24 16:07

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	ug/l	ug/l	ug/l	ug/l	%	%		%			%	%
Methane	67.8	U	63.1	64.2	93.1	94.7	1	50.0-150			1.73	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4158343-2 12/15/24 04:21

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4158343-2 12/15/24 04:21

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	98.2			80.0-120
(S) 4-Bromofluorobenzene	97.2			77.0-126
(S) 1,2-Dichloroethane-d4	98.3			70.0-130

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R4158343-1 12/15/24 03:42 • (LCSD) R4158343-3 12/15/24 10:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Acetone	25.0	50.6	36.6	202	146	19.0-160	J4	J3	32.1	27
Acrylonitrile	25.0	39.5	36.6	158	146	55.0-149	J4		7.62	20
Benzene	5.00	4.66	4.65	93.2	93.0	70.0-123			0.215	20
Bromobenzene	5.00	4.65	4.49	93.0	89.8	73.0-121			3.50	20
Bromodichloromethane	5.00	4.99	4.87	99.8	97.4	75.0-120			2.43	20
Bromochloromethane	5.00	4.96	5.02	99.2	100	76.0-122			1.20	20
Bromoform	5.00	5.71	5.90	114	118	68.0-132			3.27	20
Bromomethane	5.00	4.86	4.22	97.2	84.4	10.0-160			14.1	25
n-Butylbenzene	5.00	3.81	3.88	76.2	77.6	73.0-125			1.82	20
sec-Butylbenzene	5.00	4.08	3.93	81.6	78.6	75.0-125			3.75	20
tert-Butylbenzene	5.00	4.30	3.92	86.0	78.4	76.0-124			9.25	20
Carbon disulfide	5.00	4.92	4.78	98.4	95.6	61.0-128			2.89	20
Carbon tetrachloride	5.00	4.70	4.68	94.0	93.6	68.0-126			0.426	20
Chlorobenzene	5.00	4.58	4.41	91.6	88.2	80.0-121			3.78	20
Chlorodibromomethane	5.00	4.84	4.84	96.8	96.8	77.0-125			0.000	20
Chloroethane	5.00	4.71	4.15	94.2	83.0	47.0-150			12.6	20
2-Chloroethyl vinyl ether	25.0	25.0	26.1	100	104	51.0-160	J	J	4.31	20
Chloroform	5.00	4.82	4.53	96.4	90.6	73.0-120			6.20	20
Chloromethane	5.00	5.41	5.08	108	102	41.0-142			6.29	20
2-Chlorotoluene	5.00	4.41	4.17	88.2	83.4	76.0-123			5.59	20
4-Chlorotoluene	5.00	4.36	4.12	87.2	82.4	75.0-122			5.66	20
1,2-Dibromo-3-Chloropropane	5.00	4.49	4.58	89.8	91.6	58.0-134			1.98	20
1,2-Dibromoethane	5.00	4.83	4.83	96.6	96.6	80.0-122			0.000	20
Dibromomethane	5.00	4.75	4.75	95.0	95.0	80.0-120			0.000	20
1,2-Dichlorobenzene	5.00	4.36	4.39	87.2	87.8	79.0-121			0.686	20
1,3-Dichlorobenzene	5.00	4.42	4.31	88.4	86.2	79.0-120			2.52	20
1,4-Dichlorobenzene	5.00	4.26	4.16	85.2	83.2	79.0-120			2.38	20
Dichlorodifluoromethane	5.00	4.69	5.11	93.8	102	51.0-149			8.57	20
1,1-Dichloroethane	5.00	5.18	4.76	104	95.2	70.0-126			8.45	20
1,2-Dichloroethane	5.00	4.47	4.41	89.4	88.2	70.0-128			1.35	20
1,1-Dichloroethene	5.00	5.08	4.87	102	97.4	71.0-124			4.22	20
cis-1,2-Dichloroethene	5.00	4.72	4.45	94.4	89.0	73.0-120			5.89	20
trans-1,2-Dichloroethene	5.00	5.07	4.74	101	94.8	73.0-120			6.73	20
1,2-Dichloropropane	5.00	5.18	5.04	104	101	77.0-125			2.74	20
1,1-Dichloropropene	5.00	4.92	4.69	98.4	93.8	74.0-126			4.79	20
1,3-Dichloropropane	5.00	4.60	4.50	92.0	90.0	80.0-120			2.20	20
cis-1,3-Dichloropropene	5.00	4.47	4.53	89.4	90.6	80.0-123			1.33	20
trans-1,3-Dichloropropene	5.00	4.26	4.40	85.2	88.0	78.0-124			3.23	20
trans-1,4-Dichloro-2-butene	5.00	5.36	3.62	107	72.4	33.0-144		JJ3	38.8	20
2,2-Dichloropropane	5.00	4.88	5.23	97.6	105	58.0-130			6.92	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4158343-1 12/15/24 03:42 • (LCSD) R4158343-3 12/15/24 10:14

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Di-isopropyl ether	5.00	4.91	5.02	98.2	100	58.0-138			2.22	20
Ethylbenzene	5.00	4.83	4.61	96.6	92.2	79.0-123			4.66	20
Hexachloro-1,3-butadiene	5.00	3.92	4.57	78.4	91.4	54.0-138			15.3	20
2-Hexanone	25.0	25.8	26.0	103	104	67.0-149			0.772	20
n-Hexane	5.00	5.08	6.04	102	121	57.0-133			17.3	20
Iodomethane	25.0	24.6	23.1	98.4	92.4	33.0-147			6.29	26
Isopropylbenzene	5.00	4.71	4.57	94.2	91.4	76.0-127			3.02	20
p-Isopropyltoluene	5.00	4.09	3.94	81.8	78.8	76.0-125			3.74	20
2-Butanone (MEK)	25.0	30.9	31.7	124	127	44.0-160			2.56	20
Methylene Chloride	5.00	4.96	4.95	99.2	99.0	67.0-120			0.202	20
4-Methyl-2-pentanone (MIBK)	25.0	27.9	26.9	112	108	68.0-142			3.65	20
Methyl tert-butyl ether	5.00	4.91	4.82	98.2	96.4	68.0-125			1.85	20
Naphthalene	5.00	2.95	3.54	59.0	70.8	54.0-135			18.2	20
n-Propylbenzene	5.00	4.55	4.17	91.0	83.4	77.0-124			8.72	20
Styrene	5.00	4.76	4.70	95.2	94.0	73.0-130			1.27	20
1,1,1,2-Tetrachloroethane	5.00	4.79	4.63	95.8	92.6	75.0-125			3.40	20
1,1,2,2-Tetrachloroethane	5.00	4.72	4.71	94.4	94.2	65.0-130			0.212	20
1,1,2-Trichlorotrifluoroethane	5.00	4.68	4.66	93.6	93.2	69.0-132			0.428	20
Tetrachloroethene	5.00	5.22	4.96	104	99.2	72.0-132			5.11	20
Toluene	5.00	4.62	4.44	92.4	88.8	79.0-120			3.97	20
1,2,3-Trichlorobenzene	5.00	2.78	3.56	55.6	71.2	50.0-138		J3	24.6	20
1,2,4-Trichlorobenzene	5.00	3.09	4.00	61.8	80.0	57.0-137		J3	25.7	20
1,1,1-Trichloroethane	5.00	4.41	4.48	88.2	89.6	73.0-124			1.57	20
1,1,2-Trichloroethane	5.00	4.70	4.54	94.0	90.8	80.0-120			3.46	20
Trichloroethene	5.00	4.87	4.69	97.4	93.8	78.0-124			3.77	20
Trichlorofluoromethane	5.00	4.54	4.39	90.8	87.8	59.0-147			3.36	20
1,2,3-Trichloropropane	5.00	4.77	4.48	95.4	89.6	73.0-130			6.27	20
1,2,4-Trimethylbenzene	5.00	4.27	4.10	85.4	82.0	76.0-121			4.06	20
1,2,3-Trimethylbenzene	5.00	4.20	3.99	84.0	79.8	77.0-120			5.13	20
1,3,5-Trimethylbenzene	5.00	4.39	4.16	87.8	83.2	76.0-122			5.38	20
Vinyl acetate	25.0	26.0	30.4	104	122	11.0-160			15.6	20
Vinyl chloride	5.00	4.71	4.48	94.2	89.6	67.0-131			5.01	20
Xylenes, Total	15.0	14.1	13.7	94.0	91.3	79.0-123			2.88	20
(S) Toluene-d8				97.8	96.8	80.0-120				
(S) 4-Bromofluorobenzene				96.7	99.7	77.0-126				
(S) 1,2-Dichloroethane-d4				99.3	96.3	70.0-130				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4159652-3 12/18/24 10:36

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4159652-3 12/18/24 10:36

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	0.335	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	96.8			77.0-126
(S) 1,2-Dichloroethane-d4	117			70.0-130

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

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

(LCS) R4159652-1 12/18/24 09:30 • (LCSD) R4159652-2 12/18/24 09:52

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 %
Acetone	25.0	43.1	45.5	172	182	19.0-160	J4	J4	5.42	27
Acrylonitrile	25.0	31.3	31.6	125	126	55.0-149			0.954	20
Benzene	5.00	4.34	4.42	86.8	88.4	70.0-123			1.83	20
Bromobenzene	5.00	4.01	3.90	80.2	78.0	73.0-121			2.78	20
Bromodichloromethane	5.00	4.88	4.88	97.6	97.6	75.0-120			0.000	20
Bromochloromethane	5.00	5.27	5.56	105	111	76.0-122			5.36	20
Bromoform	5.00	5.42	5.73	108	115	68.0-132			5.56	20
Bromomethane	5.00	5.07	6.04	101	121	10.0-160			17.5	25
n-Butylbenzene	5.00	3.91	3.98	78.2	79.6	73.0-125			1.77	20
sec-Butylbenzene	5.00	4.29	4.37	85.8	87.4	75.0-125			1.85	20
tert-Butylbenzene	5.00	4.20	4.23	84.0	84.6	76.0-124			0.712	20
Carbon disulfide	5.00	4.36	4.67	87.2	93.4	61.0-128			6.87	20
Carbon tetrachloride	5.00	5.79	6.09	116	122	68.0-126			5.05	20
Chlorobenzene	5.00	4.70	4.79	94.0	95.8	80.0-121			1.90	20
Chlorodibromomethane	5.00	5.36	5.21	107	104	77.0-125			2.84	20
Chloroethane	5.00	5.21	5.37	104	107	47.0-150			3.02	20
2-Chloroethyl vinyl ether	25.0	21.2	21.9	84.8	87.6	51.0-160	J	J	3.25	20
Chloroform	5.00	4.85	4.90	97.0	98.0	73.0-120			1.03	20
Chloromethane	5.00	5.50	5.89	110	118	41.0-142			6.85	20
2-Chlorotoluene	5.00	4.17	4.20	83.4	84.0	76.0-123			0.717	20
4-Chlorotoluene	5.00	4.02	3.91	80.4	78.2	75.0-122			2.77	20
1,2-Dibromo-3-Chloropropane	5.00	4.70	4.25	94.0	85.0	58.0-134			10.1	20
1,2-Dibromoethane	5.00	4.49	4.75	89.8	95.0	80.0-122			5.63	20
Dibromomethane	5.00	5.28	5.40	106	108	80.0-120			2.25	20
1,2-Dichlorobenzene	5.00	4.48	4.61	89.6	92.2	79.0-121			2.86	20
1,3-Dichlorobenzene	5.00	4.55	4.57	91.0	91.4	79.0-120			0.439	20
1,4-Dichlorobenzene	5.00	4.44	4.51	88.8	90.2	79.0-120			1.56	20
Dichlorodifluoromethane	5.00	5.67	6.49	113	130	51.0-149			13.5	20
1,1-Dichloroethane	5.00	4.83	4.96	96.6	99.2	70.0-126			2.66	20
1,2-Dichloroethane	5.00	5.18	5.31	104	106	70.0-128			2.48	20
1,1-Dichloroethene	5.00	4.17	4.52	83.4	90.4	71.0-124			8.06	20
cis-1,2-Dichloroethene	5.00	4.15	4.60	83.0	92.0	73.0-120			10.3	20
trans-1,2-Dichloroethene	5.00	4.35	4.43	87.0	88.6	73.0-120			1.82	20
1,2-Dichloropropane	5.00	4.68	4.77	93.6	95.4	77.0-125			1.90	20
1,1-Dichloropropene	5.00	4.62	4.78	92.4	95.6	74.0-126			3.40	20
1,3-Dichloropropane	5.00	4.61	4.55	92.2	91.0	80.0-120			1.31	20
cis-1,3-Dichloropropene	5.00	4.07	4.41	81.4	88.2	80.0-123			8.02	20
trans-1,3-Dichloropropene	5.00	4.25	4.31	85.0	86.2	78.0-124			1.40	20
trans-1,4-Dichloro-2-butene	5.00	3.79	3.58	75.8	71.6	33.0-144	J	J	5.70	20
2,2-Dichloropropane	5.00	5.06	5.52	101	110	58.0-130			8.70	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

