SUBMITTED TO:
Alaska DOT&PF
2301 Peger Road
Fairbanks, AK 99709

BY:
Shannon & Wilson, Inc.
2355 Hill Road
Fairbanks, AK 99709

(907) 479-0600
www.shannonwilson.com

FINAL

REPORT

Nenana Maintenance Station 2021 Groundwater Monitoring

NENANA, ALASKA

SHANNON & WILSON

December 2021

Shannon & Wilson No: 31-1-11729-064

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Submitted To: Alaska DOT&PF
2301 Peger Road
Fairbanks, AK 99709
Attn: Sam Myers & Daniel Adamczak, P.E.

Subject: FINAL REPORT, NENANA MAINTENANCE STATION
2021 GROUNDWATER MONITORING, NENANA, ALASKA

Shannon & Wilson participated in this project as a contractor to the Alaska Department of Transportation and Public Facilities. Our scope of services was approved under NTP 15f and 16e, Amendment 31, dated May 24, 2021 to contract 025-4-1-015.

We appreciate the opportunity to be of service to you on this project. If you have questions concerning this report, or we may be of further service, please contact us.

Sincerely,

SHANNON & WILSON, INC.

Tiffany Green
Environmental Scientist

TXG:MSL/txg

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ACRONYMS

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
DOT&PF	Alaska Department of Transportation & Public Facilities
bgs	below ground surface
°C	degrees Celsius
CAFO	Consent Agreement and Final Order
COC	chain of custody
COPC	contaminant of potential concern
CSM	conceptual site model
CUL	cleanup level
DQO	data quality objective
DRO	diesel range organic
EPA	Environmental Protection Agency
GAC	granular activated carbon
GWP	Generic Work Plan
GRO	gasoline range organic
IW	injection well
LCS	laboratory control sample
LCSD	laboratory control sample duplicate
LOQ	limit of quantitation
mg/L	milligrams per liter
MS	matrix spike
MSD	matrix spike duplicate
M&O	Maintenance and Operations
QA	quality assurance
QC	quality control
RRO	residual range organic
RPD	relative percent difference
SGS	SGS Environmental Services, Inc.
VOC	volatile organic compound
WO	Work Order

1 INTRODUCTION

Exhibit 1-1: Site Information

Site Information	
Facility Name	Nenana Maintenance Station
Facility Owner	DOT&PF, 2301 Peger Road, Fairbanks, Alaska 99709
Physical Location/Address	Northeast corner of Sixth and D Streets in Nenana, Alaska
Contaminated Sites Program File Number	110.38.012
Number of IWs	2
IW Label & Status	NE-IW-1 (removed in 2016), NE-IW-2 (closed in-place in 2016)
Qualified Environmental Professionals (18 AAC 75.333[b] and 18 AAC 78.088[b])	Tiffany Green, Dana Fjare
Field Work Dates	August 17, 2021 to August 18, 2021

This report summarizes site characterization activities following the closure of two motor vehicle waste disposal wells, otherwise known as Class V injection wells (IWs), at the Alaska Department of Transportation and Public Facilities (DOT&PF) Nenana Maintenance Station in Nenana, Alaska (Figure 1). The injection wells were closed in 2016 and site characterization was completed in 2017 with additional groundwater monitoring activities in 2018. We performed 2021 groundwater sampling activities at the Nenana Maintenance Station consistent with the DOT&PF's previously submitted *Generic Work Plan (GWP) ADOT&PF Maintenance Station, Various Sites, Alaska*, the *GWP Addendum 049-NE21-6 Nenana Maintenance Station 2021 Groundwater Monitoring*, and the Alaska Department of Environmental Conservation's (ADEC's) October 2019 *Field Sampling Guidance* document. This work is a continuation of injection-well-related site characterization summarized in:

- *GWP Addendum 001-NE-1 Nenana Maintenance Station Injection Well Closure REV01*, dated April 2016;
- *Nenana Maintenance Station Injection Well Closure Report*, dated February 2017;
- *GWP Addendum 020-NE17-2 REV01 Nenana Maintenance Station Site Characterization*, dated September 2017;
- *Nenana Maintenance Station Injection Well Site Characterization Report FINAL*, dated October 2018;
- *GWP Addendum 028-NE18-3 Nenana Maintenance Station Additional Site Characterization*, dated November 2018;
- *Nenana Maintenance Station Additional Site Characterization*, dated April 2019.

- *GWP Addendum 036-NE19-4 FINAL Nenana Maintenance Station 2019 Groundwater Monitoring*, dated August 2019;
- *Nenana Maintenance Station 2019 Groundwater Monitoring Report*, dated May 2020;
- *GWP Addendum 041-NE20-5 FINAL Nenana Maintenance Station 2020;* and,
- *Nenana Maintenance Station 2020 Groundwater Monitoring Report*, dated April 2021.

1.1 Purpose and Scope of Services

In September 2013, the U.S. Environmental Protection Agency (EPA) issued a Consent Agreement and Final Order (CAFO) to the DOT&PF, Northern Region, requiring them to close Underground Injection Control Class-V IWs at their facilities. In 2016, the DOT&PF submitted their GWP, *DOT&PF Maintenance Stations, Various Sites, Alaska*, to the EPA in response to the CAFO. The GWP describes the IW removal techniques and investigative and sampling strategies to be employed at IW sites.

DOT&PF received conditional closure approval from the EPA on May 30, 2017, with the condition that DOT&PF work with ADEC to address contamination that remains in the ground near the former NE-IW-1 and assess soil and groundwater near the former NE-IW-2 (Figure 2). We submitted an addendum to the GWP, *049-NE21-6 FINAL Nenana Maintenance Station 2021 Groundwater Monitoring*, dated August 2021, outlining groundwater sampling activities at the Nenana Maintenance Station.

We sampled groundwater from three existing monitoring wells and installed one new monitoring well downgradient from the former injection well NE-IW-2 in order to determine if contaminants of potential concern (COPCs) are present at the property boundary or near former NE-IW-2 location. This report summarizes our 2021 groundwater and soil sampling activities.

1.2 Alaska Department of Environmental Conservation Contaminated Sites Database

The Nenana Maintenance Station is listed in the ADEC's Contaminated Sites Database as "Active" (File No. 110.38.012, Hazard ID No. 26544) due to the contamination identified at NE-IW-1 and NE-IW-2.

1.3 Background

The Nenana Maintenance Station previously had two IWs, designated NE-IW-1 and NE-IW-2. Both IWs received floor-drain effluent from the Maintenance & Operations (M&O) Shop. In July 2016, Shannon & Wilson observed the partial removal of the NE-IW-1 piping and

structure and discovered NE-IW-2 during the process. The shallow depth to groundwater (3.5 feet) and unstable excavation inhibited the full removal of the NE-IW-1 piping and wooden crib, which is believed to have collapsed prior to the closure activities. NE-IW-2 was closed in-place and backfilled with concrete due to its proximity to the M&O Shop foundation, and sampling activities were limited due to the presence of groundwater.

A new floor-drain effluent system, reviewed and approved by ADEC's wastewater division, was installed during summer 2016. The new system routes floor-drain effluent to a sump, through a below-grade oil-water separator, and then to the City of Nenana sewer system. Sanitary waste from the M&O Shop is also discharged to the City sewer system.

During 2016 closure activities, Shannon & Wilson collected 15 analytical samples related to NE-IW-1 and 6 analytical samples related to NE-IW-2 (Figure 5). In general, samples collected from the limits of NE-IW-1 excavation and related piping did not contain analytes exceeding ADEC cleanup levels, except for sample NE-IWE-2 taken from the south sidewall at a depth of approximately 3.5 feet below ground surface (bgs). NE-IW-2 had exceedances for diesel range organics (DRO), residual range organics (RRO), and arsenic. We collected an injection-well contents sample from NE-IW-2; we were unable to collect additional analytical samples in the vicinity of NE-IW-2 due to the shallow depth to groundwater at the time of excavation. Injection well NE-IW-2 contents were removed and disposed of in accordance with Federal, State, and Local Regulations, and the injection well was filled with concrete. Approximately 17 cubic yards of contaminated soil and IW-related debris associated with NE-IW-1 was removed and disposed of by NRC Alaska in September 2016.

In October 2017, we conducted a site characterization to assess contamination remaining after the IW removal. Five soil borings were advanced to 15 feet bgs downgradient from the former IWs. One monitoring well, NE-MW17-1, was installed to the west of former NE-IW-2 and three temporary well points were installed downgradient from the former NE-IW-1. DRO were detected above soil cleanup levels in a boring to the west of NE-IW-1 at 6.9 to 7.8 feet bgs. A water sample from a temporary well point north of NE-IW-1 had a DRO detection of 4.06 milligrams per liter (mg/L), above the ADEC cleanup level, and a sample from the monitoring well west from NE-IW-2 contained DRO at a concentration less than ADEC cleanup levels.

We conducted additional site characterization activities in December 2018 to further assess soil and groundwater contamination after the IW removal. Five soil borings were advanced to 15 feet bgs, downgradient from the former IWs. One of the borings was finished as a temporary well point and two as monitoring wells. Analytical soil and groundwater samples results were either non-detect or the sample results had detections for the project COPCs at concentrations less than the ADEC Cleanup Levels (CULs), with the exception of

arsenic in the soil samples. We believe the levels of arsenic detected in project samples is consistent with background levels, based on a 1988 United States Geological Survey examination of metal concentrations in soil samples throughout Alaska.

Based on our additional site characterization activities in December 2018, we concluded that the use of injection wells NE-IW-1 and NE-IW-2 resulted in a limited impact to soils and groundwater immediately surrounding each IW and contamination does not appear to be migrating off-site.

We continued groundwater monitoring in September 2019 with samples from the three onsite monitoring wells. A sample collected from monitoring well NE-MW17-1, installed near the former NE-IW-2 location, contained a concentration of DRO that exceeded the ADEC CUL (2.43 mg/L). Samples collected from monitoring wells NE-MW18-2 and NE-MW18-3 did not contain detectable concentrations of contaminants of concern.

Additional groundwater monitoring was performed in August 2020 with samples from the three onsite monitoring wells. Samples collected from monitoring well NE-MW17-1 contained concentrations of DRO (2.53 mg/L) and RRO (1.29 J* mg/L) that exceeded their respective ADEC CULs. Samples collected from monitoring wells NE-MW18-2 and NE-MW18-3 did not contain detectable concentrations of contaminants of concern.

2 SITE CHARACTERIZATION ACTIVITIES

2.1 Soil Boring

On August 17, 2021 we worked with Discovery Drilling to advance one soil boring using direct push technology (Figure 3).

- NE21-SB-1 was advanced approximately 40 feet west of NE-IW-2 to a depth of 14 feet bgs.