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

(LCS) R4159652-1 12/18/24 09:30 • (LCSD) R4159652-2 12/18/24 09:52

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	<u>LCS Qualifier</u>	<u>LCSD Qualifier</u>	RPD %	RPD Limits %
Di-isopropyl ether	5.00	5.06	5.23	101	105	58.0-138			3.30	20
Ethylbenzene	5.00	4.71	4.58	94.2	91.6	79.0-123			2.80	20
Hexachloro-1,3-butadiene	5.00	4.57	4.58	91.4	91.6	54.0-138			0.219	20
2-Hexanone	25.0	22.9	23.3	91.6	93.2	67.0-149			1.73	20
n-Hexane	5.00	4.82	5.07	96.4	101	57.0-133	U		5.06	20
Iodomethane	25.0	25.2	27.1	101	108	33.0-147			7.27	26
Isopropylbenzene	5.00	4.79	4.90	95.8	98.0	76.0-127			2.27	20
p-Isopropyltoluene	5.00	4.32	4.31	86.4	86.2	76.0-125			0.232	20
2-Butanone (MEK)	25.0	32.0	31.4	128	126	44.0-160			1.89	20
Methylene Chloride	5.00	4.41	4.78	88.2	95.6	67.0-120			8.05	20
4-Methyl-2-pentanone (MIBK)	25.0	29.4	29.2	118	117	68.0-142			0.683	20
Methyl tert-butyl ether	5.00	5.04	5.38	101	108	68.0-125			6.53	20
Naphthalene	5.00	3.47	3.57	69.4	71.4	54.0-135			2.84	20
n-Propylbenzene	5.00	3.97	3.94	79.4	78.8	77.0-124			0.759	20
Styrene	5.00	4.18	4.27	83.6	85.4	73.0-130			2.13	20
1,1,1,2-Tetrachloroethane	5.00	4.84	4.99	96.8	99.8	75.0-125			3.05	20
1,1,2,2-Tetrachloroethane	5.00	4.18	4.04	83.6	80.8	65.0-130			3.41	20
1,1,2-Trichlorotrifluoroethane	5.00	4.30	4.80	86.0	96.0	69.0-132			11.0	20
Tetrachloroethene	5.00	4.98	5.09	99.6	102	72.0-132			2.18	20
Toluene	5.00	4.22	4.35	84.4	87.0	79.0-120			3.03	20
1,2,3-Trichlorobenzene	5.00	3.83	4.12	76.6	82.4	50.0-138			7.30	20
1,2,4-Trichlorobenzene	5.00	4.19	4.32	83.8	86.4	57.0-137			3.06	20
1,1,1-Trichloroethane	5.00	5.12	5.68	102	114	73.0-124			10.4	20
1,1,2-Trichloroethane	5.00	5.08	4.93	102	98.6	80.0-120			3.00	20
Trichloroethene	5.00	4.96	5.26	99.2	105	78.0-124			5.87	20
Trichlorofluoromethane	5.00	6.68	7.12	134	142	59.0-147			6.38	20
1,2,3-Trichloropropane	5.00	4.42	4.70	88.4	94.0	73.0-130			6.14	20
1,2,4-Trimethylbenzene	5.00	4.10	4.19	82.0	83.8	76.0-121			2.17	20
1,2,3-Trimethylbenzene	5.00	4.17	4.32	83.4	86.4	77.0-120			3.53	20
1,3,5-Trimethylbenzene	5.00	4.39	4.35	87.8	87.0	76.0-122			0.915	20
Vinyl acetate	25.0	25.4	26.6	102	106	11.0-160			4.62	20
Vinyl chloride	5.00	5.22	5.52	104	110	67.0-131			5.59	20
Xylenes, Total	15.0	14.2	14.9	94.7	99.3	79.0-123			4.81	20
(S) Toluene-d8				101	99.1	80.0-120				
(S) 4-Bromofluorobenzene				100	97.7	77.0-126				
(S) 1,2-Dichloroethane-d4				117	116	70.0-130				

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4156271-1 12/10/24 14:30

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C9-C18 Aliphatics	U		69.6	600
Unadjusted C19-C36 Aliphatics	U		58.5	600
Unadjusted Total Petroleum Hydrocarbons	U		200	600
(S) 1-Chloro-octadecane	65.1			40.0-140

Method Blank (MB)

(MB) R4156271-1 12/10/24 14:30

Analyte	MB Result ug/l	MB Qualifier	MB MDL ug/l	MB RDL ug/l
Unadjusted C11-C22 Aromatics	U	U	49.2	600
(S) o-Terphenyl	75.6			40.0-140
(S) 2-Fluorobiphenyl	93.0			40.0-140
(S) 2-Bromonaphthalene	92.8			40.0-140

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

(LCS) R4156271-2 12/10/24 14:51 • (LCSD) R4156271-3 12/10/24 15:13

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C9-C18 Aliphatics	600	307	263	51.2	43.8	40.0-140	J	J	15.4	25
Unadjusted C19-C36 Aliphatics	800	595	509	74.4	63.6	40.0-140	J	J	15.6	25
(S) 1-Chloro-octadecane				67.4	62.1	40.0-140				

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

(LCS) R4156271-2 12/10/24 14:51 • (LCSD) R4156271-3 12/10/24 15:13

Analyte	Spike Amount ug/l	LCS Result ug/l	LCSD Result ug/l	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Unadjusted C11-C22 Aromatics	1700	1390	1250	81.8	73.5	40.0-140			10.6	25
(S) o-Terphenyl				84.3	75.9	40.0-140				
(S) 2-Fluorobiphenyl				93.3	95.3	40.0-140				
(S) 2-Bromonaphthalene				93.4	95.3	40.0-140				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4158491-2 12/13/24 01:15

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

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R4158491-2 12/13/24 01:15

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	30.1			10.0-120
(S) Phenol-d5	19.8			10.0-120
(S) Nitrobenzene-d5	63.6			10.0-127
(S) 2-Fluorobiphenyl	66.6			10.0-130
(S) 2,4,6-Tribromophenol	37.6			10.0-155
(S) p-Terphenyl-d14	65.3			10.0-128

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

6 Qc

7 Gl

8 Al

9 Sc

Method Blank (MB)

(MB) R4161799-2 12/20/24 01:16

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

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Method Blank (MB)

(MB) R4161799-2 12/20/24 01:16

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) R4158491-1 12/13/24 00:54

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Acenaphthene	50.0	36.4	72.8	41.0-120	
Acenaphthylene	50.0	32.9	65.8	43.0-120	
Anthracene	50.0	34.1	68.2	45.0-120	
Benzidine	100	7.87	7.87	10.0-120	J J4
Benzo(a)anthracene	50.0	32.9	65.8	47.0-120	
Benzo(b)fluoranthene	50.0	31.7	63.4	46.0-120	
Benzo(k)fluoranthene	50.0	31.0	62.0	46.0-120	
Benzo(g,h,i)perylene	50.0	31.9	63.8	48.0-121	
Benzo(a)pyrene	50.0	31.1	62.2	47.0-120	
Bis(2-chlorethoxy)methane	50.0	28.8	57.6	33.0-120	
Bis(2-chloroethyl)ether	50.0	33.4	66.8	23.0-120	
2,2-Oxybis(1-Chloropropane)	50.0	31.6	63.2	28.0-120	
4-Bromophenyl-phenylether	50.0	33.9	67.8	45.0-120	
2-Chloronaphthalene	50.0	33.9	67.8	37.0-120	
4-Chlorophenyl-phenylether	50.0	34.1	68.2	44.0-120	
Chrysene	50.0	32.2	64.4	48.0-120	
Dibenz(a,h)anthracene	50.0	34.5	69.0	47.0-120	
3,3-Dichlorobenzidine	100	45.6	45.6	44.0-120	
2,4-Dinitrotoluene	50.0	37.4	74.8	49.0-124	
2,6-Dinitrotoluene	50.0	36.9	73.8	46.0-120	
Fluoranthene	50.0	36.4	72.8	51.0-120	
Fluorene	50.0	35.9	71.8	47.0-120	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R4158491-1 12/13/24 00:54

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Hexachlorobenzene	50.0	31.5	63.0	44.0-120	
Hexachloro-1,3-butadiene	50.0	24.8	49.6	19.0-120	
Hexachlorocyclopentadiene	50.0	9.73	19.5	15.0-120	J
Hexachloroethane	50.0	30.3	60.6	15.0-120	
Indeno(1,2,3-cd)pyrene	50.0	31.9	63.8	49.0-122	
Isophorone	50.0	30.8	61.6	36.0-120	
Naphthalene	50.0	28.3	56.6	27.0-120	
Nitrobenzene	50.0	28.6	57.2	27.0-120	
n-Nitrosodimethylamine	50.0	22.4	44.8	10.0-120	
n-Nitrosodiphenylamine	50.0	34.1	68.2	47.0-120	
n-Nitrosodi-n-propylamine	50.0	33.3	66.6	31.0-120	
Phenanthrene	50.0	33.7	67.4	46.0-120	
Benzylbutyl phthalate	50.0	38.2	76.4	43.0-121	
Bis(2-Ethylhexyl)phthalate	50.0	36.3	72.6	43.0-122	
Di-n-butyl phthalate	50.0	38.7	77.4	49.0-121	
Diethyl phthalate	50.0	37.5	75.0	48.0-122	
Dimethyl phthalate	50.0	34.8	69.6	48.0-120	
Di-n-octyl phthalate	50.0	35.0	70.0	42.0-125	
Pyrene	50.0	33.8	67.6	47.0-120	
1,2,4-Trichlorobenzene	50.0	26.8	53.6	24.0-120	
Aniline	50.0	4.35	8.70	13.0-120	J J4
1,2-Diphenylhydrazine	50.0	37.0	74.0	41.0-126	N2
Benzyl alcohol	50.0	20.5	41.0	25.0-120	
4-Chloroaniline	50.0	15.2	30.4	25.0-120	
4-Chloro-3-methylphenol	50.0	18.7	37.4	40.0-120	J4
2-Chlorophenol	50.0	17.9	35.8	25.0-120	
Dibenzofuran	50.0	35.2	70.4	44.0-120	
2,4-Dichlorophenol	50.0	19.8	39.6	36.0-120	
2,4-Dimethylphenol	50.0	16.9	33.8	33.0-120	
4,6-Dinitro-2-methylphenol	50.0	27.5	55.0	38.0-138	
2,4-Dinitrophenol	50.0	23.7	47.4	10.0-120	
2-Methylnaphthalene	50.0	30.7	61.4	33.0-120	
2-Methylphenol	50.0	16.5	33.0	28.0-120	
3&4-Methyl Phenol	50.0	18.1	36.2	31.0-120	
2-Nitroaniline	50.0	35.9	71.8	43.0-120	
3-Nitroaniline	50.0	29.1	58.2	38.0-120	
4-Nitroaniline	50.0	33.5	67.0	18.0-160	
2-Nitrophenol	50.0	21.6	43.2	31.0-120	
4-Nitrophenol	50.0	9.03	18.1	10.0-120	J
Pentachlorophenol	50.0	14.7	29.4	23.0-120	

¹Cp

²Tc

³Ss

⁴Cn

⁵Sr

⁶Qc

⁷Gl

⁸Al

⁹Sc

Laboratory Control Sample (LCS)

(LCS) R4158491-1 12/13/24 00:54

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Phenol	50.0	8.72	17.4	10.0-120	J
Pyridine	50.0	10.0	20.0	10.0-120	J
2,4,6-Trichlorophenol	50.0	26.3	52.6	42.0-120	
Acetophenone	50.0	29.8	59.6	29.0-120	
Diphenylamine	50.0	34.1	68.2	35.0-120	
1,2,4,5-Tetrachlorobenzene	50.0	31.2	62.4	31.0-121	
2,3,4,6-Tetrachlorophenol	50.0	26.5	53.0	42.0-132	
2,4,5-Trichlorophenol	50.0	26.1	52.2	44.0-120	
(S) 2-Fluorophenol			23.0	10.0-120	
(S) Phenol-d5			16.1	10.0-120	
(S) Nitrobenzene-d5			54.7	10.0-127	
(S) 2-Fluorobiphenyl			63.7	10.0-130	
(S) 2,4,6-Tribromophenol			47.6	10.0-155	
(S) p-Terphenyl-d14			56.9	10.0-128	

Laboratory Control Sample (LCS)

(LCS) R4161799-1 12/20/24 00:54

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
2-Acetylaminofluorene	50.0	44.7	89.4	32.0-120	
4-Aminobiphenyl	50.0	6.37	12.7	20.0-120	J J4
Chlorobenzilate	50.0	42.8	85.6	29.0-128	J
Diallate	50.0	46.7	93.4	30.0-120	
2,6-Dichlorophenol	50.0	25.7	51.4	19.0-136	
Dimethoate	50.0	44.4	88.8	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	40.5	81.0	27.0-120	
Dimethylbenz (A) Anthracene	50.0	10.9	21.8	14.0-124	
1,3-Dinitrobenzene	50.0	38.6	77.2	34.0-120	
Diphenylamine	50.0	39.3	78.6	35.0-120	
Dinoseb	50.0	36.9	73.8	39.0-120	J
Disulfoton	50.0	52.6	105	32.0-120	
Ethyl methanesulfonate	50.0	32.5	65.0	10.0-120	
Ethyl Parathion	50.0	65.4	131	46.0-130	J4
Famphur	50.0	53.8	108	32.0-120	
Hexachloropropene	50.0	21.5	43.0	10.0-120	J
Hexachlorophene	100	53.6	53.6	10.0-120	
Isodrin	50.0	48.0	96.0	22.0-157	
Isosafrole	50.0	33.0	66.0	25.0-133	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Laboratory Control Sample (LCS)

(LCS) R4161799-1 12/20/24 00:54

Analyte	Spike Amount ug/l	LCS Result ug/l	LCS Rec. %	Rec. Limits %	LCS Qualifier
Kepone	50.0	36.7	73.4	10.0-120	
Methapyrilene	50.0	16.0	32.0	10.0-120	J
3-Methylcholanthrene	50.0	28.2	56.4	30.0-160	
Methyl methanesulfonate	50.0	23.0	46.0	10.0-120	J
Methyl parathion	50.0	60.9	122	42.0-120	J4
1,4-Naphthoquinone	50.0	2.25	4.50	50.0-150	J J4
1-Naphthylamine	50.0	4.62	9.24	19.0-120	J J4
2-Naphthylamine	50.0	4.33	8.66	10.0-120	J J4
5-Nitro-o-toluidine	50.0	37.5	75.0	34.0-120	
4-Nitroquinoline 1-oxide	50.0	32.6	65.2	10.0-159	
n-Nitrosodiethylamine	50.0	32.2	64.4	10.0-120	
n-Nitrosodi-n-butylamine	50.0	44.5	89.0	13.0-143	
n-Nitrosomethylethylamine	50.0	27.3	54.6	10.0-120	
n-Nitrosomorpholine	50.0	29.9	59.8	10.0-120	
n-Nitrosopiperidine	50.0	39.8	79.6	10.0-160	
n-Nitrosopyrrolidine	50.0	28.9	57.8	10.0-124	
Pentachlorobenzene	50.0	30.8	61.6	25.0-120	
Pentachloroethane	50.0	29.2	58.4	10.0-120	J
Pentachloronitrobenzene	50.0	37.5	75.0	34.0-132	
Phenacetin	50.0	43.8	87.6	34.0-127	
Phorate	50.0	62.0	124	13.0-160	
2-Picoline	50.0	21.4	42.8	10.0-120	J
Pronamide	50.0	46.1	92.2	38.0-130	
Safrole	50.0	33.2	66.4	21.0-120	
Sulfotep	50.0	64.0	128	52.0-120	J4
Thionazin	50.0	60.0	120	38.0-121	
o-Toluidine	50.0	17.2	34.4	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	37.2	74.4	11.0-135	
1,3,5-Trinitrobenzene	50.0	40.0	80.0	37.0-147	

L1806642-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806642-03 12/13/24 04:29 • (MS) R4158491-3 12/13/24 04:51 • (MSD) R4158491-4 12/13/24 05:13

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	45.5	U	30.7	34.6	67.5	69.2	1	28.0-120			11.9	25
Acenaphthylene	45.5	U	28.6	32.1	62.9	64.2	1	31.0-121			11.5	25
Anthracene	45.5	U	29.2	32.7	64.2	65.4	1	36.0-120			11.3	23
Benzidine	91.0	U	6.91	7.65	7.59	7.65	1	10.0-120	J J6	J J6	10.2	37

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1806642-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806642-03 12/13/24 04:29 • (MS) R4158491-3 12/13/24 04:51 • (MSD) R4158491-4 12/13/24 05:13

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 %
Benzo(a)anthracene	45.5	U	27.1	31.2	59.6	62.4	1	39.0-120			14.1	23
Benzo(b)fluoranthene	45.5	U	25.5	30.0	56.0	60.0	1	37.0-120			16.2	23
Benzo(k)fluoranthene	45.5	U	24.8	29.1	54.5	58.2	1	37.0-120			16.0	26
Benzo(g,h,i)perylene	45.5	U	24.7	29.4	54.3	58.8	1	37.0-123			17.4	25
Benzo(a)pyrene	45.5	U	24.6	29.0	54.1	58.0	1	37.0-120			16.4	24
Bis(2-chlorethoxy)methane	45.5	U	25.8	29.4	56.7	58.8	1	17.0-120			13.0	31
Bis(2-chloroethyl)ether	45.5	U	29.8	34.6	65.5	69.2	1	14.0-120			14.9	33
2,2-Oxybis(1-Chloropropane)	45.5	U	27.8	32.6	61.1	65.2	1	18.0-120			15.9	34
4-Bromophenyl-phenylether	45.5	U	28.4	32.2	62.4	64.4	1	37.0-120			12.5	24
2-Chloronaphthalene	45.5	U	29.4	33.3	64.6	66.6	1	29.0-120			12.4	28
4-Chlorophenyl-phenylether	45.5	U	28.3	32.6	62.2	65.2	1	36.0-120			14.1	23
Chrysene	45.5	U	26.9	30.7	59.1	61.4	1	38.0-120			13.2	23
Dibenz(a,h)anthracene	45.5	U	26.2	31.2	57.6	62.4	1	36.0-121			17.4	24
3,3-Dichlorobenzidine	91.0	U	38.3	38.8	42.1	38.8	1	10.0-134			1.30	30
2,4-Dinitrotoluene	45.5	U	31.5	35.0	69.2	70.0	1	39.0-125			10.5	25
2,6-Dinitrotoluene	45.5	U	31.1	34.1	68.4	68.2	1	36.0-120			9.20	27
Fluoranthene	45.5	U	32.3	36.5	71.0	73.0	1	41.0-121			12.2	22
Fluorene	45.5	U	30.1	33.6	66.2	67.2	1	37.0-120			11.0	24
Hexachlorobenzene	45.5	U	26.9	30.0	59.1	60.0	1	35.0-122			10.9	24
Hexachloro-1,3-butadiene	45.5	U	23.0	27.8	50.5	55.6	1	12.0-120			18.9	34
Hexachlorocyclopentadiene	45.5	U	10.8	16.1	23.7	32.2	1	10.0-120		J3	39.4	33
Hexachloroethane	45.5	U	27.8	32.6	61.1	65.2	1	10.0-120			15.9	40
Indeno(1,2,3-cd)pyrene	45.5	U	24.9	29.5	54.7	59.0	1	38.0-125			16.9	24
Isophorone	45.5	U	27.2	31.3	59.8	62.6	1	21.0-120			14.0	27
Naphthalene	45.5	U	24.9	28.7	54.7	57.4	1	10.0-120			14.2	31
Nitrobenzene	45.5	U	26.0	29.7	57.1	59.4	1	12.0-120			13.3	30
n-Nitrosodimethylamine	45.5	U	21.4	23.7	47.0	47.4	1	10.0-120			10.2	40
n-Nitrosodiphenylamine	45.5	U	28.6	31.8	62.9	63.6	1	37.0-120			10.6	24
n-Nitrosodi-n-propylamine	45.5	U	29.9	34.1	65.7	68.2	1	16.0-120			13.1	30
Phenanthrene	45.5	U	29.2	32.0	64.2	64.0	1	33.0-120			9.15	22
Benzylbutyl phthalate	45.5	U	33.1	37.4	72.7	74.8	1	34.0-126			12.2	24
Bis(2-Ethylhexyl)phthalate	45.5	U	27.9	33.2	61.3	66.4	1	33.0-126			17.3	25
Di-n-butyl phthalate	45.5	U	33.8	39.3	74.3	78.6	1	35.0-128			15.0	23
Diethyl phthalate	45.5	U	31.4	35.6	69.0	71.2	1	39.0-125			12.5	24
Dimethyl phthalate	45.5	U	29.1	32.7	64.0	65.4	1	37.0-120			11.7	24
Di-n-octyl phthalate	45.5	U	27.2	32.2	59.8	64.4	1	25.0-135			16.8	26
Pyrene	45.5	U	29.1	32.7	64.0	65.4	1	39.0-120			11.7	22
1,2,4-Trichlorobenzene	45.5	U	24.2	27.9	53.2	55.8	1	15.0-120			14.2	31
Aniline	45.5	U	3.51	2.88	7.71	5.76	1	10.0-120	J J6	J J6	19.7	39
1,2-Diphenylhydrazine	45.5	U	31.2	34.6	68.6	69.2	1	28.0-129	N2	N2	10.3	25

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1806642-03 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L1806642-03 12/13/24 04:29 • (MS) R4158491-3 12/13/24 04:51 • (MSD) R4158491-4 12/13/24 05:13

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 %
Benzyl alcohol	45.5	U	20.2	23.6	44.4	47.2	1	14.0-120			15.5	38
4-Chloroaniline	45.5	U	13.1	12.4	28.8	24.8	1	10.0-120			5.49	31
4-Chloro-3-methylphenol	45.5	U	18.8	27.1	41.3	54.2	1	26.0-120		J3	36.2	27
2-Chlorophenol	45.5	U	18.6	27.9	40.9	55.8	1	18.0-120		J3	40.0	34
Dibenzofuran	45.5	U	29.9	33.6	65.7	67.2	1	32.0-120			11.7	26
2,4-Dichlorophenol	45.5	U	20.3	28.7	44.6	57.4	1	19.0-120		J3	34.3	27
2,4-Dimethylphenol	45.5	U	17.4	23.6	38.2	47.2	1	15.0-120		J3	30.2	28
4,6-Dinitro-2-methylphenol	45.5	U	26.2	34.3	57.6	68.6	1	10.0-144			26.8	39
2,4-Dinitrophenol	45.5	U	22.6	34.0	49.7	68.0	1	10.0-120		J3	40.3	40
2-Methylnaphthalene	45.5	U	27.0	31.5	59.3	63.0	1	17.0-120			15.4	28
2-Methylphenol	45.5	U	16.0	23.6	35.2	47.2	1	10.0-120		J3	38.4	30
3&4-Methyl Phenol	45.5	U	17.9	25.5	39.3	51.0	1	10.0-120			35.0	36
2-Nitroaniline	45.5	U	31.2	35.0	68.6	70.0	1	33.0-120			11.5	27
3-Nitroaniline	45.5	U	24.6	28.5	54.1	57.0	1	20.0-120			14.7	27
4-Nitroaniline	45.5	U	29.9	33.6	65.7	67.2	1	10.0-160			11.7	26
2-Nitrophenol	45.5	U	22.1	29.2	48.6	58.4	1	20.0-120			27.7	30
4-Nitrophenol	45.5	U	9.19	11.3	20.2	22.6	1	10.0-120	J		20.6	40
Pentachlorophenol	45.5	U	15.8	22.3	34.7	44.6	1	10.0-128			34.1	37
Phenol	45.5	U	8.51	10.7	18.7	21.4	1	10.0-120	J		22.8	40
Pyridine	45.5	U	7.82	6.25	17.2	12.5	1	10.0-120	J	J	22.3	37
2,4,6-Trichlorophenol	45.5	U	25.8	32.8	56.7	65.6	1	26.0-120			23.9	31
Acetophenone	45.5	U	26.5	30.5	58.2	61.0	1	20.0-120			14.0	35
Diphenylamine	45.5	U	28.6	31.8	62.9	63.6	1	35.0-120			10.6	30
1,2,4,5-Tetrachlorobenzene	45.5	U	28.1	32.2	61.8	64.4	1	19.0-122			13.6	32
2,3,4,6-Tetrachlorophenol	45.5	U	25.9	32.8	56.9	65.6	1	17.0-142			23.5	34
2,4,5-Trichlorophenol	45.5	U	26.1	33.6	57.4	67.2	1	33.0-120			25.1	31
(S) 2-Fluorophenol					25.7	32.2		10.0-120				
(S) Phenol-d5					17.7	20.1		10.0-120				
(S) Nitrobenzene-d5					55.5	56.0		10.0-127				
(S) 2-Fluorobiphenyl					59.1	62.0		10.0-130				
(S) 2,4,6-Tribromophenol					48.4	54.5		10.0-155				
(S) p-Terphenyl-d14					52.0	53.5		10.0-128				

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1806642-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1806642-03 12/20/24 05:30 • (MS) R4161799-3 12/20/24 05:51