The boring log is presented in Figure 6. Soil color observed in the boring consisted of brown, gray, gray-brown, and yellow-brown. Soil gradation was comprised of various gradations of sand, gravel, and silt. Groundwater in the boring was observed at 7 feet bgs. No seasonally frozen soil or permafrost was encountered.

We collected PID field-screening samples from every 5-foot depth interval; readings were less than 20 ppm in all field-screening samples. We collected one analytical sample and a duplicate, in accordance with the GWP Addendum.

2.2 Monitoring Well

We subcontracted Discovery Drilling to install one monitoring well downgradient of the former NE-IW-2 location. The monitoring well was completed to a depth of 14 feet bgs with a 10-foot screen interval. The monitoring well was installed in general accordance with the GWP Section 4.5.1.

2.3 Monitoring Well Development

The monitoring well was developed on August 18, 2021. We recorded depth to water before and after development as well as periodic turbidity assessments. The monitoring well was purged with a Waterra Hydrolift 2 inertial pump for approximately 1.5 hours until turbidity decreased. The tubing was moved approximately one foot at a time in order to develop the full screen length. The monitoring well development log is presented in Appendix D.

2.4 Groundwater Sampling

On August 18, we sampled the three existing monitoring wells and the newly installed monitoring well in the area of former NE-IW-1 and NE-IW-2 using the procedure as described in Section 4.5 of the GWP. We purged each well for 20 to 30 minutes, recording parameters (temperature, dissolved oxygen, conductivity, pH, oxidation-reduction potential, and water clarity observations) every three minutes. Parameters stabilized in NE-MW21-4 and NE-MW18-3, and three well volumes were purged from NE-MW17-1 and NE-MW18-2 prior to sampling. In addition, we recorded the depth to groundwater prior to purge and sampling, measurements of the well casing and monument relative to the ground surface, total volume of water purged, and odor, color, sheen, or other apparent groundwater characteristics. We collected five groundwater samples in total, including a duplicate sample at monitoring well NE-MW17-1.

- *NE-MW17-1* and duplicate *NE-MW17-101*, from monitoring well NE-MW17-1 located approximately 10 feet downgradient from the former NE-IW-2, screened at a depth of 5.3 feet to 15.0 feet bgs.
- *NE-MW18-2*, from monitoring well NE-MW18-2 located along the west fence line downgradient from the former NE-IW-1, screened at a depth 6.8 feet to 16.6 feet bgs.
- *NE-MW18-3*, from monitoring well NE-MW18-2 located near the northwest fence corner, screened at a depth of 7.1 feet to 16.9 feet bgs.
- *NE-MW21-4*, from monitoring well NE-MW21-4 located along the west fence line downgradient from the former NE-IW-2, screened at a depth 4.7 feet to 14.8 feet bgs.

Results of groundwater analytical samples collected at the Nenana Maintenance Station are presented in Table 2 and Figure 3. See Appendix A for project photographs.

2.5 Investigation Derived Waste Management

Soil cuttings were spread onsite near the newly installed monitoring well, as the PID readings were all less than 20 ppm.

Purge water from each monitoring well was collected in 5-gallon buckets prior to disposal through our portable granulated activated carbon (GAC) unit. There was no sheen or odor observed from the monitoring well purge water collected during this field effort. Monitoring well purge water treated through the portable GAC unit was discharged to the ground onsite near the respective monitoring well location.

2.6 Deviations from the Work Plan

There were no deviations from the work plan.

3 ANALYTICAL RESULTS

3.1 Cleanup Levels

Results from groundwater samples (DRO, RRO, gasoline range organics [GRO], and volatile organic compounds [VOCs]) were compared to ADEC groundwater CULs (Table C, Groundwater Cleanup Levels, 18 AAC 75.345). Results from soil samples (DRO, RRO, GRO, and VOCs) were compared to ADEC migration to groundwater CULs (Table B1 Method Two - Soil Cleanup Levels Table, 18 AAC 75.341).

3.2 Monitoring Wells

The sample *NE-MW17-1* and its duplicate *NE-MW17-101* contained DRO at concentrations not exceeding the ADEC CUL (1.49 mg/L; Table 2). In addition, RRO was detected at a concentration not exceeding the ADEC CUL (0.604 mg/L) in the duplicate and parent sample. Dichlorodifluoromethane and trichlorofluoromethane were also detected in sample *NE-MW17-1* and its duplicate *NE-MW17-101* at concentrations not exceeding respective ADEC CULs. Sample *NE-MW21-4* contained a concentration of dichlorodifluoromethane not exceeding the ADEC CULs. There were no other analytes detected above ADEC CULs in the groundwater samples.

3.3 Soil Boring

The sample *NE21-SB-1* and its duplicate NE21-SB-101 did not contain detectable concentrations of COPCs.

4 QUALITY ASSURANCE/QUALITY CONTROL

Quality assurance (QA) and quality control (QC) procedures assist in producing data of acceptable quality and reliability. We reviewed the analytical results provided by SGS Environmental Services, Inc. (SGS) for laboratory QC samples and conducted our own QA assessment for this project. We reviewed chain of custody (COC) records and laboratory sample-receipt forms to check that we followed proper custody procedures, met sample holding times, and kept samples properly chilled (between 0 degrees Celsius [ºC] and 6 ºC) until analysis. Our QA review procedures allow us to document accuracy and precision of the analytical data and check that analyses were sufficiently sensitive to detect analytes below regulatory standards.

For this report, we reviewed the groundwater report for SGS work order (WO) 1215320 and the soil report for SGS WO 1215323. The SGS laboratory report includes the case narrative, sample-receipt forms, and the ADEC Laboratory Data Review Checklist, included in Appendix C. Our field notes are provided in Appendix D. Details regarding our QA analysis are presented below.

4.1 Sample Handling

We hand-delivered two coolers containing samples from WO 1209601 and 1215323 respectively to the SGS Fairbanks sample-receiving facility on August 19, 2021. The coolers contained a temperature blank to measure whether samples were kept appropriately cold as well as a trip blank. SGS shipped the samples to their Anchorage laboratory to perform analyses by methods specified on the COC records, receiving the WO on August 20, 2021. SGS personnel measured the temperature blanks at the time that samples arrived at their facilities; the temperature blanks were within the proper temperature range upon submittal in Fairbanks and arrival at the SGS laboratory in Anchorage.

4.2 Analytical Sensitivity

We compared soil-sample and groundwater-sample limits of quantitation (LOQs) to ADEC soil-cleanup levels and groundwater-cleanup levels. LOQs were below ADEC-established

cleanup levels, where applicable, with exceptions highlighted in bold in the analytical results tables.

We submitted a trip blank with our water samples and with our soil samples to be analyzed for volatile constituents to determine if cross-contamination among samples or contamination from an outside source may have occurred during shipment or storage. Volatile constituents include GRO and VOCs. The project analytes were not detected in any of the trip blanks. In addition, the laboratory runs a method blank with each sample batch to detect analyte carryover during analysis. RRO were detected in the method blank associated with sample *NE-MW21-4*; however, RRO were not detected in the associated sample and the sample result is considered unaffected. GRO were also detected in the method blank associated with the soil samples; however, GRO were not detected in any of the soil samples and the sample results are considered unaffected. Other analytes were not detected above the LOQ in any of the method blanks.

4.3 Accuracy

The laboratory assessed the accuracy of its analytical procedures by analyzing laboratory control samples (LCS) and LCS duplicates (LCSD). LCS/LCSD analysis allows the laboratory to evaluate their ability to recover analytes added at a known concentration to clean aqueous matrices. LCS/LCSD samples were reported for GRO, DRO, RRO, and VOCs. Laboratory accuracy was also measured for each sample by assessing the recovery of analyte surrogates added to individual project samples. Finally, the accuracy of laboratory methods in the sample matrix was measured using a matrix spike (MS) and matrix spike duplicate (MSD), the addition of a known concentration of analyte to a field sample. Failures in MS/MSD detection accuracy or precision only affect data in the associated matrix parent sample.

Recovery of the SW8260D surrogate 4-bromofluorobenzene was grossly low in the MS/MSD samples reported with preparation batch VXX37713; however, the field sample from which the MS and MSD samples were spiked is not included with this work order. Potential matrix effects impacting method recovery are not applicable to the reported project samples.

The EPA method 8260D LCSD reported with preparatory batch VXX37741 exhibited low recovery for methylene chloride. Project samples *NE-MW17-1*, *NE-MW17-101*, *NE-MW18-3*, *NE-MW21-4*, and Trip Blank are associated with preparatory batch VXX37741. Methyl chloride was not detected in any of the associated samples. These samples may be affected by low method recovery for methylene chloride. The non-detect methylene chloride results of samples *NE-MW17-1*, *NE-MW17-101*, *NE-MW18-3*, and *NE-MW21-4* are considered estimated and flagged 'UJ' for reporting purposes.

The remaining LCS/LCSD, surrogate, and MS/MSD recovery was acceptable in the work order.

4.4 Precision

We collected *NE-MW17-101* as a field duplicate groundwater sample of *NE-MW17-1* and *NE21-SB-101* as a field duplicate soil sample of *NE21-SB-1*. To evaluate data precision and reproducibility of our sampling techniques, we calculated the relative percent difference (RPD) between the field-duplicate results. RPD is defined as the difference between the sample and its duplicate divided by the mean of the two. We can only evaluate RPDs if the results of the analysis for both the sample and its duplicate are greater than the LOQs for a given analyte.

The groundwater duplicate pair *NE-MW17-1*/*NE-MW17-101* was within acceptable data quality objective (DQO) limit of 30% for all analytes, where calculable. The soil duplicate pair *NE21-SB-1*/ *NE21-SB-101* was within acceptable DQO limit of 50% for all analytes, where calculable.

We also used RPD calculations to evaluate laboratory analytical precision. The LCS/LCSDs provide information regarding the reproducibility of laboratory procedures and are therefore a measure of the laboratory's analytical precision. MS/MSDs provide information regarding the reproducibility of laboratory procedures in the sample matrix (soil or groundwater), and therefore measure analytical precision in the field samples.

The relative precision demonstrated between the methylene chloride recoveries of the EPA method 8260D LCS and LCSD reported with preparation batch VXX37741 did not meet acceptance criteria. The results were previously flagged due to a surrogate recovery failure.

The RPD results for the remaining LCS/LCSDs and MS/MSDs were within laboratory control limits, where calculable.

4.5 Data Quality Summary

By working in accordance with our proposed scope of services, we consider the samples we collected to be representative of site conditions at the locations and times they were obtained. Based on our QA review, no samples were rejected as unusable due to QC failures. For this project, the quality of the analytical data does not appear to have been compromised, and those results affected by QC anomalies are qualified with appropriate flags by Shannon & Wilson.