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
2-Acetylaminofluorene	50.0	U	43.7	87.4	1	32.0-120	
4-Aminobiphenyl	50.0	U	2.90	5.80	1	20.0-120	J J6
Chlorobenzilate	50.0	U	41.6	83.2	1	29.0-128	J
Diallate	50.0	U	42.0	84.0	1	30.0-120	
2,6-Dichlorophenol	50.0	U	29.6	59.2	1	19.0-136	
Dimethoate	50.0	U	48.3	96.6	1	11.0-134	J
P-(Dimethylamino) Azobenzene	50.0	U	37.6	75.2	1	27.0-120	
Dimethylbenz (A) Anthracene	50.0	U	7.24	14.5	1	30.0-120	J J6
3,3-Dimethylbenzidine	50.0	U	U	0.000	1	13.0-120	J6
a,a-Dimethylphenethylamine	50.0	U	U	0.000	1	10.0-129	J6
1,3-Dinitrobenzene	50.0	U	34.7	69.4	1	34.0-120	
Diphenylamine	50.0	U	34.6	69.2	1	35.0-120	
Dinoseb	50.0	U	39.8	79.6	1	39.0-120	J
Disulfoton	50.0	U	46.1	92.2	1	32.0-120	
Ethyl methanesulfonate	50.0	U	33.5	67.0	1	10.0-120	
Ethyl Parathion	50.0	U	63.1	126	1	46.0-130	
Famphur	50.0	U	54.0	108	1	32.0-120	
Hexachloropropene	50.0	U	22.0	44.0	1	10.0-120	J
Hexachlorophene	100	U	48.6	48.6	1	10.0-120	J
Isodrin	50.0	U	44.8	89.6	1	22.0-157	
Isosafrole	50.0	U	30.8	61.6	1	25.0-133	
Kepone	50.0	U	43.1	86.2	1	10.0-120	
Methapyrilene	50.0	U	U	0.000	1	10.0-120	J6
3-Methylcholanthrene	50.0	U	23.9	47.8	1	30.0-160	
Methyl methanesulfonate	50.0	U	24.2	48.4	1	10.0-120	J
Methyl parathion	50.0	U	59.3	119	1	42.0-120	
1,4-Naphthoquinone	50.0	U	U	0.000	1	50.0-150	J6
1-Naphthylamine	50.0	U	2.39	4.78	1	19.0-120	J J6
2-Naphthylamine	50.0	U	U	0.000	1	10.0-120	J6
5-Nitro-o-toluidine	50.0	U	34.2	68.4	1	34.0-120	
4-Nitroquinoline 1-oxide	50.0	U	29.7	59.4	1	10.0-159	
n-Nitrosodiethylamine	50.0	U	33.3	66.6	1	10.0-120	
n-Nitrosodi-n-butylamine	50.0	U	41.7	83.4	1	13.0-143	
n-Nitrosomethylethylamine	50.0	U	28.7	57.4	1	10.0-120	
n-Nitrosomorpholine	50.0	U	31.5	63.0	1	10.0-120	
n-Nitrosopiperidine	50.0	U	41.2	82.4	1	10.0-160	
n-Nitrosopyrrolidine	50.0	U	30.0	60.0	1	10.0-124	
Pentachlorobenzene	50.0	U	29.2	58.4	1	25.0-120	
Pentachloroethane	50.0	U	29.0	58.0	1	10.0-120	J
Pentachloronitrobenzene	50.0	U	34.3	68.6	1	34.0-132	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L1806642-03 Original Sample (OS) • Matrix Spike (MS)

(OS) L1806642-03 12/20/24 05:30 • (MS) R4161799-3 12/20/24 05:51

Analyte	Spike Amount ug/l	Original Result ug/l	MS Result ug/l	MS Rec. %	Dilution	Rec. Limits %	MS Qualifier
Phenacetin	50.0	U	46.4	92.8	1	34.0-127	
p-Phenylenediamine	50.0	U	U	0.000	1	60.0-140	J6
Phorate	50.0	U	56.0	112	1	13.0-160	
2-Picoline	50.0	U	13.4	26.8	1	10.0-120	J
Pronamide	50.0	U	44.2	88.4	1	38.0-130	
Safrole	50.0	U	31.5	63.0	1	21.0-120	
Sulfotep	50.0	U	59.4	119	1	52.0-120	
Thionazin	50.0	U	54.5	109	1	38.0-121	
o-Toluidine	50.0	U	11.7	23.4	1	10.0-120	
O,O,O-Triethyl Phosphorothioate	50.0	U	35.0	70.0	1	11.0-135	
1,3,5-Trinitrobenzene	50.0	U	39.0	78.0	1	37.0-147	

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

GLOSSARY OF TERMS

Guide to Reading and Understanding Your Laboratory Report

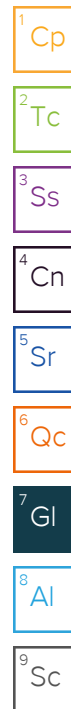
The information below is designed to better explain the various terms used in your report of analytical results from the Laboratory. This is not intended as a comprehensive explanation, and if you have additional questions please contact your project representative.

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

Abbreviations and Definitions

MDL	Method Detection Limit.
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.
J	The identification of the analyte is acceptable; the reported value is an estimate.
J2	Surrogate recovery limits have been exceeded; values are outside lower control limits.
J3	The associated batch QC was outside the established quality control range for precision.
J4	The associated batch QC was outside the established quality control range for accuracy.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
N2	Analyte reported using a calibration and validation based on Azobenzene (CAS 103-33-3). 1,2-Diphenylhydrazine decomposes into Azobenzene during the analysis.
T8	Sample(s) received past/too close to holding time expiration.
U	Below Detectable Limits: Indicates that the analyte was not detected.



ACCREDITATIONS & LOCATIONS

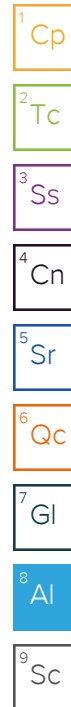
Pace Analytical National 12065 Lebanon Rd Mount Juliet, TN 37122

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

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

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

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



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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 Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301		SP301	
		CMR-SP301-221214		CMR-SP301-221214		CMR-SP301-221214		CMR-DS3-221214	
		10/31/2022		11/30/2022		12/14/2022		12/14/2022	
		22		11		88		---	
		75		20		469		---	
								Field Duplicate	
VOCs	CAS No.	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)	Result (ug/m³)	
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 Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-230531		CMR-SP301-230531		CMR-SP301-290623	
		4/30/2023		5/31/2023		6/29/2023	
		81		75		70	
		533		510		449	
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	275 U	0.00	275 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	2 U	0.00	2 U	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	1 U	0.00	1 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	1 U	0.00	1 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	933 U	0.00	933 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	196 U	0.00	196 U	0.00	4	0.00
1,2-Dibromoethane (EDB)	106-93-4	2 U	0.00	2 U	0.00	2 U	0.00
1,2-Dichlorobenzene	95-50-1	240 U	0.00	240 U	0.00	1 U	0.00
1,2-Dichloroethane	107-06-2	1 U	0.00	1 U	0.00	1 U	0.00
1,2-Dichloropropane	78-87-5	1 U	0.00	1 U	0.00	1 U	0.00
1,3,5-Trimethylbenzene	108-67-8	196 U	0.00	196 U	0.00	2	0.00
1,3-Butadiene	106-99-0	4 U	0.00	4 U	0.00	4 U	0.00
1,3-Dichlorobenzene	541-73-1	240 U	0.00	240 U	0.00	1 U	0.00
1,4-Dichlorobenzene	106-46-7	240 U	0.00	240 U	0.00	1 U	0.00
2-Butanone (MEK)	78-93-3	22	0.00	22	0.00	4 U	0.00
2-Hexanone	591-78-6	5 U	0.00	5 U	0.00	5 U	0.00
2-Propanol	67-63-0	13	0.00	13	0.00	3 U	0.00
4-Ethyltoluene	622-96-8	196 U	0.00	196 U	0.00	1 U	0.00
4-Methyl-2-pentanone (MIBK)	108-10-1	5 U	0.00	5 U	0.00	5 U	0.00
Acetone	67-64-1	3 U	0.00	3 U	0.00	3 U	0.00
Benzene	71-43-2	206	0.03	206	0.03	1 U	0.00
Benzyl chloride	100-44-7	208 U	0.00	208 U	0.00	1 U	0.00
Bromodichloromethane	75-27-4	1 U	0.00	1 U	0.00	1 U	0.00
Bromoform	75-25-2	1,240 U	0.00	1,240 U	0.00	6 U	0.00
Bromomethane	74-83-9	1 U	0.00	1 U	0.00	1 U	0.00
Carbon disulfide	75-15-0	6	0.00	6	0.00	1 U	0.00
Carbon tetrachloride	56-23-5	1 U	0.00	1 U	0.00	1 U	0.00
Chlorobenzene	108-90-7	1 U	0.00	1 U	0.00	1 U	0.00
Chloroethane	75-00-3	1 U	0.00	1 U	0.00	1 U	0.00
Chloroform	67-66-3	1 U	0.00	1 U	0.00	1 U	0.00
Chloromethane	74-87-3	0 U	0.00	0 U	0.00	1	0.00
cis-1,2-Dichloroethene	156-59-2	1 U	0.00	1 U	0.00	1 U	0.00
cis-1,3-Dichloropropene	10061-01-5	1 U	0.00	1 U	0.00	1 U	0.00
Cyclohexane	110-82-7	278	0.05	278	0.04	3,120	0.37
Dibromochloromethane	124-48-1	2 U	0.00	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	3	0.00	3	0.00	2	0.00
Dichlorotetrafluoroethane	76-14-2	1 U	0.00	1 U	0.00	1 U	0.00
Ethanol	64-17-5	60	0.01	60	0.01	13	0.00
Ethyl acetate	141-78-6	-- --	--	-- --	--	-- --	--
Ethylbenzene	100-41-4	173 U	0.00	173 U	0.00	160	0.02
Hexachloro-1,3-butadiene	87-68-3	1,350 U	0.00	1,350 U	0.00	7 U	0.00
m&p-Xylene	179601-23-1	642	0.10	642	0.09	221	0.03
Methylene Chloride	75-09-2	1 U	0.00	1 U	0.00	1 U	0.00
Methyl-tert-butyl ether	1634-04-4	1 U	0.00	1 U	0.00	1 U	0.00
Naphthalene	91-20-3	660 U	0.00	660 U	0.00	3 U	0.00
n-Heptane	142-82-5	11,700	1.90	11,700	1.67	2,920	0.34
n-Hexane	110-54-3	1,700	0.28	1,700	0.24	9,270	1.09
o-Xylene	95-47-6	189	0.03	189	0.03	46	0.01
Propylene	115-07-1	27	0.00	27	0.00	15	0.00
Styrene	100-42-5	170 U	0.00	170 U	0.00	1 U	0.00
Tetrachloroethene	127-18-4	4	0.00	4	0.00	1 U	0.00
Tetrahydrofuran	109-99-9	1 U	0.00	1 U	0.00	1 U	0.00
Toluene	108-88-3	146	0.02	146	0.02	159	0.02
trans-1,2-Dichloroethene	156-60-5	1 U	0.00	1 U	0.00	1 U	0.00
trans-1,3-Dichloropropene	10061-02-6	1 U	0.00	1 U	0.00	1 U	0.00
Trichloroethene	79-01-6	1 U	0.00	1 U	0.00	1 U	0.00
Trichlorofluoromethane	75-69-4	1	0.00	1	0.00	1	0.00
Vinyl acetate	108-05-4	1 U	0.00	1 U	0.00	1 U	0.00
Vinyl chloride	75-01-4	1 U	0.00	1 U	0.00	1 U	0.00
Total VOCs	--	--	2.43	--	2.14	--	1.87
Period Total VOC Mass Removed (lbs)		2.4		2.1		1.9	
Cumulative Total VOC Mass Removed (lbs)		2,878		2,880		2,882	