4.6 Conceptual Site Model

The release mechanism for floor-drain effluent from NE-IW-1 and NE-IW-2 was direct discharge to subsurface soil (greater than 2 feet bgs) and groundwater. DRO and RRO are the contaminants of concern in soil and groundwater at the Nenana Maintenance Station based on analytical sampling. Arsenic has been detected at concentrations exceeding ADEC CULs; however, we believe the concentrations of arsenic are attributable to background concentrations in the Nenana area. We identified incidental soil ingestion, dermal absorption of soil contaminants, and ingestion of groundwater as potential exposure pathways.

Groundwater flow direction was to the west in our December 2018 groundwater gradient survey, though this could change at different times of the year. In addition, the gradient is relatively flat which suggests that it may be difficult to predict which direction water will flow throughout the year. The site is within an ADEC drinking water protection area because the Nenana municipal water-supply well is approximately 1,500 feet northwest of the site (Figure 1). To the west of the Nenana Maintenance Station is a community park, and the nearest potential off-site, downgradient residential receptor is approximately 250 feet northwest. Drinking-water wells may be present downgradient of the Nenana Maintenance Station site; however, the area is also served by the Nenana municipal water system.

We believe that the risk to off-site receptors from contamination related to the former IWs is low based on the results of our December 2018 and August 2021 soil and groundwater sampling and 2019 and 2020 groundwater sampling efforts. COPCs have primarily been detected in monitoring well NE-MW17-1, adjacent to NE-IW-2, in project samples from 2017 through 2021 with concentrations exceeding ADEC CULs in 2019 and 2020 project samples. COPCs were not detected in samples from monitoring wells downgradient from the former IW locations.

The conceptual site model (CSM) scoping and graphic forms for the Nenana Maintenance Station are included in Appendix B.

5 DISCUSSION

The groundwater samples collected from monitoring wells NE-MW18-2 and NE-MW18-3, located at the west and north property boundaries, did not contain analytes at concentrations exceeding respective LOQs. A sample and duplicate sample collected from NE-MW17-1 contained DRO at a concentration not exceeding the ADEC CUL (downgradient from the former NE-IW-2 location) as well as RRO at a concentration not

exceeding the ADEC CUL. The VOCs dichlorodifluoromethane and trichlorofluoromethane were also detected at concentrations not exceeding the respective ADEC CULs in the sample and duplicate sample from NE-MW17-1 as well as the sample from NE-MW21-4.

In 2017 and 2018, samples collected from NE-MW17-1 contained DRO, dichlorodifluoromethane, and trichlorofluoromethane at concentrations not exceeding ADEC CULs (Table 3). In 2019, detected analytes remained the same; however, DRO was detected above the ADEC CUL in both the parent and duplicate samples. In 2020, detected analytes remained the same except the detection of RRO; DRO concentrations remained above ADEC CULs. RRO was detected in both the parent and duplicate samples, however, the duplicate contained concentrations above the ADEC CUL.

The groundwater gradient was determined to be to the west-northwest during our December 2018 field effort. We believe the risk to offsite receptors is low based on analytical results from the monitoring wells at the property boundary. In addition, the area is served by City of Nenana municipal water system, though connection status of surrounding properties is unknown.

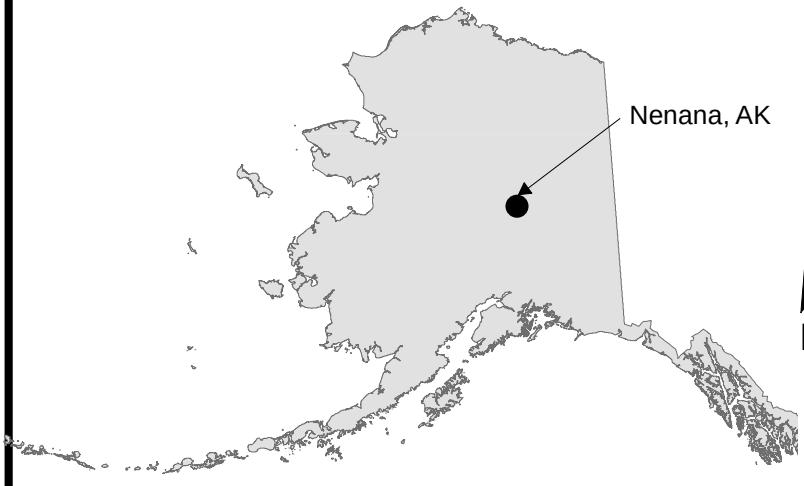
6 CONCLUSION & RECOMMENDATIONS

Our injection well closure investigation, subsequent site characterizations, and continued groundwater monitoring found that the use of injection wells NE-IW-1 and NE-IW-2 resulted in a limited impact to the groundwater and soils immediately surrounding each IW.

We recommend additional sampling of the four on-site monitoring wells in spring or summer of 2022. Additionally, we recommend surveying monitoring wells for a repeated assessment of the groundwater flow direction.

In a letter dated November 17, 2021, ADEC noted that temporary well point TWP17-4, advanced during site characterization activities in 2017, contained DRO at concentrations exceeding the ADEC CUL. Groundwater contamination in this area requires further delineation prior to requesting site closure.

Map adapted from aerial imagery provided by Google Earth Pro (Image © 2016 Digital Globe), reproduced by permission granted by Google Earth ™ Mapping Service.



0 500 1,000

Feet

N

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VICINITY MAP

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Figure 1

Map adapted from aerial imagery provided by Pictometry International Corporation, 2012.

0 50 100

Feet

LEGEND

- Injection Well (Closed)
- Monitoring Well
- Building
- Property Line

N

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SITE MAP

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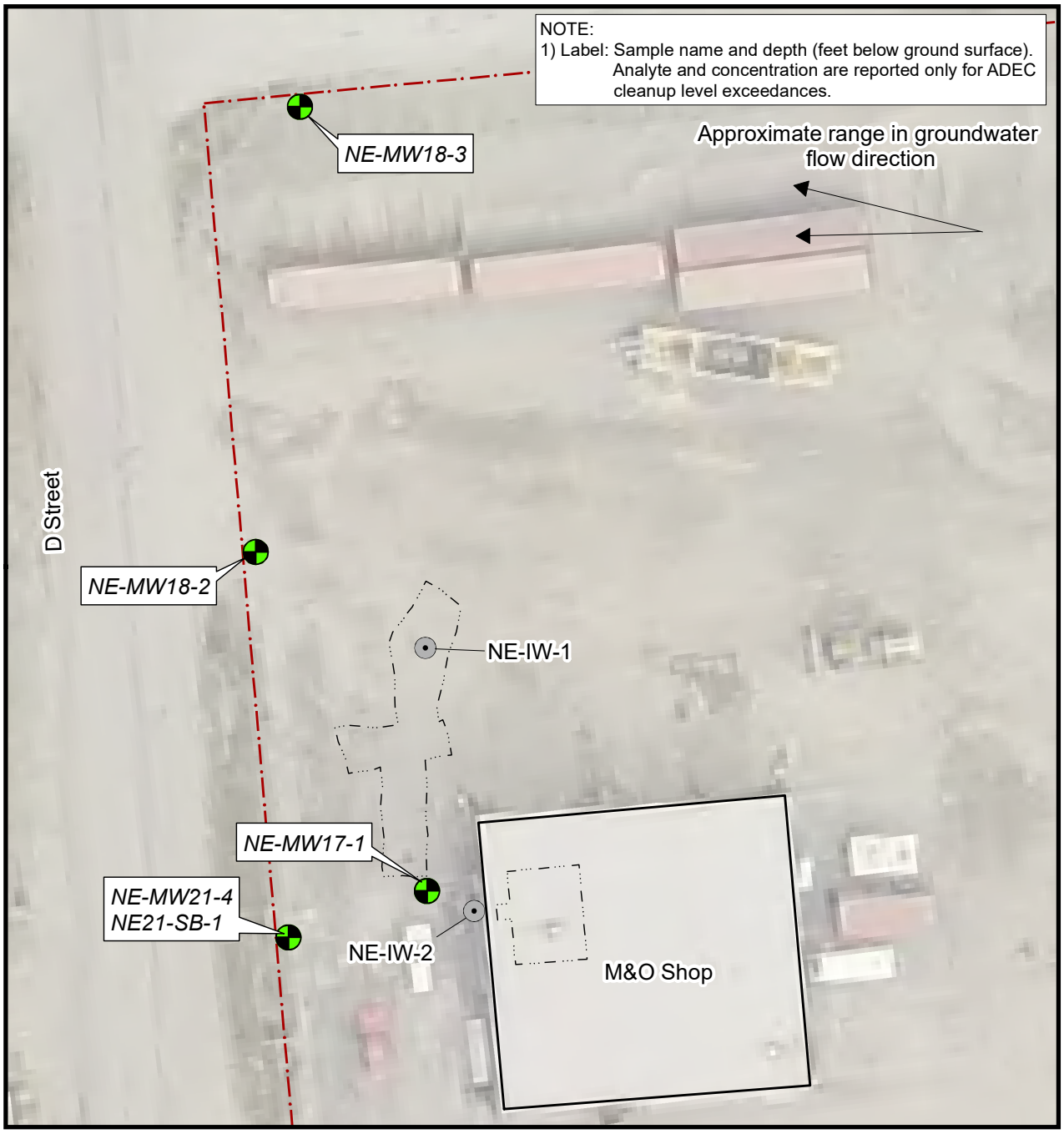
Figure 2



Map adapted from aerial imagery provided by Pictometry International Corporation, 2012

0 25 50

Feet

LEGEND

- Analyte Concentrations Do Not Exceed ADEC CULs
- Injection Well (Closed)
- 2016 Excavation Limits
- Property Line
- Building