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

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes		SP301		SP301		SP301	
		CMR-SP301-110723		CMR-SB-301-101223		CMR-SP301-122723	
		7/11/2023		10/12/2023		12/27/2023	
		78		26		41	
		310		238		595	
VOCs	CAS No.	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)	Result (ug/m ³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	22 U	0.00	1 U	0.00	1 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	28 U	0.00	550 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	22 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	31 U	0.00	2	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	16 U	0.00	1 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	16 U	0.00	1 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	93 U	0.00	1,870 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	638	0.06	795	0.02	59	0.01
1,2-Dibromoethane (EDB)	106-93-4	31 U	0.00	2 U	0.00	2 U	0.00
1,2-Dichlorobenzene	95-50-1	24 U	0.00	481 U	0.00	1 U	0.00
1,2-Dichloroethane	107-06-2	16 U	0.00	18	0.00	1 U	0.00
1,2-Dichloropropane	78-87-5	19 U	0.00	1 U	0.00	1 U	0.00
1,3,5-Trimethylbenzene	108-67-8	408	0.04	712	0.02	75	0.01
1,3-Butadiene	106-99-0	89 U	0.00	4 U	0.00	4 U	0.00
1,3-Dichlorobenzene	541-73-1	24 U	0.00	481 U	0.00	1 U	0.00
1,4-Dichlorobenzene	106-46-7	24 U	0.00	481 U	0.00	1 U	0.00
2-Butanone (MEK)	78-93-3	74 U	0.00	81	0.00	11	0.00
2-Hexanone	591-78-6	102 U	0.00	5 U	0.00	5 U	0.00
2-Propanol	67-63-0	62 U	0.00	17	0.00	10	0.00
4-Ethyltoluene	622-96-8	287	0.03	445	0.01	27	0.00
4-Methyl-2-pentanone (MIBK)	108-10-1	102 U	0.00	5 U	0.00	5 U	0.00
Acetone	67-64-1	59 U	0.00	3 U	0.00	3 U	0.00
Benzene	71-43-2	3,550	0.32	25,700	0.59	348	0.03
Benzyl chloride	100-44-7	21 U	0.00	416 U	0.00	1 U	0.00
Bromodichloromethane	75-27-4	27 U	0.00	1 U	0.00	1 U	0.00
Bromoform	75-25-2	124 U	0.00	2,480 U	0.00	6 U	0.00
Bromomethane	74-83-9	16 U	0.00	1 U	0.00	1 U	0.00
Carbon disulfide	75-15-0	12 U	0.00	28	0.00	2	0.00
Carbon tetrachloride	56-23-5	25 U	0.00	1 U	0.00	1 U	0.00
Chlorobenzene	108-90-7	19 U	0.00	287	0.01	1 U	0.00
Chloroethane	75-00-3	11 U	0.00	2	0.00	1 U	0.00
Chloroform	67-66-3	20 U	0.00	1 U	0.00	1 U	0.00
Chloromethane	74-87-3	8 U	0.00	9	0.00	0 U	0.00
cis-1,2-Dichloroethene	156-59-2	16 U	0.00	1 U	0.00	1 U	0.00
cis-1,3-Dichloropropene	10061-01-5	18 U	0.00	1 U	0.00	1 U	0.00
Cyclohexane	110-82-7	6,100	0.55	3,550	0.08	479	0.04
Dibromochloromethane	124-48-1	34 U	0.00	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	20 U	0.00	2	0.00	2	0.00
Dichlorotetrafluoroethane	76-14-2	28 U	0.00	1 U	0.00	1 U	0.00
Ethanol	64-17-5	94 U	0.00	42	0.00	43	0.00
Ethyl acetate	141-78-6	-- --	--	-- --	--	-- --	--
Ethylbenzene	100-41-4	2,310	0.21	1,530	0.04	100	0.01
Hexachloro-1,3-butadiene	87-68-3	135 U	0.00	2,690 U	0.00	7 U	0.00
m&p-Xylene	179601-23-1	7,720	0.70	8,710	0.20	590	0.05
Methylene Chloride	75-09-2	14 U	0.00	1 U	0.00	1 U	0.00
Methyl-tert-butyl ether	1634-04-4	14 U	0.00	1 U	0.00	1 U	0.00
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 Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes	SP301		SP301		SP301		
	CMR-SP301-013124		CMR-SP301-240208		CMR-SP301-240327		
	1/31/2024		2/8/2024		3/27/2024		
	46		143		116		
	558		689		739		
VOCs	CAS No.	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	2 U	0.00	2 U	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	1 U	0.00	1 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	1 U	0.00	1 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	5 U	0.00	5 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	2	0.00	810	0.30	100	0.03
1,2-Dibromoethane (EDB)	106-93-4	2 U	0.00	2 U	0.00	2 U	0.00
1,2-Dichlorobenzene	95-50-1	1 U	0.00	1 U	0.00	1 U	0.00
1,2-Dichloroethane	107-06-2	1 U	0.00	1 U	0.00	1 U	0.00
1,2-Dichloropropane	78-87-5	1 U	0.00	1 U	0.00	1 U	0.00
1,3,5-Trimethylbenzene	108-67-8	1 U	0.00	785	0.29	204	0.07
1,3-Butadiene	106-99-0	4 U	0.00	4 U	0.00	4 U	0.00
1,3-Dichlorobenzene	541-73-1	1 U	0.00	1 U	0.00	1 U	0.00
1,4-Dichlorobenzene	106-46-7	1 U	0.00	1 U	0.00	1 U	0.00
2-Butanone (MEK)	78-93-3	4 U	0.00	4 U	0.00	4 U	0.00
2-Hexanone	591-78-6	5 U	0.00	5 U	0.00	5 U	0.00
2-Propanol	67-63-0	3	0.00	5	0.00	3 U	0.00
4-Ethyltoluene	622-96-8	2	0.00	227	0.08	33	0.01
4-Methyl-2-pentanone (MIBK)	108-10-1	6	0.00	5 U	0.00	5 U	0.00
Acetone	67-64-1	17	0.00	10	0.00	3 U	0.00
Benzene	71-43-2	4	0.00	1,020	0.38	145	0.05
Benzyl chloride	100-44-7	1 U	0.00	1 U	0.00	1 U	0.00
Bromodichloromethane	75-27-4	1 U	0.00	1 U	0.00	1 U	0.00
Bromoform	75-25-2	6 U	0.00	6 U	0.00	6 U	0.00
Bromomethane	74-83-9	1 U	0.00	1 U	0.00	1 U	0.00
Carbon disulfide	75-15-0	1 U	0.00	2	0.00	3	0.00
Carbon tetrachloride	56-23-5	1 U	0.00	1 U	0.00	1 U	0.00
Chlorobenzene	108-90-7	1 U	0.00	1 U	0.00	1 U	0.00
Chloroethane	75-00-3	1 U	0.00	1 U	0.00	1 U	0.00
Chloroform	67-66-3	1 U	0.00	1 U	0.00	1 U	0.00
Chloromethane	74-87-3	1	0.00	0 U	0.00	0	0.00
cis-1,2-Dichloroethene	156-59-2	1 U	0.00	1 U	0.00	1 U	0.00
cis-1,3-Dichloropropene	10061-01-5	1 U	0.00	1 U	0.00	1 U	0.00
Cyclohexane	110-82-7	2	0.00	3,260	1.20	396	0.13
Dibromochloromethane	124-48-1	2 U	0.00	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	2	0.00	1	0.00	2	0.00
Dichlorotetrafluoroethane	76-14-2	1 U	0.00	1 U	0.00	1 U	0.00
Ethanol	64-17-5	17	0.00	8 B	0.00	13	0.00
Ethyl acetate	141-78-6	-- --	--	-- --	--	-- --	--
Ethylbenzene	100-41-4	2	0.00	233	0.09	41	0.01
Hexachloro-1,3-butadiene	87-68-3	7 U	0.00	7 U	0.00	7 U	0.00
m&p-Xylene	179601-23-1	9	0.00	2,990	1.10	299	0.10
Methylene Chloride	75-09-2	1 U	0.00	1 U	0.00	1 U	0.00
Methyl-tert-butyl ether	1634-04-4	1 U	0.00	1 U	0.00	1 U	0.00
Naphthalene	91-20-3	3 U	0.00	3 U	0.00	3 U	0.00
n-Heptane	142-82-5	4	0.00	2,000	0.74	194	0.06
n-Hexane	110-54-3	7	0.00	4,650	1.72	652	0.21
o-Xylene	95-47-6	4	0.00	720	0.27	102	0.03
Propylene	115-07-1	2 U	0.00	10	0.00	7	0.00
Styrene	100-42-5	1 U	0.00	1 U	0.00	1 U	0.00
Tetrachloroethene	127-18-4	1 U	0.00	1 U	0.00	1 U	0.00
Tetrahydrofuran	109-99-9	1 U	0.00	1 U	0.00	1 U	0.00
Toluene	108-88-3	8	0.00	36	0.01	13	0.00
trans-1,2-Dichloroethene	156-60-5	1 U	0.00	1 U	0.00	1 U	0.00
trans-1,3-Dichloropropene	10061-02-6	1 U	0.00	2	0.00	1 U	0.00
Trichloroethene	79-01-6	1 U	0.00	1 U	0.00	1 U	0.00
Trichlorofluoromethane	75-69-4	1	0.00	1 U	0.00	1	0.00
Vinyl acetate	108-05-4	2 U	0.00	2 U	0.00	2 U	0.00
Vinyl chloride	75-01-4	1 U	0.00	1 U	0.00	1 U	0.00
Total VOCs	--	--	0.02	--	6.22	--	0.73
Period Total VOC Mass Removed (lbs)		0.0		6.2		0.7	
Cumulative Total VOC Mass Removed (lbs)		2,888		2,894		2,895	

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

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

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes	SP301		SP301		SP301		
	CMR-SP301-240711		CMR-SP301-240819		CMR-SP301-240924		
	7/11/2024		8/19/2024		9/24/2024		
	84		70		82		
	740		563		690		
VOCs	CAS No.	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	1 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	274	0.06	393 U	0.06	33	0.01
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	290	0.07	393 U	0.06	31	0.01
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	42	0.01	16	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 U	0.00	10	0.00	19	0.00
4-Ethyltoluene	622-96-8	423	0.10	445	0.07	28	0.01
4-Methyl-2-pentanone (MIBK)	108-10-1	5 U	0.00	5 U	0.00	5 U	0.00
Acetone	67-64-1	77	0.02	24	0.00	52	0.01
Benzene	71-43-2	1,190	0.28	955	0.14	428	0.09
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	4	0.00	7	0.00	7	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	1	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	1,330	0.31	2,980	0.44	444	0.09
Dibromochloromethane	124-48-1	2 U	0.00	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	3	0.00	2	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	13	0.00	98	0.01	113	0.02
Ethyl acetate	141-78-6	-- --	--	-- --	--	-- --	--
Ethylbenzene	100-41-4	380	0.09	347 U	0.05	49	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	1,200	0.28	1,610	0.24	185	0.04
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	4	0.00	3 U	0.00	3 U	0.00
n-Heptane	142-82-5	1,300	0.30	1,670	0.25	342	0.07
n-Hexane	110-54-3	3,160	0.74	4,230	0.62	846	0.18
o-Xylene	95-47-6	267	0.06	350	0.05	32	0.01
Propylene	115-07-1	12	0.00	20	0.00	2 U	0.00
Styrene	100-42-5	2 U	0.00	2 U	0.00	21	0.00
Tetrachloroethene	127-18-4	16	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	81	0.02	236	0.03	43	0.01
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	2	0.00	1	0.00	1 U	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	--	--	2.35	--	2.04	--	0.59
Period Total VOC Mass Removed (lbs)		2.4		2.0		0.6	
Cumulative Total VOC Mass Removed (lbs)		2,901		2,903		2,903	

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

Location Ramboll Sample ID Sample Date Blower Flow (scfm) Period Operational Time (hrs) Notes	SP301		SP301		SP301		
	CMR-SP301-241024		CMR-SP301-241120		CMR-SP301-241218		
	10/24/2024		11/20/2024		12/18/2024		
	87		100		123		
	606		462		524		
VOCs	CAS No.	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)	Result (ug/m³)	Mass (lb)
1,1,1-Trichloroethane	71-55-6	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2,2-Tetrachloroethane	79-34-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichloroethane	79-00-5	1 U	0.00	1 U	0.00	1 U	0.00
1,1,2-Trichlorotrifluoroethane	76-13-1	2 U	0.00	2 U	0.00	2 U	0.00
1,1-Dichloroethane	75-34-3	1 U	0.00	1 U	0.00	1 U	0.00
1,1-Dichloroethene	75-35-4	1 U	0.00	1 U	0.00	1 U	0.00
1,2,4-Trichlorobenzene	120-82-1	5 U	0.00	5 U	0.00	5 U	0.00
1,2,4-Trimethylbenzene	95-63-6	29	0.01	3	0.00	29	0.01
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	32	0.01	5	0.00	45	0.01
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	7	0.00	4 U	0.00	9	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 U	0.00	3	0.00	5	0.00
4-Ethyltoluene	622-96-8	13	0.00	1	0.00	1 U	0.00
4-Methyl-2-pentanone (MIBK)	108-10-1	70	0.01	5 U	0.00	5 U	0.00
Acetone	67-64-1	3 U	0.00	3 U	0.00	55	0.01
Benzene	71-43-2	374	0.07	214	0.04	241	0.06
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	7 U	0.00	7 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	1 U	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	1	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	596	0.12	389	0.07	592	0.14
Dibromochloromethane	124-48-1	2 U	0.00	2 U	0.00	2 U	0.00
Dichlorodifluoromethane	75-71-8	2	0.00	2	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	61	0.01	26	0.00	62	0.01
Ethyl acetate	141-78-6	-- --	--	-- --	--	-- --	--
Ethylbenzene	100-41-4	81	0.02	10	0.00	28	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	371	0.07	33	0.01	139	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	3 U	0.00	3 U	0.00	4	0.00
n-Heptane	142-82-5	404	0.08	177	0.03	1 U	0.00
n-Hexane	110-54-3	7,440	1.47	515	0.09	1,040	0.25
o-Xylene	95-47-6	56	0.01	6	0.00	23	0.01
Propylene	115-07-1	9	0.00	4	0.00	2 U	0.00
Styrene	100-42-5	2 U	0.00	2 U	0.00	2 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	29	0.01	2 U	0.00	2 U	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	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 U	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	--	--	1.91	--	0.25	--	0.57
Period Total VOC Mass Removed (lbs)		1.9		0.3		0.6	
Cumulative Total VOC Mass Removed (lbs)		2,905		2,906		2,906	

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. Therefore, these results were rejected.
 4. Sample was not collected during September 2022, therefore results from August 2022 were used for mass removal calculations.
 5. Sample was not collected during October 2022 and November 2022, therefore results from December 2022 were used for mass removal calculations.
 6. Sample collected for April 2023 was received by the lab outside the allowable vacuum range so sample was not analyzed; therefore results from May 2023 were used for mass removal calculations.
 7. Samples were not collected in August and September 2023 due to system shutdown.
 8. Samples were not collected in November 2023 due to system shutdown.
- E: Analyte concentration exceeded the calibration range. The reported result is estimated.
R: Result rejected.
U: The analyte was not detected in the sample at the estimated detection limit.
B: The analyte was found in the associated blank as well as in the sample.

VOCs : Volatile Organic Compounds

ug/m³ : micrograms per cubic meter

Sample Calculation

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

APPENDIX C

HISTORICAL ANALYTICAL RESULTS AND CONTAMINANT MASS REMOVAL - LIQUID

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes	CAS No.	SP200		SP200		SP200		SP200	
		CMR-SP200-211015		CMR-SP200-211208		CMR-SP200-220216		CMR-SP200-220411	
		10/15/2021		12/8/2021		2/16/2022		4/11/2022	
		21,138		43,176		80,754		137,543	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
VOCs									
1,1,1-TRICHLOROETHANE	71-55-6	ND	--	ND	--	ND	--	ND	--
1,1,2,2-TETRACHLOROETHANE	79-34-5	ND	--	ND	--	ND	--	ND	--
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ND	--	ND	--	ND	--	ND	--
1,1,2-TRICHLOROETHANE	79-00-5	ND	--	ND	--	ND	--	ND	--
1,1-DICHLOROETHANE	75-34-3	ND	--	ND	--	ND	--	ND	--
1,1-DICHLOROETHENE	75-35-4	ND	--	ND	--	ND	--	ND	--
1,2,3-TRICHLOROBENZENE	87-61-6	ND	--	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--	ND	--
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	ND	--	ND	--	ND	--	ND	--
1,2-DIBROMOETHANE	106-93-4	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROETHANE	107-06-2	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROPROPANE	78-87-5	ND	--	ND	--	ND	--	ND	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	ND	--	ND	--	ND	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	ND	--	ND	--	ND	--
1,4-DIOXANE	123-91-1	ND	--	ND	--	ND	--	ND	--
2-BUTANONE	78-93-3	ND	--	ND	--	ND	--	ND	--
2-HEXANONE	591-78-6	ND	--	ND	--	ND	--	ND	--
4-METHYL-2-PENTANONE	108-10-1	ND	--	ND	--	ND	--	ND	--
ACETONE	67-64-1	ND	--	ND	--	ND	--	ND	--
BENZENE	71-43-2	2300	0.11	350	0.0333	420	0.0748	540	0.1637
BROMOCHLOROMETHANE	74-97-5	ND	--	ND	--	ND	--	ND	--
BROMODICHLOROMETHANE	75-27-4	ND	--	ND	--	ND	--	ND	--
BROMOFORM	75-25-2	ND	--	ND	--	ND	--	ND	--
BROMOMETHANE	74-83-9	ND	--	ND	--	ND	--	ND	--
CARBON DISULFIDE	75-15-0	ND	--	ND	--	ND	--	ND	--
CARBON TETRACHLORIDE	56-23-5	ND	--	ND	--	ND	--	ND	--
CHLOROBENZENE	108-90-7	ND	--	ND	--	ND	--	ND	--
CHLOROETHANE	75-00-3	ND	--	ND	--	ND	--	ND	--
CHLOROFORM	67-66-3	ND	--	ND	--	ND	--	ND	--
CHLOROMETHANE	74-87-3	ND	--	ND	--	ND	--	ND	--
CIS-1,2-DICHLOROETHENE	156-59-2	ND	--	79	0.01	ND	--	ND	--
CIS-1,3-DICHLOROPROPENE	10061-01-5	ND	--	ND	--	ND	--	ND	--
CUMENE	98-82-8	ND	--	130	0.0124	ND	--	ND	--
CYCLOHEXANE	110-82-7	160	0.01	72	0.01	ND	--	ND	--
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--	ND	--	ND	--
ETHYL BENZENE	100-41-4	1100	0.05	730	0.0695	450	0.0801	590	0.1789
M,P-XYLENE	179601-23-1	5100	0.24	5400	0.51	3200	0.57	3200	0.97
METHYL ACETATE	79-20-9	ND	--	ND	--	ND	--	ND	--
METHYL TERT-BUTYL ETHER	1634-04-4	ND	--	ND	--	ND	--	ND	--
METHYLCYCLOHEXANE	108-87-2	71	0.00	43	0.00	ND	--	ND	--
METHYLENE CHLORIDE	75-09-2	ND	--	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	290	0.01	1500	0.1428	460	0.0819	510	0.1546
ORTHO-XYLENE	95-47-6	1400	0.07	1800	0.17	1100	0.20	960	0.29
STYRENE	100-42-5	ND	--	ND	--	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--	ND	--
TOLUENE	108-88-3	1500	0.07	330	0.03	370	0.07	ND	--
TRANS-1,2-DICHLOROETHENE	156-60-5	ND	--	ND	--	ND	--	ND	--
TRANS-1,3-DICHLOROPROPENE	10061-02-6	ND	--	ND	--	ND	--	ND	--
TRICHLOROETHENE	79-01-6	ND	--	ND	--	ND	--	ND	--
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 Ramboll Sample ID Sample Date Effluent Volume (L)* Notes	CAS No.	SP200		SP200		SP200		SP200	
		CMR-SP200-211015		CMR-SP200-211208		CMR-SP200-220216		CMR-SP200-220411	
		10/15/2021		12/8/2021		2/16/2022		4/11/2022	
		21,138		43,176		80,754		137,543	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
SVOCs									
1,2,4,5-TETRACHLOROBENZENE	95-94-3	ND	--	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	ND	--	ND	--	ND	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	ND	--	ND	--	ND	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	ND	--	ND	--	ND	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ND	--	ND	--	ND	--	ND	--
2,3,4,6-TETRACHLOROPHENOL	58-90-2	ND	--	ND	--	ND	--	ND	--
2,4,5-TRICHLOROPHENOL	95-95-4	ND	--	ND	--	ND	--	ND	--
2,4,6-TRICHLOROPHENOL	88-06-2	ND	--	ND	--	ND	--	ND	--
2,4-DICHLOROPHENOL	120-83-2	ND	--	ND	--	ND	--	ND	--
2,4-DIMETHYLPHENOL	105-67-9	ND	--	ND	--	590	0.1050	270	0.0819
2,4-DINITROPHENOL	51-28-5	ND	--	ND	--	ND	--	ND	--
2,4-DINITROTOLUENE	121-14-2	ND	--	ND	--	ND	--	ND	--
2,6-DINITROTOLUENE	606-20-2	ND	--	ND	--	ND	--	ND	--
2-CHLORONAPHTHALENE	91-58-7	ND	--	ND	--	ND	--	ND	--
2-CHLOROPHENOL	95-57-8	ND	--	ND	--	ND	--	ND	--
2-METHYLNAPHTHALENE	91-57-6	710	0.03	9,700	0.9233	710	0.1264	340	0.1031
2-METHYLPHENOL	95-48-7	ND	--	ND	--	ND	--	ND	--
2-NITROANILINE	88-74-4	ND	--	ND	--	ND	--	ND	--
2-NITROPHENOL	88-75-5	ND	--	ND	--	ND	--	ND	--
3,3'-DICHLOROBENZIDINE	91-94-1	ND	--	ND	--	ND	--	ND	--
3-NITROANILINE	99-09-2	ND	--	ND	--	ND	--	ND	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	--	ND	--	ND	--	ND	--
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	--	ND	--	ND	--	ND	--
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	--	ND	--	ND	--	ND	--
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	--	ND	--	ND	--	ND	--
4-METHYLPHENOL	106-44-5	ND	--	ND	--	ND	--	ND	--
4-NITROANILINE	100-01-6	ND	--	ND	--	ND	--	ND	--
4-NITROPHENOL	100-02-7	ND	--	ND	--	ND	--	ND	--
ACENAPHTHENE	83-32-9	ND	--	ND	--	14	0.0025	ND	--
ACENAPHTHYLENE	208-96-8	38	0.00	ND	--	ND	--	ND	--
ANTHRACENE	120-12-7	ND	--	ND	--	ND	--	ND	--
BENZO(A)ANTHRACENE	56-55-3	ND	--	ND	--	ND	--	ND	--
BENZO(A)PYRENE	50-32-8	ND	--	ND	--	ND	--	ND	--
BENZO(B)FLUORANTHENE	205-99-2	ND	--	ND	--	ND	--	ND	--
BENZO(G,H,I)PERYLENE	191-24-2	ND	--	ND	--	ND	--	ND	--
BENZO(K)FLUORANTHENE	207-08-9	ND	--	ND	--	ND	--	ND	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	--	ND	--	ND	--	ND	--
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	--	ND	--	ND	--	ND	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	--	ND	--	ND	--	ND	--
BUTYLBENZYLPHthalate	85-68-7	ND	--	ND	--	ND	--	ND	--
CARBAZOLE	86-74-8	ND	--	ND	--	ND	--	ND	--
CHRYSENE	218-01-9	ND	--	ND	--	ND	--	ND	--
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	--	ND	--	ND	--	ND	--
DIBENZOFURAN	132-64-9	ND	--	ND	--	ND	--	ND	--
DIETHYLPHthalate	84-66-2	ND	--	ND	--	ND	--	ND	--
DIMETHYLPHthalate	131-11-3	ND	--	ND	--	ND	--	ND	--
DI-N-BUTYLPHthalate	84-74-2	ND	--	ND	--	ND	--	ND	--
DI-N-OCTYLPHthalate	117-84-0	ND	--	ND	--	ND	--	ND	--
FLUORANTHENE	206-44-0	ND	--	ND	--	ND	--	ND	--
FLUORENE	86-73-7	30	0.00	360	0.0343	ND	--	13	0.0039
HEXACHLOROBENZENE	118-74-1	ND	--	ND	--	ND	--	ND	--
HEXACHLOROBUTADIENE	87-68-3	ND	--	ND	--	ND	--	ND	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	--	ND	--	ND	--	ND	--
HEXACHLOROETHANE	67-72-1	ND	--	ND	--	ND	--	ND	--
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	--	ND	--	ND	--	ND	--
ISOPHORONE	78-59-1	ND	--	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	610	0.03	5,800	0.5521	560	0.0997	330	0.1001
NITROBENZENE	98-95-3	ND	--	ND	--	ND	--	ND	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	--	ND	--	ND	--	ND	--
N-NITROSODIPHENYLAMINE	86-30-6	ND	--	ND	--	ND	--	ND	--
PENTACHLOROPHENOL	87-86-5	ND	--	ND	--	ND	--	ND	--
PHENANTHRENE	85-01-8	48	0.00	610	0.0581	53	0.0094	22	0.0067
PHENOL	108-95-2	ND	--	ND	--	ND	--	47	0.01
PYRENE	129-00-0	12	0.00	110	0.0105	7	0.0013	3	0.0010
Total SVOCs	--	--	0.07	--	1.58	--	0.34	--	0.31
Period Total SVOC Mass Removed (lbs)			0.1		1.6		0.3		0.3
Cumulative Total VOC Mass Removed (lbs)			0.1		1.6		2.0		2.3

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

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

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

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

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes	SP200		SP200		SP200		SP200		
	CMR-SP200-220517		CMR-SP200-220617		CMR-SP200-220727		CMR-SP200-220830		
	5/17/2022		6/17/2022		7/27/2022		8/30/2022		
	0		126,978		76,011		31,926		
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
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
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
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
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	--
Period Total SVOC Mass Removed (lbs)				0.0		1.1		0.5	
Cumulative Total VOC Mass Removed (lbs)				2.3		3.4		4.0	

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200	
		CMR-SP200-220517		CMR-SP200-220617		CMR-SP200-220727		CMR-SP200-220830	
		5/17/2022		6/17/2022		7/27/2022		8/30/2022	
		0		126,978		76,011		31,926	
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
EPH									
C11 THROUGH C22 AROMATIC HYDROCARBONS	C11-C22-AROM	740,000	R	--	530,000	148.36	120,000	20.11	--
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	660,000	R	--	37,000	10.36	80,000	13.41	--
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	3,700,000	R	--	240,000	67.18	340,000	56.97	--
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	5,100,000	R	--	810,000	226.75	540,000	90.49	--
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	5,900,000	R	--	670,000	187.56	590,000	98.87	2,550,000
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
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
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
Total VPHs	--	--	0.00	--	8.12	--	1.59	--	4.42
Period Total VPH Mass Removed (lbs)		0.0		8.1		1.6		4.4	
Cumulative Total VPH Mass Removed (lbs)		50.9		59.0		60.6		65.1	