N

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WATER AND SOIL SAMPLE LOCATIONS AND EXCEEDANCES 2021

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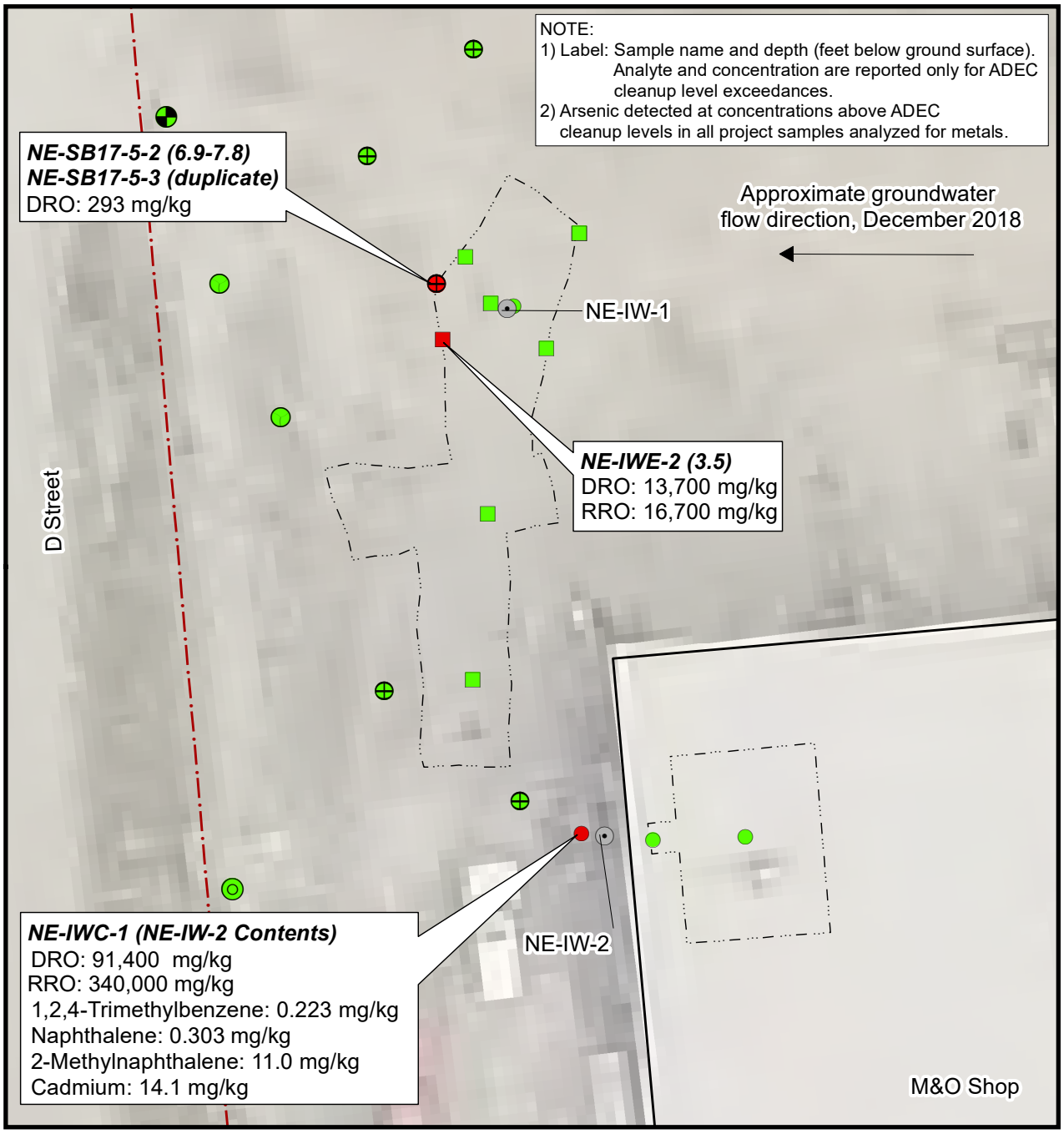
Figure 3



Map adapted from aerial imagery provided by Pictometry International Corporation, 2012

LEGEND

- Injection Well (Closed)
- Analyte concentrations exceed ADEC cleanup levels (CULs)
- Analyte concentrations do not exceed ADEC CULs
- 2016 Excavation Limits Sample
- 2016 Excavated Soil Sample
- 2017 Soil Boring Sample
- 2018 Soil Boring Sample
- 2021 Soil Boring Sample
- 2016 Excavation Limits
- Property Line
- Building

0 15 30

Feet

N

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SOIL ANALYTICAL RESULTS COMPARISON 2016-2021

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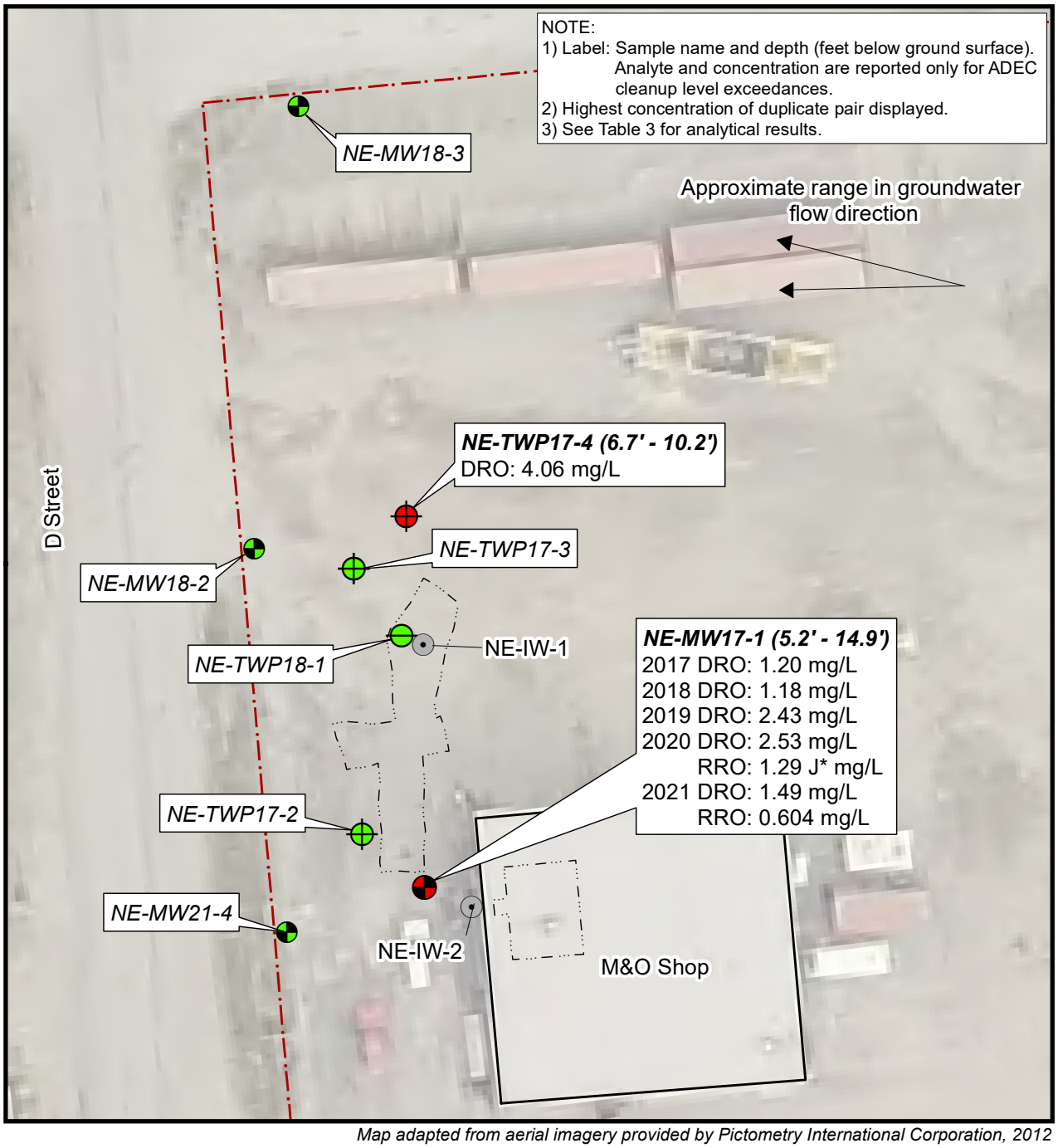
Figure 4



Map adapted from aerial imagery provided by Pictometry International Corporation, 2012

LEGEND

- Analyte concentrations exceeded ADEC cleanup levels in one or more samples
- Analyte concentrations do not exceed ADEC cleanup levels
- 2017 to 2021 Monitoring Well Sample
- 2017 Temporary Well Point Sample
- 2018 Temporary Well Point Sample
- Injection Well (Closed)
- 2016 Excavation Limits
- Property Line
- Building

0 25 50
Feet

N

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GROUNDWATER ANALYTICAL RESULTS COMPARISON 2017-2021

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Figure 5

LOG OF BORING

Date Started *8/17/21*	**Location** *West from M&O Shop*	**Ground Elevation:** *NA*
Date Completed *8/17/21*		**Typical Run Length** *5 feet*
Total Depth (ft) *14.0*	**Drilling Company:** *Discovery Drilling*	**Hole Diameter:** *4 inches*

Depth (ft)	Probe Run	Soil Description	Depth, ft.	Symbol	PID, ppm	Well Construction	Sample Number, Description, and Results	Depth (ft)
		Brown, *Poorly Graded Gravel with Sand (GP)*; moist; fill.						
		Yellow-brown to light gray-brown, *Sandy Silt (ML)*; moist; organics at 1.3 and 2.7 feet below ground surface (bgs); rust-colored laminations and trace organics throughout.	1.3		0			
		Gray-brown, *Silty Sand (SM)*; moist.	3.5		0			
5		Gray-brown, *Poorly Graded Sand with Silt (SP-SM)*; moist to 7.0 feet bgs, wet below.	5.0		0	During Drilling	NE21-SB-1 / NE21-SB-101	5
10		Gray, *Poorly Graded Sand with Gravel (SP)*; wet.	10.0					10
			14.0					
15		BOTTOM OF BORING COMPLETED 8/17/21 Monitoring Well NE-MW21-4 completed 8/17/21 Construction Details: Above-grade monument Top of casing is 3.61 feet above ground surface 2-inch diameter PVC riser pipe 20/40 gradation silica sand pre-pack Screened interval: 4.67 to 14.79 feet bgs Total depth of well: 14.96 feet bgs						15
20								20

Typ: DHF
Rev:
Log:
GEOPROBE_WELL 31111729-071 2021.GPJ 21-20447.GPJ 11/11/21

NOTES

1. In some cases where recovery was low in the upper part of the run, the soil sample may have slid down in the tube prior to removal from the ground.
2. Groundwater level, if indicated above, was estimated during probing and should be considered approximate.
3. Refer to KEY for definitions and explanation of symbols.
4. CT = corrosion test sample; TR = thermal resistivity sample; EN = environmental sample; GE = geotechnical sample; AR = archeological sample.

LEGEND

3 — 2" Plastic Tube - No Soil Recovery
2" Plastic Tube with Soil Recovery
Run No.

Piezometer Screen and Sand Filter

Ground Water Level ATD

DOT&PF Nenana Maintenance Station
2021 Groundwater Monitoring Report
Nenana, Alaska

LOG OF BORING NE21-SB-1

December 2021 31-1-11729-064

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

Figure 6

REV 1 - Log in Progress

Table 1 - Sample Locations and Descriptions

Sample ID	Sample Details	Sample Location (See Figure 3)	Sample Date	Sample Depth (feet bgs)	Analyses
NE-MW17-1	Groundwater	Monitoring well, installed in 2017 west of former NE-IW-2.	8/18/2021	5.3-15.0*	GRO, DRO, RRO, VOC
NE-MW17-101	Groundwater	Duplicate of sample *NE-MW17-1*	8/18/2021	5.3-15.0*	GRO, DRO, RRO, VOC
NE-MW18-2	Groundwater	Monitoring well, installed northwest from the former NE-IW-1 and near the west fence line.	8/18/2021	6.8-16.6*	GRO, DRO, RRO, VOC
NE-MW18-3	Groundwater	Monitoring well, installed north from the former NE-IW-1 and near the northwest corner of the fence line	8/18/2021	7.1-16.9*	GRO, DRO, RRO, VOC
NE-MW21-4	Groundwater	Monitoring well, installed along the west fence line downgradient from the former NE-IW-2	8/18/2021	4.7-14.8*	GRO, DRO, RRO, VOC
NE21-SB-1	Soil	Soil boring, located along the west fence line downgradient from the former NE-IW-2	8/17/2021	5.0-6.5	GRO, DRO, RRO, VOC
NE21-SB-101	Soil	Duplicate of sample *NE21-SB-1*	8/17/2021	5.0-6.5	GRO, DRO, RRO, VOC

Notes:

*	denotes depth of screen interval
bgs	below ground surface
GRO	gasoline range organics
VOC	volatile organic compounds
DRO	diesel range organics
RRO	residual range organics

Table 2 - Soil Boring Sample Results

Analytical Method	Analyte	Cleanup Level	Units	NE21-SB-1 5.0' - 6.5'	NE21-SB-1 Duplicate
AK101	Gasoline Range Organics	300	mg/kg	<3.33	<3.59
AK102	Diesel Range Organics	250	mg/kg	<25.7	<25.5
AK103	Residual Range Organics	10,000*	mg/kg	<129	<128
SM21 2540G	Total Solids	—	%	77.1	77.7
SW8260D (VOCs)	1,1,1,2-Tetrachloroethane	0.022	mg/kg	**<0.0267**	**<0.0288**
	1,1,1-Trichloroethane	32	mg/kg	<0.0333	<0.0359
	1,1,2,2-Tetrachloroethane	0.003	mg/kg	<0.00267	<0.00288
	1,1,2-Trichloroethane	0.0014	mg/kg	<0.00133	**<0.00144**
	1,1-Dichloroethane	0.092	mg/kg	<0.0333	<0.0359
	1,1-Dichloroethene	1.2	mg/kg	<0.0333	<0.0359
	1,1-Dichloropropene	—	mg/kg	<0.0333	<0.0359
	1,2,3-Trichlorobenzene	0.15	mg/kg	<0.133	<0.144
	1,2,3-Trichloropropane	0.000031	mg/kg	**<0.00267**	**<0.00288**
	1,2,4-Trichlorobenzene	0.082	mg/kg	<0.0333	<0.0359
	1,2,4-Trimethylbenzene	0.61	mg/kg	<0.133	<0.144
	1,2-Dibromo-3-chloropropane	—	mg/kg	<0.133	<0.144
	1,2-Dibromoethane	0.00024	mg/kg	**<0.00200**	**<0.00216**
	1,2-Dichlorobenzene	2.4	mg/kg	<0.0333	<0.0359
	1,2-Dichloroethane	0.0055	mg/kg	<0.00267	<0.00288
	1,2-Dichloropropane	0.03	mg/kg	<0.0133	<0.0144
	1,3,5-Trimethylbenzene	0.66	mg/kg	<0.0333	<0.0359
	1,3-Dichlorobenzene	2.3	mg/kg	<0.0333	<0.0359
	1,3-Dichloropropane	—	mg/kg	<0.0133	<0.0144
	1,4-Dichlorobenzene	0.037	mg/kg	<0.0333	<0.0359
	2,2-Dichloropropane	—	mg/kg	<0.0333	<0.0359
	2-Butanone (MEK)	15	mg/kg	<0.333	<0.359
	2-Chlorotoluene	—	mg/kg	<0.0333	<0.0359
	2-Hexanone	0.11	mg/kg	**<0.160**	**<0.173**
	4-Chlorotoluene	—	mg/kg	<0.0267	<0.0288
	Acetone	38	mg/kg	<0.333	<0.359
	Benzene	0.022	mg/kg	<0.0167	<0.0180
	Bromobenzene	0.36	mg/kg	<0.0333	<0.0359
	Bromochloromethane	—	mg/kg	<0.0333	<0.0359
	Bromodichloromethane	0.0043	mg/kg	<0.00267	<0.00288
	Bromoform	0.1	mg/kg	<0.0333	<0.0359
	Bromomethane	0.024	mg/kg	**<0.0267**	**<0.0288**
	Carbon disulfide	2.9	mg/kg	<0.133	<0.144
	Carbon tetrachloride	0.021	mg/kg	<0.0167	<0.0180
	Chlorobenzene	0.46	mg/kg	<0.0333	<0.0359
	Chloroethane	72	mg/kg	<0.267	<0.288
	Chloroform	0.0071	mg/kg	**<0.00800**	**<0.00863**
	Chloromethane	0.61	mg/kg	<0.0333	<0.0359
	cis-1,2-Dichloroethene	0.12	mg/kg	<0.0333	<0.0359
	cis-1,3-Dichloropropene	0.018	mg/kg	<0.0167	**<0.0180**
	Dibromochloromethane	0.0027	mg/kg	**<0.00667**	**<0.00719**
	Dibromomethane	0.025	mg/kg	**<0.0333**	**<0.0359**
	Dichlorodifluoromethane	3.9	mg/kg	<0.133	<0.144
	Ethylbenzene	0.13	mg/kg	<0.0333	<0.0359
	Hexachlorobutadiene	0.02	mg/kg	**<0.0267**	**<0.0288**
	Isopropylbenzene	5.6	mg/kg	<0.0333	<0.0359
	m,p-xylenes	1.5	mg/kg	<0.0667	<0.0719
	Methyl isobutyl ketone	18	mg/kg	<0.333	<0.359
	Methylene chloride	0.33	mg/kg	<0.133	<0.144
	Methyl-t-butyl ether (MTBE)	0.4	mg/kg	<0.133	<0.144
	Naphthalene	0.038	mg/kg	<0.0333	<0.0359
	n-Butylbenzene	20*	mg/kg	<0.0333	<0.0359
	n-Propylbenzene	9.1	mg/kg	<0.0333	<0.0359
	o-Xylene	1.5	mg/kg	<0.0333	<0.0359
	p-Isopropyltoluene	—	mg/kg	<0.107	<0.115
	sec-Butylbenzene	28*	mg/kg	<0.0333	<0.0359
	Styrene	10	mg/kg	<0.0333	<0.0359
	tert-Butylbenzene	11	mg/kg	<0.0333	<0.0359
	Tetrachloroethene	0.19	mg/kg	<0.0167	<0.0180
	Toluene	6.7	mg/kg	<0.0333	<0.0359
	Total Xylenes	1.5	mg/kg	<0.100	<0.108
	trans-1,2-Dichloroethene	1.3	mg/kg	<0.0333	<0.0359
	trans-1,3-Dichloropropene	0.018	mg/kg	<0.0167	**<0.0180**
	Trichloroethene	0.011	mg/kg	**<0.0133**	**<0.0144**
	Trichlorofluoromethane	41	mg/kg	<0.0667	<0.0719
	Trichlorotrifluoroethane	310	mg/kg	<0.133	<0.144
	Vinyl acetate	1.1	mg/kg	<0.133	<0.144
	Vinyl chloride	0.0008	mg/kg	**<0.00107**	**<0.00115**

Table 2 - Soil Boring Sample Results

Notes:	Results reported from SGS work order 1215323.
	DEC Soil Cleanup Levels from 18 AAC 75.341 Table B1 Method Two - Soil Cleanup Levels Table (Migration to Groundwater) and Table B2 Method Two - Petroleum Hydrocarbon Soil Cleanup Levels, unless otherwise noted.
*	ADEC Soil Cleanup Levels from 18 AAC 75.341 Table B1 Method Two - Soil Cleanup Levels Table (Human Health - Under 40 Inch Zone)
DEC	Alaska Department of Environmental Conservation
VOCs	volatile organic compounds
mg/kg	miligrams per kilogram
—	No applicable regulatory limit exists for the associated analyte.
<	Analyte was not detected; reported as <LOD.
<Bold	The laboratory's limit of detection (LOD) is greater than the regulatory limit.

Table 3 - Groundwater Sample Results

Analytical Method	Analyte	Cleanup Level	Units	NE-MW17-1		NE-MW18-2	NE-MW18-3	NE-MW21-4
				8/20/2021	Duplicate	8/20/2021	8/20/2021	8/20/2021
AK101	Gasoline Range Organics	2.2	mg/L	<0.100	<0.100	<0.100	<0.100	<0.100
AK102	Diesel Range Organics	1.5	mg/L	1.40	1.49	<0.566	<0.577	<0.556
AK103	Residual Range Organics	1.1	mg/L	0.518	0.604	<0.472	<0.481	<0.463
SW8260D (VOCs)	1,1,1,2-Tetrachloroethane	5.7	µg/L	<0.500	<0.500	<0.500	<0.500	<0.500
	1,1,1-Trichloroethane	8,000	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,1,2,2-Tetrachloroethane	0.76	µg/L	<0.500	<0.500	<0.500	<0.500	<0.500
	1,1,2-Trichloroethane	0.41	µg/L	<0.400	<0.400	<0.400	<0.400	<0.400
	1,1-Dichloroethane	28	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,1-Dichloroethene	280	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,1-Dichloropropene	—	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,2,3-Trichlorobenzene	7	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,2,3-Trichloropropane	0.0075	µg/L	**<1.00**	**<1.00**	**<1.00**	**<1.00**	**<1.00**
	1,2,4-Trichlorobenzene	4	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,2,4-Trimethylbenzene	56	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,2-Dibromo-3-chloropropane	—	µg/L	<10.0	<10.0	<10.0	<10.0	<10.0
	1,2-Dibromoethane	0.075	µg/L	**<0.0750**	**<0.0750**	**<0.0750**	**<0.0750**	**<0.0750**
	1,2-Dichlorobenzene	300	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,2-Dichloroethane	1.7	µg/L	<0.500	<0.500	<0.500	<0.500	<0.500
	1,2-Dichloropropane	8.2	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,3,5-Trimethylbenzene	60	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,3-Dichlorobenzene	300	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	1,3-Dichloropropane	—	µg/L	<0.500	<0.500	<0.500	<0.500	<0.500
	1,4-Dichlorobenzene	4.8	µg/L	<0.500	<0.500	<0.500	<0.500	<0.500
	2,2-Dichloropropane	—	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	2-Butanone (MEK)	5,600	µg/L	<10.0	<10.0	<10.0	<10.0	<10.0
	2-Chlorotoluene	—	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	2-Hexanone	38	µg/L	<10.0	<10.0	<10.0	<10.0	<10.0
	4-Chlorotoluene	—	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Benzene	4.6	µg/L	<0.400	<0.400	<0.400	<0.400	<0.400
	Bromobenzene	62	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Bromochloromethane	—	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Bromodichloromethane	1.3	µg/L	<0.500	<0.500	<0.500	<0.500	<0.500
	Bromoform	33	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Bromomethane	7.5	µg/L	<6.00	<6.00	<6.00	<6.00	<6.00
	Carbon disulfide	810	µg/L	<10.0	<10.0	<10.0	<10.0	<10.0
	Carbon tetrachloride	4.6	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Chlorobenzene	78	µg/L	<0.500	<0.500	<0.500	<0.500	<0.500
	Chloroethane	21,000	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Chloroform	2.2	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Chloromethane	190	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	cis-1,2-Dichloroethene	36	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	cis-1,3-Dichloropropene	4.7	µg/L	<0.500	<0.500	<0.500	<0.500	<0.500
	Dibromochloromethane	8.7	µg/L	<0.500	<0.500	<0.500	<0.500	<0.500
	Dibromomethane	8.3	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Dichlorodifluoromethane	200	µg/L	1.92	1.52	<1.00	<1.00	1.59
	Ethylbenzene	15	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Hexachlorobutadiene	1.4	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Isopropylbenzene	450	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	m,p-xylenes	190	µg/L	<2.00	<2.00	<2.00	<2.00	<2.00
	Methyl isobutyl ketone	6,300	µg/L	<10.0	<10.0	<10.0	<10.0	<10.0
	Methylene chloride	110	µg/L	<10.0 J*	<10.0 J*	<10.0	<10.0 J*	<10.0 J*
	Methyl-t-butyl ether (MTBE)	140	µg/L	<10.0	<10.0	<10.0	<10.0	<10.0
	Naphthalene	1.7	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	n-Butylbenzene	1,000	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	n-Propylbenzene	660	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	o-Xylene	190	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	p-Isopropyltoluene	—	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	sec-Butylbenzene	2,000	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Styrene	1,200	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	tert-Butylbenzene	690	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Tetrachloroethene	41	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Toluene	1,100	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Total Xylenes	190	µg/L	<3.00	<3.00	<3.00	<3.00	<3.00
	trans-1,2-Dichloroethene	360	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	trans-1,3-Dichloropropene	4.7	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Trichloroethene	2.8	µg/L	<1.00	<1.00	<1.00	<1.00	<1.00
	Trichlorofluoromethane	5,200	µg/L	16.2	19.5	<1.00	<1.00	<1.00
	Trichlorotrifluoroethane	10,000	µg/L	<10.0	<10.0	<10.0	<10.0	<10.0
	Vinyl acetate	410	µg/L	<10.0	<10.0	<10.0	<10.0	<10.0
	Vinyl chloride	0.19	µg/L	<0.150	<0.150	<0.150	<0.150	<0.150