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

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

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes	CAS No.	SP200		SP200		SP200		SP200		SP200	
		CMR-SP200-220830		CMR-SP200-221214		CMR-SP200-221214		CMR-SP200-221214		CMR-DS2-	
		9/30/2022		10/31/2022		11/30/2022		12/14/2022		12/14/2022	
		39,179		4,319		17		159,877		--	
		Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Field Duplicate	
Analyte										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 Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		SP200		SP200
		CMR-SP200-220830		CMR-SP200-221214		CMR-SP200-221214		CMR-SP200-221214		CMR-DS2-
		9/30/2022		10/31/2022		11/30/2022		12/14/2022		12/14/2022
		39,179		4,319		17		159,877		--
										Field Duplicate
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)
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 Ramboll Sample ID Sample Date Effluent Volume (L)* Notes	SP200		SP200		SP200		SP200		
	CMR-SP200-230126		CMR-SP200-230228		CMR-SP200-230321		CMR-SP200-230503		
	1/26/2023		2/28/2023		3/21/2023		5/3/2023		
	88,291		48,336		89,975		127,742		
Notes									
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
VOCs									
1,1,1-TRICHLOROETHANE	71-55-6	ND	--	ND	--	ND	--	ND	--
1,1,2,2-TETRACHLOROETHANE	79-34-5	ND	--	ND	--	ND	--	1.9	0.00
1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-13-1	ND	--	ND	--	ND	--	ND	--
1,1,2-TRICHLOROETHANE	79-00-5	ND	--	ND	--	ND	--	ND	--
1,1-DICHLOROETHANE	75-34-3	ND	--	ND	--	ND	--	ND	--
1,1-DICHLOROETHENE	75-35-4	ND	--	ND	--	ND	--	ND	--
1,2,3-TRICHLOROBENZENE	87-61-6	ND	--	ND	--	ND	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--	ND	--	ND	--
1,2-DIBROMO-3-CHLOROPROPANE	96-12-8	ND	--	ND	--	ND	--	ND	--
1,2-DIBROMOETHANE	106-93-4	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROETHANE	107-06-2	ND	--	ND	--	ND	--	ND	--
1,2-DICHLOROPROPANE	78-87-5	ND	--	ND	--	ND	--	ND	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	ND	--	ND	--	ND	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	ND	--	ND	--	ND	--
1,4-DIOXANE	123-91-1	ND	--	ND	--	ND	--	ND	--
2-BUTANONE	78-93-3	ND	--	ND	--	ND	--	18	0.01
2-HEXANONE	591-78-6	ND	--	ND	--	ND	--	9.8	0.00
4-METHYL-2-PENTANONE	108-10-1	ND	--	ND	--	ND	--	5	0.00
ACETONE	67-64-1	40	0.01	ND	--	ND	--	45	0.01
BENZENE	71-43-2	23	0.0045	6	0.0006	21	0.0042	90	0.0253
BROMOCHLOROMETHANE	74-97-5	ND	--	ND	--	ND	--	ND	--
BROMODICHLOROMETHANE	75-27-4	ND	--	ND	--	ND	--	0.49	0.00
BROMOFORM	75-25-2	5.1	0.00	ND	--	ND	--	ND	--
BROMOMETHANE	74-83-9	ND	--	ND	--	ND	--	ND	--
CARBON DISULFIDE	75-15-0	ND	--	ND	--	ND	--	ND	--
CARBON TETRACHLORIDE	56-23-5	ND	--	ND	--	ND	--	ND	--
CHLOROBENZENE	108-90-7	ND	--	ND	--	ND	--	ND	--
CHLOROETHANE	75-00-3	ND	--	ND	--	ND	--	ND	--
CHLOROFORM	67-66-3	ND	--	ND	--	ND	--	ND	--
CHLOROMETHANE	74-87-3	ND	--	ND	--	ND	--	ND	--
CIS-1,2-DICHLOROETHENE	156-59-2	ND	--	ND	--	ND	--	ND	--
CIS-1,3-DICHLOROPROPENE	10061-01-5	ND	--	ND	--	ND	--	ND	--
CUMENE	98-82-8	15	0.0029	ND	--	ND	--	2.6	0.0007
CYCLOHEXANE	110-82-7	39	0.01	ND	--	ND	--	5.1	0.00
DIBROMOCHLOROMETHANE	124-48-1	ND	--	ND	--	ND	--	ND	--
DICHLORODIFLUOROMETHANE	75-71-8	ND	--	ND	--	ND	--	ND	--
ETHYL BENZENE	100-41-4	34	0.0066	ND	--	37	0.0073	29	0.0082
M,P-XYLENE	179601-23-1	1000	0.19	100	0.01	240	0.05	140	0.04
METHYL ACETATE	79-20-9	ND	--	ND	--	ND	--	ND	--
METHYL TERT-BUTYL ETHER	1634-04-4	ND	--	ND	--	ND	--	ND	--
METHYLCYCLOHEXANE	108-87-2	44	0.01	ND	--	ND	--	4.7	0.00
METHYLENE CHLORIDE	75-09-2	ND	--	ND	--	ND	--	ND	--
NAPHTHALENE	91-20-3	1300	0.2530	130	0.0139	110	0.0218	61	0.0172
ORTHO-XYLENE	95-47-6	310	0.06	48	0.01	81	0.02	40	0.01
STYRENE	100-42-5	ND	--	ND	--	ND	--	1.3	0.00
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	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 Ramboll Sample ID Sample Date Effluent Volume (L)* Notes	CAS No.	SP200		SP200		SP200		SP200	
		CMR-SP200-230126		CMR-SP200-230228		CMR-SP200-230321		CMR-SP200-230503	
		1/26/2023		2/28/2023		3/21/2023		5/3/2023	
		88,291		48,336		89,975		127,742	
Notes									
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
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 Ramboll Sample ID Sample Date Effluent Volume (L)*	SP200		SP200		SP200		SP200		
	CMR-SP200-230126		CMR-SP200-230228		CMR-SP200-230321		CMR-SP200-230503		
	1/26/2023		2/28/2023		3/21/2023		5/3/2023		
	88,291		48,336		89,975		127,742		
Notes									
Analyte	CAS No.	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
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		
Cumulative Total EPH Mass Removed (lbs)			1176.9	1202.5			1315.3		
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		
Cumulative Total VPH Mass Removed (lbs)			128.4	137.6			141.8		

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

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

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

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

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

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

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200	
		CMQ-SP200-101223		CUR-SP200-122723	
		10/12/2023		12/27/2023	
		33,349		54,067	
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 Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200 CMQ-SP200-101223 10/12/2023 33,349		SP200 CUR-SP200-122723 12/27/2023 54,067	
		Result (ug/L)	Mass (lb)	Result (ug/L)	Mass (lb)
Analyte	CAS No.				
SVOCs					
1,2,4,5-TETRACHLOROBENZENE	95-94-3	--	--	ND	--
1,2,4-TRICHLOROBENZENE	120-82-1	ND	--	ND	--
1,2-DICHLOROBENZENE	95-50-1	ND	--	--	--
1,3-DICHLOROBENZENE	541-73-1	ND	--	--	--
1,4-DICHLOROBENZENE	106-46-7	ND	--	--	--
2,2'-OXYBIS(1-CHLOROPROPANE)	108-60-1	ND	--	ND	--
2,3,4,6-TETRACHLOROPHENOL	58-90-2	--	--	ND	--
2,4,5-TRICHLOROPHENOL	95-95-4	--	--	ND	--
2,4,6-TRICHLOROPHENOL	88-06-2	ND	--	ND	--
2,4-DICHLOROPHENOL	120-83-2	ND	--	ND	--
2,4-DIMETHYLPHENOL	105-67-9	ND	--	47	0.0056
2,4-DINITROPHENOL	51-28-5	ND	--	ND	--
2,4-DINITROTOLUENE	121-14-2	ND	--	ND	--
2,6-DINITROTOLUENE	606-20-2	ND	--	ND	--
2-CHLORONAPHTHALENE	91-58-7	ND	--	ND	--
2-CHLOROPHENOL	95-57-8	ND	--	ND	--
2-METHYLNAPHTHALENE	91-57-6	--	--	57	0.0068
2-METHYLPHENOL	95-48-7	--	--	ND	--
2-NITROANILINE	88-74-4	--	--	ND	--
2-NITROPHENOL	88-75-5	ND	--	ND	--
3,3'-DICHLOROBENZIDINE	91-94-1	ND	--	ND	--
3-NITROANILINE	99-09-2	--	--	ND	--
4,6-DINITRO-2-METHYLPHENOL	534-52-1	ND	--	ND	--
4-BROMOPHENYL-PHENYL ETHER	101-55-3	ND	--	ND	--
4-CHLORO-3-METHYLPHENOL	59-50-7	ND	--	ND	--
4-CHLOROPHENYL-PHENYL ETHER	7005-72-3	ND	--	ND	--
4-METHYLPHENOL	106-44-5	--	--	--	--
4-NITROANILINE	100-01-6	--	--	ND	--
4-NITROPHENOL	100-02-7	ND	--	ND	--
ACENAPHTHENE	83-32-9	ND	--	8	0.0010
ACENAPHTHYLENE	208-96-8	ND	--	ND	--
ANTHRACENE	120-12-7	ND	--	ND	--
BENZO(A)ANTHRACENE	56-55-3	ND	--	ND	--
BENZO(A)PYRENE	50-32-8	ND	--	ND	--
BENZO(B)FLUORANTHENE	205-99-2	ND	--	ND	--
BENZO(G,H,I)PERYLENE	191-24-2	ND	--	ND	--
BENZO(K)FLUORANTHENE	207-08-9	ND	--	ND	--
BIS(2-CHLOROETHOXY)METHANE	111-91-1	ND	--	ND	--
BIS(2-CHLOROETHYL) ETHER	111-44-4	ND	--	ND	--
BIS(2-ETHYLHEXYL)PHTHALATE	117-81-7	ND	--	ND	--
BUTYLBENZYLPHTHALATE	85-68-7	ND	--	ND	--
CARBAZOLE	86-74-8	--	--	--	--
CHRYSENE	218-01-9	ND	--	ND	--
DIBENZ(A,H)ANTHRACENE	53-70-3	ND	--	ND	--
DIBENZOFURAN	132-64-9	--	--	ND	--
DIETHYLPHTHALATE	84-66-2	ND	--	ND	--
DIMETHYLPHTHALATE	131-11-3	ND	--	ND	--
DI-N-BUTYLPHTHALATE	84-74-2	ND	--	ND	--
DI-N-OCTYLPHTHALATE	117-84-0	ND	--	ND	--
FLUORANTHENE	206-44-0	ND	--	ND	--
FLUORENE	86-73-7	ND	--	16	0.0019
HEXACHLOROBENZENE	118-74-1	ND	--	ND	--
HEXACHLOROBUTADIENE	87-68-3	ND	--	ND	--
HEXACHLOROCYCLOPENTADIENE	77-47-4	ND	--	ND	--
HEXACHLOROETHANE	67-72-1	ND	--	ND	--
INDENO(1,2,3-CD)PYRENE	193-39-5	ND	--	ND	--
ISOPHORONE	78-59-1	ND	--	ND	--
NAPHTHALENE	91-20-3	7	0.0005	19	0.0023
NITROBENZENE	98-95-3	ND	--	ND	--
N-NITROSO-DI-N-PROPYLAMINE	621-64-7	ND	--	ND	--
N-NITROSODIPHENYLAMINE	86-30-6	ND	--	ND	--
PENTACHLOROPHENOL	87-86-5	ND	--	ND	--
PHENANTHRENE	85-01-8	ND	--	11	0.0013
PHENOL	108-95-2	ND	--	ND	--
PYRENE	129-00-0	ND	--	4	0.0005
Total SVOCs	--	--	0.00054	--	0.019
Period Total SVOC Mass Removed (lbs)		0.00054		0.019	
Cumulative Total VOC Mass Removed (lbs)		13.79		13.81	

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

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

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

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

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

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

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

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

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-240430		CMR-SP200-240522		CMR-SP200-240620	
		4/30/2024		5/22/2024		6/20/2024	
		37,097		342,387		155,891	
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 Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-240430		CMR-SP200-240522		CMR-SP200-240620	
		4/30/2024		5/22/2024		6/20/2024	
		37,097		342,387		155,891	
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	--	--
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 Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		
		CMR-SP200-240430		CMR-SP200-240522		CMR-SP200-240620		
		4/30/2024		5/22/2024		6/20/2024		
		37,097		342,387		155,891		
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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-240711		CMR-SP200-240816		CMR-SP200-240924	
		7/11/2024		8/16/2024		9/24/2024	
		111,401		47,927		73,074	
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	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	11.6	0.0028	2.4	0.0003	4.61	0.0007
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	3.5	0.00	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	2.02	0.0005	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	9.73	0.0024	ND	--	2.06	0.0003
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	--	4.5	0.00	ND	--
NAPHTHALENE	91-20-3	88.5	0.0217	ND	--	12.9	0.0021
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--
STYRENE	100-42-5	ND	--	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--
TOLUENE	108-88-3	ND	--	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	--	--	0.028	--	0.001	--	0.003
Period Total VOC Mass Removed (lbs)			0.028		0.001		0.003
Cumulative Total VOC Mass Removed (lbs)			10.79		10.79		10.80