Table 3 - Groundwater Sample Results

Notes:	Results reported from SGS work order 1215320.
	Regulatory limits from DEC 18 AAC 75.345 Table C. Groundwater Cleanup Levels.
DEC	Alaska Department of Environmental Conservation
VOCs	volatile organic compounds
µg/L	micrograms per liter
—	No applicable regulatory limit exists for the associated analyte.
<	Analyte was not detected; reported as <LOD.
<Bold	The laboratory's limit of detection (LOD) is greater than the regulatory limit.
J*	Estimated concentration due to quality control failures. Flag applied by Shannon & Wilson, Inc. (*)

Table 4 - NE-MW17-1 Historical Groundwater Result Comparison, 2017 to 2021

Analytical Method	Analyte	Cleanup Level	Units	NE-MW17-1							
				2017	2018	2019	2019 (DUP)	2020	2020 (DUP)	2021	2021 (DUP)
AK102	Diesel Range Organics	1.5	mg/L	1.23	1.18	**2.43**	**2.39**	**2.31**	**2.53**	1.40	1.49
AK103	Residual Range Organics	1.1	mg/L	<0.472	<0.500	<0.893B*	<0.490	0.651 J*	**1.29 J***	0.518	0.604
SW8260C (VOC)	Dichlorodifluoromethane	200	µg/L	1.18	2.67	1.14	1.06	4.25	3.58	1.92	1.52
	Trichlorofluoromethane	5,200	µg/L	25.6	10.7	11.2	13.2	15.9	14.9	16.2	19.5

Notes:

DEC Alaska Department of Environmental Conservation

mg/L milligrams per liter

ug/L micrograms per liter

VOC volatile organic compound

BOLD Detected concentration exceeds regulatory limit.

< Analyte not detected; listed as less than the LOQ unless otherwise flagged due to quality-control failures.

J* Estimated concentration due to quality control failures. Flag applied by Shannon & Wilson, Inc. (*)

B* Result is considered not detected at the LOQ or reported concentration (higher value reported) due to contamination identified in a blank.

APPENDIX A: PROJECT PHOTOGRAPHS

Appendix A

Project Photographs

Photo 1: NE-MW18-2

Photo 2: NE-MW21-4 Development

Photo 3: NE-MW21-4 Installation

Photo 4: NE-MW21-4 Turbidity

Photo 5: NE21-SB-1 0'-5' (1)

Photo 6: NE21-SB-1 0'-5' (2)

Photo 7: NE21-SB-1 10'-14'

Photo 8:NE21-SB-1 5'-10' (2)

Photo 9: NE21-SB-1 5'-10' (1)

Photo 10: NE21-SB-1 Drilling

APPENDIX B: CONCEPTUAL SITE MODEL

Appendix B

Conceptual Site Model

CONTENTS

Print Form

Appendix A - Human Health Conceptual Site Model Scoping Form and Standardized Graphic

Site Name: Nenana ADOT&PF Maintenance Station

File Number: 110.38.012

Completed by: Shannon and Wilson, Inc.

Introduction

The form should be used to reach agreement with the Alaska Department of Environmental Conservation (DEC) about which exposure pathways should be further investigated during site characterization. From this information, summary text about the CSM and a graphic depicting exposure pathways should be submitted with the site characterization work plan and updated as needed in later reports.

General Instructions: Follow the italicized instructions in each section below.

1. General Information:

Sources *(check potential sources at the site)*

- ☐ USTs
- ☐ ASTs
- ☐ Dispensers/fuel loading racks
- ☐ Drums
- ☐ Vehicles
- ☐ Landfills
- ☐ Transformers
- ☒ Other: Class V Underground Injection Well

Release Mechanisms *(check potential release mechanisms at the site)*

- ☐ Spills
- ☐ Leaks
- ☒ Direct discharge
- ☐ Burning
- ☐ Other:

Impacted Media *(check potentially-impacted media at the site)*

- ☐ Surface soil (0-2 feet bgs*)
- ☒ Subsurface soil (>2 feet bgs)
- ☐ Air
- ☐ Sediment
- ☒ Groundwater
- ☐ Surface water
- ☐ Biota
- ☐ Other:

Receptors *(check receptors that could be affected by contamination at the site)*

- ☒ Residents (adult or child)
- ☒ Commercial or industrial worker
- ☒ Construction worker
- ☐ Subsistence harvester (i.e. gathers wild foods)
- ☐ Subsistence consumer (i.e. eats wild foods)
- ☒ Site visitor
- ☒ Trespasser
- ☐ Recreational user
- ☐ Farmer
- ☐ Other:

* bgs - below ground surface

2. Exposure Pathways: *(The answers to the following questions will identify complete exposure pathways at the site. Check each box where the answer to the question is "yes".)*

a) Direct Contact -

1. Incidental Soil Ingestion

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site-specific basis.) ☒

If the box is checked, label this pathway complete: Complete

Comments:

Analytical results in 2017 indicated the presence of DRO in one of the soil samples collected immediately north of the former NE-IW-1 location. Soil samples collected in 2018 west of the former NE-IW-1 and in 2021 east of the former NE-IW-2 location did not contain analytes exceeding ADEC CULs.

2. Dermal Absorption of Contaminants from Soil

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☒

Can the soil contaminants permeate the skin (see Appendix B in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Analytical results of soil samples indicate the presence of arsenic in all project soil samples collected. However, the arsenic concentrations are consistent with the observed background levels in the Nenana area. The detected arsenic is believed to be naturally occurring and not related to the operation of the injection well.

b) Ingestion -

1. Ingestion of Groundwater

Have contaminants been detected or are they expected to be detected in the groundwater, or are contaminants expected to migrate to groundwater in the future? ☒

Could the potentially affected groundwater be used as a current or future drinking water source? Please note, only leave the box unchecked if DEC has determined the ground-water is not a currently or reasonably expected future source of drinking water according to 18 AAC 75.350. ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

Contamination was found in 2016 at groundwater (GW) interface. GW samples collected in 2017 found DRO at a concentration above ADEC CULs north of the former NE-IW-1. GW samples collected in 2018 downgradient were clean. GW samples collected in 2019 and 2020 at NW-MW17-1 contained DRO and RRO concentrations above ADEC CULs. 2021 results for GW were below ADEC CUL for DRO and RRO.

2. Ingestion of Surface Water

Have contaminants been detected or are they expected to be detected in surface water, or are contaminants expected to migrate to surface water in the future? ☐

Could potentially affected surface water bodies be used, currently or in the future, as a drinking water source? Consider both public water systems and private use (i.e., during residential, recreational or subsistence activities). ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

There are no permanent surface water bodies in the vicinity of the Nenana DOT&PF Maintenance Station.

3. Ingestion of Wild and Farmed Foods

Is the site in an area that is used or reasonably could be used for hunting, fishing, or harvesting of wild or farmed foods? ☐

Do the site contaminants have the potential to bioaccumulate (see Appendix C in the guidance document)? ☐

Are site contaminants located where they would have the potential to be taken up into biota? (i.e. soil within the root zone for plants or burrowing depth for animals, in groundwater that could be connected to surface water, etc.) ☐

If all of the boxes are checked, label this pathway complete: Incomplete

Comments:

c) Inhalation-

1. Inhalation of Outdoor Air

Are contaminants present or potentially present in surface soil between 0 and 15 feet below the ground surface? (Contamination at deeper depths may require evaluation on a site specific basis.) ☐

Are the contaminants in soil volatile (see Appendix D in the guidance document)? ☐

If both boxes are checked, label this pathway complete: Incomplete

Comments:

2. Inhalation of Indoor Air

Are occupied buildings on the site or reasonably expected to be occupied or placed on the site in an area that could be affected by contaminant vapors? (within 30 horizontal or vertical feet of petroleum contaminated soil or groundwater; within 100 feet of non-petroleum contaminted soil or groundwater; or subject to "preferential pathways," which promote easy airflow like utility conduits or rock fractures) ☐

Are volatile compounds present in soil or groundwater (see Appendix D in the guidance document)? ☒

If both boxes are checked, label this pathway complete: Complete

Comments:

DRO was detected in soil and groundwater samples collected at the former location of NE-IW-1, which is within 50 feet of the DOT&PF M&O Shop. We do not believe indoor air quality has been compromised by the use of the injection wells.

3. **Additional Exposure Pathways:** *(Although there are no definitive questions provided in this section, these exposure pathways should also be considered at each site. Use the guidelines provided below to determine if further evaluation of each pathway is warranted.)*

Dermal Exposure to Contaminants in Groundwater and Surface Water

Dermal exposure to contaminants in groundwater and surface water may be a complete pathway if:

- Climate permits recreational use of waters for swimming.
- Climate permits exposure to groundwater during activities, such as construction.
- Groundwater or surface water is used for household purposes, such as bathing or cleaning.

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Inhalation of Volatile Compounds in Tap Water

Inhalation of volatile compounds in tap water may be a complete pathway if:

- The contaminated water is used for indoor household purposes such as showering, laundering, and dish washing.
- The contaminants of concern are volatile (common volatile contaminants are listed in Appendix D in the guidance document.)

Generally, DEC groundwater cleanup levels in 18 AAC 75, Table C, are assumed to be protective of this pathway.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

There is no onsite drinking water well at the Nenana Maintenance Station. City of Nenana utilities provides water to the M&O Shop.

Inhalation of Fugitive Dust

Inhalation of fugitive dust may be a complete pathway if:

- Nonvolatile compounds are found in the top 2 centimeters of soil. The top 2 centimeters of soil are likely to be dispersed in the wind as dust particles.
- Dust particles are less than 10 micrometers (Particulate Matter - PM_{10}). Particles of this size are called respirable particles and can reach the pulmonary parts of the lungs when inhaled.
- Chromium is present in soil that can be dispersed as dust particles of any size.

Generally, DEC direct contact soil cleanup levels in Table B1 of 18 AAC 75 are protective of this pathway because it is assumed most dust particles are incidentally ingested instead of inhaled to the lower lungs. The inhalation pathway only needs to be evaluated when very small dust particles are present (e.g., along a dirt roadway or where dusts are a nuisance). This is not true in the case of chromium. Site specific cleanup levels will need to be calculated in the event that inhalation of dust containing chromium is a complete pathway at a site.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

Direct Contact with Sediment

This pathway involves people's hands being exposed to sediment, such as during some recreational, subsistence, or industrial activity. People then incidentally ingest sediment from normal hand-to-mouth activities. In addition, dermal absorption of contaminants may be of concern if the the contaminants are able to permeate the skin (see Appendix B in the guidance document). This type of exposure should be investigated if:

- Climate permits recreational activities around sediment.
- The community has identified subsistence or recreational activities that would result in exposure to the sediment, such as clam digging.

Generally, DEC direct contact soil cleanup levels in 18 AAC 75, Table B1, are assumed to be protective of direct contact with sediment.

Check the box if further evaluation of this pathway is needed: ☐

Comments:

4. Other Comments *(Provide other comments as necessary to support the information provided in this form.)*

HUMAN HEALTH CONCEPTUAL SITE MODEL GRAPHIC FORM

Site: Nenana DOT&PF Maintenance Station

Completed By: Shannon & Wilson, Inc.

Date Completed: August 2021

***Instructions*: Follow the numbered directions below. Do not consider contaminant concentrations or engineering/land use controls when describing pathways.**

(1) *Check the media that could be directly affected by the release.*

(2) *For each medium identified in (1), follow the top arrow and check possible transport mechanisms. Check additional media under (1) if the media acts as a secondary source.*

(3) *Check all exposure media identified in (2).*

(4) *Check all pathways that could be complete. The pathways identified in this column **must** agree with Sections 2 and 3 of the Human Health CSM Scoping Form.*

(5) *Identify the receptors potentially affected by each exposure pathway: Enter "C" for current receptors, "F" for future receptors, "C/F" for both current and future receptors, or "I" for insignificant exposure.*

Media	Transport Mechanisms	Exposure Media	Exposure Pathway/Route	Current & Future Receptors: Residents (adults or children)	Commercial or industrial workers	Site visitors, trespassers, or recreational users	Construction workers	Farmers or subsistence harvesters	Subsistence consumers	Other
☐ Surface Soil (0-2 ft bgs)	☐ Direct release to surface soil — check soil									
	☐ Migration to subsurface — check soil									
	☐ Migration to groundwater — check groundwater									
	☐ Volatilization — check air									
	☐ Runoff or erosion — check surface water									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Subsurface Soil (2-15 ft bgs)	☐ Direct release to subsurface soil — check soil									
	☑ Migration to groundwater — check groundwater									
	☐ Volatilization — check air									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☑ Ground-water	☐ Direct release to groundwater — check groundwater									
	☐ Volatilization — check air									
	☐ Flow to surface water body — check surface water									
	☐ Flow to sediment — check sediment									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Surface Water	☐ Direct release to surface water — check surface water									
	☐ Volatilization — check air									
	☐ Sedimentation — check sediment									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
☐ Sediment	☐ Direct release to sediment — check sediment									
	☐ Resuspension, runoff, or erosion — check surface water									
	☐ Uptake by plants or animals — check biota									
	☐ Other (list):									
		☑ soil	☑ Incidental Soil Ingestion		C/F	C/F	C/F			
			☑ Dermal Absorption of Contaminants from Soil		C/F	C/F	C/F			
			☐ Inhalation of Fugitive Dust							
		☑ groundwater	☑ Ingestion of Groundwater		C/F	C/F	C/F			
			☐ Dermal Absorption of Contaminants in Groundwater							
			☐ Inhalation of Volatile Compounds in Tap Water							
		☐ air	☐ Inhalation of Outdoor Air							
			☐ Inhalation of Indoor Air							
			☐ Inhalation of Fugitive Dust							
		☐ surface water	☐ Ingestion of Surface Water							
			☐ Dermal Absorption of Contaminants in Surface Water							
			☐ Inhalation of Volatile Compounds in Tap Water							
		☐ sediment	☐ Direct Contact with Sediment							
		☐ biota	☐ Ingestion of Wild or Farmed Foods							

Revised, 10/01/2010

APPENDIX C: LABORATORY REPORT AND DATA REVIEW

Appendix C

Laboratory Report and Data Review

CONTENTS

Laboratory Report of Analysis

To: Shannon & Wilson-Fairbanks
2355 Hill Road
Fairbanks, AK 99709
(907)458-3153

Report Number: **1215320**

Client Project: **11729-071 Nenana MS**

Dear Tiffany Green,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Jennifer at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Stephen C. Ede
2021.09.16
14:26:19 -08'00'

Jennifer Dawkins Date
Project Manager
Jennifer.Dawkins@sgs.com

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Case Narrative

SGS Client: **Shannon & Wilson-Fairbanks**
SGS Project: **1215320**
Project Name/Site: **11729-071 Nenana MS**
Project Contact: **Tiffany Green**

Refer to sample receipt form for information on sample condition.

LCSD for HBN 1824948 [VXX/3774 (1633696) LCSD

8260D - LCS/LCSD RPDs for methylene chloride does not meet QC criteria. This analyte was not reported above the LOQ in the associated samples.
8260D - LCSD recovery for methylene chloride does not meet QC criteria. The CCV was within QC criteria for this analyte.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

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t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. The results apply to the samples as received. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020B, 7470A, 7471B, 8015C, 8021B, 8082A, 8260D, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). SGS is only certified for the analytes listed on our Drinking Water Certification (DW methods: 200.8, 2130B, 2320B, 2510B, 300.0, 4500-CN-C,E, 4500-H-B, 4500-NO3-F, 4500-P-E and 524.2) and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
TNTC	Too Numerous To Count
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

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Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
NE-MW17-1	1215320001	08/18/2021	08/20/2021	Water (Surface, Eff., Ground)
NE-MW17-101	1215320002	08/18/2021	08/20/2021	Water (Surface, Eff., Ground)
NE-MW18-2	1215320003	08/18/2021	08/20/2021	Water (Surface, Eff., Ground)
NE-MW18-3	1215320004	08/18/2021	08/20/2021	Water (Surface, Eff., Ground)
NE-MW21-4	1215320005	08/18/2021	08/20/2021	Water (Surface, Eff., Ground)
Trip Blanks	1215320006	08/18/2021	08/20/2021	Water (Surface, Eff., Ground)

Method	Method Description
AK102	DRO/RRO Low Volume Water
AK103	DRO/RRO Low Volume Water
AK101	Gasoline Range Organics (W)
SW8260D	Volatile Organic Compounds (W) FULL

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Detectable Results Summary

Client Sample ID: **NE-MW17-1**
Lab Sample ID: 1215320001

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	1.40	mg/L
	Residual Range Organics	0.518	mg/L
Volatile GC/MS	Dichlorodifluoromethane	1.92	ug/L
	Trichlorofluoromethane	16.2	ug/L

Client Sample ID: **NE-MW17-101**
Lab Sample ID: 1215320002

	Parameter	Result	Units
Semivolatile Organic Fuels	Diesel Range Organics	1.49	mg/L
	Residual Range Organics	0.604	mg/L
Volatile GC/MS	Dichlorodifluoromethane	1.52	ug/L
	Trichlorofluoromethane	19.5	ug/L

Client Sample ID: **NE-MW21-4**
Lab Sample ID: 1215320005

	Parameter	Result	Units
Volatile GC/MS	Dichlorodifluoromethane	1.59	ug/L

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Results of **NE-MW17-1**

Client Sample ID: **NE-MW17-1**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320001
Lab Project ID: 1215320

Collection Date: 08/18/21 15:17
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1.40		0.577	0.173	mg/L	1		08/27/21 14:53
Surrogates								
5a Androstane (surr)	77.1		50-150		%	1		08/27/21 14:53

Batch Information

Analytical Batch: XFC16065
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/27/21 14:53
Container ID: 1215320001-A

Prep Batch: XXX45455
Prep Method: SW3520C
Prep Date/Time: 08/26/21 16:10
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.518		0.481	0.144	mg/L	1		08/27/21 14:53
Surrogates								
n-Triacontane-d62 (surr)	85.1		50-150		%	1		08/27/21 14:53

Batch Information

Analytical Batch: XFC16065
Analytical Method: AK103
Analyst: IVM
Analytical Date/Time: 08/27/21 14:53
Container ID: 1215320001-A

Prep Batch: XXX45455
Prep Method: SW3520C
Prep Date/Time: 08/26/21 16:10
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW17-1**

Client Sample ID: **NE-MW17-1**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320001
Lab Project ID: 1215320

Collection Date: 08/18/21 15:17
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.100	U	0.100	0.0450	mg/L	1		08/27/21 04:01
Surrogates								
4-Bromofluorobenzene (surr)	84.2		50-150		%	1		08/27/21 04:01

Batch Information

Analytical Batch: VFC15781
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 08/27/21 04:01
Container ID: 1215320001-C

Prep Batch: VXX37714
Prep Method: SW5030B
Prep Date/Time: 08/26/21 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW17-1**

Client Sample ID: **NE-MW17-1**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320001
Lab Project ID: 1215320