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-240711		CMR-SP200-240816		CMR-SP200-240924	
		7/11/2024		8/16/2024		9/24/2024	
		111,401		47,927		73,074	
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	--	10.0	0.0011	8.5	0.0014
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	34	0.0083	ND	--	ND	--
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	ND	--	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	12	0.0029	ND	--	ND	--
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	--	26	0.00	ND	--
PHENANTHRENE	85-01-8	11	0.0028	ND	--	4	0.0006
PHENOL	108-95-2	ND	--	ND	--	ND	--
PYRENE	129-00-0	5	0.0011	4	0.00	2	0.00
Total SVOCs	--	--	0.015	--	0.0042	--	0.002
Period Total SVOC Mass Removed (lbs)			0.015		0.0042		0.002
Cumulative Total VOC Mass Removed (lbs)			14.20		14.20		14.21

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		
		CMR-SP200-240711		CMR-SP200-240816		CMR-SP200-240924		
		7/11/2024		8/16/2024		9/24/2024		
		111,401		47,927		73,074		
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	52,100	12.80	38,700	4.09	23,800	3.83	
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	48,300	11.86	35,800	3.78	21,700	3.50	
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	136,000	33.40	97,400	10.29	61,100	9.84	
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	236,000	57.96	172,000	18.17	107,000	17.24	
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	236,000	57.96	172,000	18.17	107,000	17.24	
Total EPHs	--	--	57.96	--	18.17	--	17.24	
Period Total EPH Mass Removed (lbs)		58.0		18.17		17.2		
Cumulative Total EPH Mass Removed (lbs)		2983.1		3001.3		3018.5		
VPH								
BENZENE	71-43-2	--	--	--	--	--	--	
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	1,020	0.25	ND	--	459	0.07	
C9 THROUGH C10 AROMATIC HYDROCARBONS	C09-C10-AROM	16,400	4.03	4,250	0.45	7,970	1.28	
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	37,400	9.19	10,900	1.15	19,000	3.06	
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	54,900	13.48	15,300	1.62	27,400	4.41	
Total VPHs	--	--	13.48	--	1.62	--	4.41	
Period Total VPH Mass Removed (lbs)		13.48		1.62		4.41		
Cumulative Total VPH Mass Removed (lbs)		261.3		262.9		267.3		

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-241024		CMR-SP200-241120		CMR-SP200-241218	
		10/24/2024		11/20/2024		12/18/2024	
		57,247		1,616		42,374	
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	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	1.11	0.0001	ND	--	ND	--
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	--	2.53	0.0000	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	--	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	ND	--	ND	--	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	--	ND	--	ND	--
ORTHO-XYLENE	95-47-6	--	--	--	--	--	--
STYRENE	100-42-5	ND	--	ND	--	ND	--
TETRACHLOROETHENE	127-18-4	ND	--	ND	--	ND	--
TOLUENE	108-88-3	ND	--	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	--	--	0.000	--	0.000	--	0.000
Period Total VOC Mass Removed (lbs)		0.000		0.000		0.000	
Cumulative Total VOC Mass Removed (lbs)		10.80		10.80		10.80	

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200	
		CMR-SP200-241024		CMR-SP200-241120		CMR-SP200-241218	
		10/24/2024		11/20/2024		12/18/2024	
		57,247		1,616		42,374	
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	--	1.8	0.0000	6.9	0.0006
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	ND	--	ND	--	ND	--
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	ND	--	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	ND	--	ND	--	2	0.0002
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	ND	--	ND	--	ND	--
PHENOL	108-95-2	ND	--	ND	--	ND	--
PYRENE	129-00-0	2	0.0003	ND	--	--	--
Total SVOCs	--	--	0.000	--	0.0000	--	0.001
Period Total SVOC Mass Removed (lbs)		0.000		0.0000		0.001	
Cumulative Total VOC Mass Removed (lbs)		14.21		14.21		14.21	

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

Location Ramboll Sample ID Sample Date Effluent Volume (L)* Notes		SP200		SP200		SP200		
		CMR-SP200-241024		CMR-SP200-241120		CMR-SP200-241218		
		10/24/2024		11/20/2024		12/18/2024		
		57,247		1,616		42,374		
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	23,300	2.94	1,350	0.00	5,770	0.54	
C19 THROUGH C36 ALIPHATIC HYDROCARBONS	C19-C36-ALIP	16,400	2.07	1,170	0.00	5,270	0.49	
C9 THROUGH C18 ALIPHATIC HYDROCARBONS	C09-C18-ALIP	44,500	5.62	2,630	0.01	12,300	1.15	
TOTAL EXTRACTABLE HYDROCARBON (POST FRACTIONATION)	68334-30-5S	84,200	10.63	5,150	0.02	23,300	2.18	
TOTAL EXTRACTABLE HYDROCARBON	68334-30-5E	84,200	10.63	5,150	0.02	23,300	2.18	
Total EPHs	--	--	10.63	--	0.02	--	2.18	
Period Total EPH Mass Removed (lbs)		10.6		0.02		2.2		
Cumulative Total EPH Mass Removed (lbs)		3029.1		3029.1		3031.3		
VPH								
BENZENE	71-43-2	--	--	--	--	--	--	
C5 THROUGH C8 ALIPHATIC HYDROCARBONS (ADJUSTED)	C05-C08-ALIP-J	ND	--	ND	--	ND	--	
C9 THROUGH C10 AROMATIC HYDROCARBONS	C09-C10-AROM	982	0.12	ND	--	595	0.06	
C9 THROUGH C12 ALIPHATIC HYDROCARBONS (ADJUSTED)	C09-C12-ALIP-J	2,980	0.38	745	0.00	2,100	0.20	
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	3,970	0.50	1,050	0.00	2,700	0.25	
Total VPHs	--	--	0.50	--	0.00	--	0.25	
Period Total VPH Mass Removed (lbs)		0.50		0.00		0.25		
Cumulative Total VPH Mass Removed (lbs)		267.8		267.8		268.1		

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

Notes:

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

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

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

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

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

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

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

Sample Calculation

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

Abbreviations:

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

APPENDIX D

GROUNDWATER SAMPLING PURGE LOGS



Calumet Montana Refinery, LLC
Great Falls, Montana

Low Flow Groundwater Sampling Field Log

Monitoring Well - MW-41S

Sampling Information

Date (MM/DD/YY) - 12/4/2024
Personnel - Kyle Groves & Ashley Warner
Weather - Clear skies, light breeze, 44 F
Sampling Device - Geotech Peristaltic Pump

Pump on - 1347
Pump off - 1446

Well Information

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

Measured Depth to Bottom - 16.72 ft BTOC
Depth to LNAPL - --- ft BTOC
Depth to Water - 11.08 ft BTOC
Depth to Pump Intake - --- 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
1347	0.0	80	7.01	1.685	---	13.70	39	1.03	---	
1352	0.4	80	7.02	1.529	---	13.00	-37	0.54	---	
1357	0.8	80	7.00	1.430	---	13.10	-69	0.38	---	
1402	1.2	80	7.02	1.385	---	13.00	-80	0.24	---	
1407	1.4	80	7.02	1.313	---	13.00	-84	0.18	---	
1408	1.48	80	7.02	1.31	---	13.10	-84	0.20	---	

Notes / Sample Information

Appearance at Start - ---
Appearance After Purging - ---

Total Volume Purged - 1.5 L
Purge Rate - 80 ml/min

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

Sample ID - CMR-MW-41S-241204
Sample Time - 1408

Additional Sample - None
Additional Sample ID - ---

SVOCs (8270);
EPH (Montana EPH)

Equipment Information

Multi-Gas Meter / PID # - NA
Water Quality Meter # - 18M102986

Oil / Water Interface Probe # - NA
Peristaltic Pump # - NA

Notes Water meter not reading SC accurate enough to calibrate.



Calumet Montana Refinery, LLC
Great Falls, Montana

Low Flow Groundwater Sampling Field Log

Monitoring Well - MW-105

Sampling Information

Date (MM/DD/YY) - 12/5/2024
Personnel - Kyle Groves & Ashley Warner
Weather - Clear, 40 F
Sampling Device - Geotech Peristaltic Pump

Pump on - 923
Pump off - 1042

Well Information

Well Casing PID - -- ppm
Well Diameter - 2 inch
Screened Zone - 5 - 10 ft BGS

Measured Depth to Bottom - 9.80 ft BTOC
Depth to LNAPL - --- ft BTOC
Depth to Water - 5.59 ft BTOC
Depth to Pump Intake - --- 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
923	0.0	80	5.54	1.682	---	12.80	232	1.79	5.95	
928	0.4	80	7.15	1.686	---	12.20	99	0.31	6.10	
933	0.8	80	7.16	1.683	---	12.00	59	0.60	6.30	
933	1.2	80	7.19	1.680	---	12.10	42	0.60	6.59	
943	1.6	80	7.20	1.68	---	12.20	40	0.64	6.83	

Notes / Sample Information

Appearance at Start - ---
Appearance After Purging - ---

Sample ID - CMW-MW105-241205
Sample Time - 943

Total Volume Purged - 1.6 L
Purge Rate - 80 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 # - 18M102986

Oil / Water Interface Probe # - NA
Peristaltic Pump # - NA

Notes Water meter not reading SC accurate enough to calibrate.
Water ran out for sampling w/ 2 of the 17 bottles partial or not filled.
The bottle w/ no water was for total Fe/Mn.



Calumet Montana Refinery, LLC
Great Falls, Montana

Low Flow Groundwater Sampling Field Log

Monitoring Well - MW-106

Sampling Information

Date (MM/DD/YY) - 12/4/2024
Personnel - Kyle Groves & Ashley Warner
Weather - Clear, breezy, 44 F
Sampling Device - Geotech Peristaltic Pump

Pump on - 1501
Pump off - 1513

Well Information

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

Measured Depth to Bottom - 12.39 ft BTOC
Depth to LNAPL - --- ft BTOC
Depth to Water - 5.39 ft BTOC
Depth to Pump Intake - --- 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
1501	0.0	80	7.22	1.515	---	12.90	-72	1.20	5.39	
1506	0.4	80	7.25	1.557	---	12.20	-85	0.31	5.61	
1511	0.8	80	7.27	1.558	---	12.30	-92	0.15	5.71	
1513	0.96	80	7.28	1.56	---	12.50	-97	0.15	---	

Notes / Sample Information

Appearance at Start - ---
Appearance After Purging - ---

Sample ID - CMR-MW106-241204
Sample Time - 1513

Total Volume Purged - 1.0 L
Purge Rate - 80 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 # - 18M102986

Oil / Water Interface Probe # - NA
Peristaltic Pump # - NA

Notes Water meter not reading SC accurate enough to calibrate.

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- For an additional fee, and with a proper endorsement on the mailpiece, you may request the following services:
 - Return receipt service, which provides a record of delivery (including the recipient's signature). You can request a hardcopy return receipt or an electronic version. For a hardcopy return receipt, complete PS Form 3811, *Domestic Return Receipt*; attach PS Form 3811 to your mailpiece;
- To ensure that your Certified Mail receipt is accepted as legal proof of mailing, it should bear a USPS postmark. If you would like a postmark on this Certified Mail receipt, please present your Certified Mail item at a Post Office™ for postmarking. If you don't need a postmark on this Certified Mail receipt, detach the barcoded portion of this label, affix it to the mailpiece, apply appropriate postage, and deposit the mailpiece.

IMPORTANT: Save this receipt for your records.

SENDER: COMPLETE THIS SECTION

- ☐ Complete items 1, 2, and 3.
- ☒ Print your name and address on the reverse so that we can return the card to you.
- ☒ Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

Wally Jemmings - Haz Waste Spec.
MT DEQ Waste Management Bureau
1520 E 6th Avenue
Helena, MT 59601



9590 9402 8688 3310 5216 67

2. Article Number (Transfer from service label)

9589 0710 5270 1484 5662 70

COMPLETE THIS SECTION ON DELIVERY

A. Signature

Support Staff

☒ *Amanda Henderson*

☐ Agent
☐ Addressee

B. Received by (Printed Name)

Amanda Henderson

C. Date of Delivery

2-18-25

D. Is delivery address different from item 1? ☐ Yes ☒ No
If YES, enter delivery address below:

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☒ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☒ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

Mail

Mail Restricted Delivery

USPS TRACKING #



9590 9402 8688 3310 5216 67

United States
Postal Service

First-Class Mail
Postage & Fees Paid
USPS
Permit No. G-10

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

2025-0213 CMR AOC-14 IM 4th Qtr. 2024
Monitoring Report #12