Collection Date: 08/18/21 15:17
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 03:52
1,1,1-Trichloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,1,2,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 03:52
1,1,2-Trichloroethane	0.400	U	0.400	0.120	ug/L	1		09/01/21 03:52
1,1-Dichloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,1-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,1-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,2,3-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,2,3-Trichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,2,4-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,2,4-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,2-Dibromo-3-chloropropane	10.0	U	10.0	3.10	ug/L	1		09/01/21 03:52
1,2-Dibromoethane	0.0750	U	0.0750	0.0180	ug/L	1		09/01/21 03:52
1,2-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,2-Dichloroethane	0.500	U	0.500	0.200	ug/L	1		09/01/21 03:52
1,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,3,5-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,3-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
1,3-Dichloropropane	0.500	U	0.500	0.150	ug/L	1		09/01/21 03:52
1,4-Dichlorobenzene	0.500	U	0.500	0.150	ug/L	1		09/01/21 03:52
2,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
2-Butanone (MEK)	10.0	U	10.0	3.10	ug/L	1		09/01/21 03:52
2-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
2-Hexanone	10.0	U	10.0	3.10	ug/L	1		09/01/21 03:52
4-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
4-Isopropyltoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 13:33
4-Methyl-2-pentanone (MIBK)	10.0	U	10.0	3.10	ug/L	1		09/01/21 03:52
Benzene	0.400	U	0.400	0.120	ug/L	1		09/01/21 03:52
Bromobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
Bromochloromethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
Bromodichloromethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 03:52
Bromoform	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
Bromomethane	6.00	U	6.00	3.00	ug/L	1		09/01/21 03:52
Carbon disulfide	10.0	U	10.0	3.10	ug/L	1		09/01/21 03:52
Carbon tetrachloride	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52
Chlorobenzene	0.500	U	0.500	0.150	ug/L	1		09/01/21 03:52
Chloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 03:52

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Results of **NE-MW17-1**

Client Sample ID: **NE-MW17-1**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320001
Lab Project ID: 1215320

Collection Date: 08/18/21 15:17
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
Chloromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
cis-1,2-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
cis-1,3-Dichloropropene	0.500 U		0.500	0.150	ug/L	1		09/01/21 03:52
Dibromochloromethane	0.500 U		0.500	0.150	ug/L	1		09/01/21 03:52
Dibromomethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
Dichlorodifluoromethane	1.92		1.00	0.310	ug/L	1		09/01/21 03:52
Ethylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
Freon-113	10.0 U		10.0	3.10	ug/L	1		09/01/21 03:52
Hexachlorobutadiene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
Isopropylbenzene (Cumene)	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
Methylene chloride	10.0 U		10.0	3.10	ug/L	1		09/01/21 03:52
Methyl-t-butyl ether	10.0 U		10.0	3.10	ug/L	1		09/01/21 03:52
Naphthalene	1.00 U		1.00	0.310	ug/L	1		09/01/21 13:33
n-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
n-Propylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
o-Xylene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
P & M -Xylene	2.00 U		2.00	0.620	ug/L	1		09/01/21 03:52
sec-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
Styrene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
tert-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
Tetrachloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
Toluene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
trans-1,2-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
trans-1,3-Dichloropropene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
Trichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 03:52
Trichlorofluoromethane	16.2		1.00	0.310	ug/L	1		09/01/21 03:52
Vinyl acetate	10.0 U		10.0	3.10	ug/L	1		09/01/21 03:52
Vinyl chloride	0.150 U		0.150	0.0500	ug/L	1		09/01/21 03:52
Xylenes (total)	3.00 U		3.00	1.00	ug/L	1		09/01/21 03:52
Surrogates								
1,2-Dichloroethane-D4 (surr)	102		81-118		%	1		09/01/21 03:52
4-Bromofluorobenzene (surr)	100		85-114		%	1		09/01/21 03:52
Toluene-d8 (surr)	102		89-112		%	1		09/01/21 03:52

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Results of **NE-MW17-1**

Client Sample ID: **NE-MW17-1**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320001
Lab Project ID: 1215320

Collection Date: 08/18/21 15:17
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21120
Analytical Method: SW8260D
Analyst: JMG
Analytical Date/Time: 09/01/21 03:52
Container ID: 1215320001-F

Prep Batch: VXX37741
Prep Method: SW5030B
Prep Date/Time: 08/31/21 21:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Analytical Batch: VMS21125
Analytical Method: SW8260D
Analyst: JMG
Analytical Date/Time: 09/01/21 13:33
Container ID: 1215320001-E

Prep Batch: VXX37749
Prep Method: SW5030B
Prep Date/Time: 09/01/21 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Results of **NE-MW17-101**

Client Sample ID: **NE-MW17-101**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320002
Lab Project ID: 1215320

Collection Date: 08/18/21 15:07
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	1.49		0.577	0.173	mg/L	1		08/27/21 15:03
Surrogates								
5a Androstane (surr)	83.2		50-150		%	1		08/27/21 15:03

Batch Information

Analytical Batch: XFC16065
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/27/21 15:03
Container ID: 1215320002-A

Prep Batch: XXX45455
Prep Method: SW3520C
Prep Date/Time: 08/26/21 16:10
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.604		0.481	0.144	mg/L	1		08/27/21 15:03
Surrogates								
n-Triacontane-d62 (surr)	89.3		50-150		%	1		08/27/21 15:03

Batch Information

Analytical Batch: XFC16065
Analytical Method: AK103
Analyst: IVM
Analytical Date/Time: 08/27/21 15:03
Container ID: 1215320002-A

Prep Batch: XXX45455
Prep Method: SW3520C
Prep Date/Time: 08/26/21 16:10
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW17-101**

Client Sample ID: **NE-MW17-101**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320002
Lab Project ID: 1215320

Collection Date: 08/18/21 15:07
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.100	U	0.100	0.0450	mg/L	1		08/27/21 04:19
Surrogates								
4-Bromofluorobenzene (surr)	89.4		50-150		%	1		08/27/21 04:19

Batch Information

Analytical Batch: VFC15781
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 08/27/21 04:19
Container ID: 1215320002-C

Prep Batch: VXX37714
Prep Method: SW5030B
Prep Date/Time: 08/26/21 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW17-101**

Client Sample ID: **NE-MW17-101**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320002
Lab Project ID: 1215320

Collection Date: 08/18/21 15:07
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:07
1,1,1-Trichloroethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,1,2,2-Tetrachloroethane	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:07
1,1,2-Trichloroethane	0.400 U		0.400	0.120	ug/L	1		09/01/21 04:07
1,1-Dichloroethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,1-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,1-Dichloropropene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,2,3-Trichlorobenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,2,3-Trichloropropane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,2,4-Trichlorobenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,2,4-Trimethylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,2-Dibromo-3-chloropropane	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:07
1,2-Dibromoethane	0.0750 U		0.0750	0.0180	ug/L	1		09/01/21 04:07
1,2-Dichlorobenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,2-Dichloroethane	0.500 U		0.500	0.200	ug/L	1		09/01/21 04:07
1,2-Dichloropropane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,3,5-Trimethylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,3-Dichlorobenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
1,3-Dichloropropane	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:07
1,4-Dichlorobenzene	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:07
2,2-Dichloropropane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
2-Butanone (MEK)	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:07
2-Chlorotoluene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
2-Hexanone	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:07
4-Chlorotoluene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
4-Isopropyltoluene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
4-Methyl-2-pentanone (MIBK)	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:07
Benzene	0.400 U		0.400	0.120	ug/L	1		09/01/21 04:07
Bromobenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
Bromochloromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
Bromodichloromethane	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:07
Bromoform	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
Bromomethane	6.00 U		6.00	3.00	ug/L	1		09/01/21 04:07
Carbon disulfide	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:07
Carbon tetrachloride	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07
Chlorobenzene	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:07
Chloroethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:07

Results of **NE-MW17-101**

Client Sample ID: **NE-MW17-101**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320002
Lab Project ID: 1215320

Collection Date: 08/18/21 15:07
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
Chloromethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
cis-1,2-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
cis-1,3-Dichloropropene	0.500	U	0.500	0.150	ug/L	1		09/01/21 04:07
Dibromochloromethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 04:07
Dibromomethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
Dichlorodifluoromethane	1.52		1.00	0.310	ug/L	1		09/01/21 04:07
Ethylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
Freon-113	10.0	U	10.0	3.10	ug/L	1		09/01/21 04:07
Hexachlorobutadiene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
Isopropylbenzene (Cumene)	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
Methylene chloride	10.0	U	10.0	3.10	ug/L	1		09/01/21 04:07
Methyl-t-butyl ether	10.0	U	10.0	3.10	ug/L	1		09/01/21 04:07
Naphthalene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
n-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
n-Propylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
o-Xylene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
P & M -Xylene	2.00	U	2.00	0.620	ug/L	1		09/01/21 04:07
sec-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
Styrene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
tert-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
Tetrachloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
Toluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
trans-1,2-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
trans-1,3-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
Trichloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:07
Trichlorofluoromethane	19.5		1.00	0.310	ug/L	1		09/01/21 04:07
Vinyl acetate	10.0	U	10.0	3.10	ug/L	1		09/01/21 04:07
Vinyl chloride	0.150	U	0.150	0.0500	ug/L	1		09/01/21 04:07
Xylenes (total)	3.00	U	3.00	1.00	ug/L	1		09/01/21 04:07
Surrogates								
1,2-Dichloroethane-D4 (surr)	101		81-118		%	1		09/01/21 04:07
4-Bromofluorobenzene (surr)	102		85-114		%	1		09/01/21 04:07
Toluene-d8 (surr)	102		89-112		%	1		09/01/21 04:07

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Results of **NE-MW17-101**

Client Sample ID: **NE-MW17-101**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320002
Lab Project ID: 1215320

Collection Date: 08/18/21 15:07
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21120
Analytical Method: SW8260D
Analyst: JMG
Analytical Date/Time: 09/01/21 04:07
Container ID: 1215320002-F

Prep Batch: VXX37741
Prep Method: SW5030B
Prep Date/Time: 08/31/21 21:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **NE-MW18-2**

Client Sample ID: **NE-MW18-2**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320003
Lab Project ID: 1215320

Collection Date: 08/18/21 10:17
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.566	U	0.566	0.170	mg/L	1		08/27/21 15:13
Surrogates								
5a Androstane (surr)	76.4		50-150		%	1		08/27/21 15:13

Batch Information

Analytical Batch: XFC16065
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/27/21 15:13
Container ID: 1215320003-A

Prep Batch: XXX45455
Prep Method: SW3520C
Prep Date/Time: 08/26/21 16:10
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.472	U	0.472	0.142	mg/L	1		08/27/21 15:13
Surrogates								
n-Triacontane-d62 (surr)	85.8		50-150		%	1		08/27/21 15:13

Batch Information

Analytical Batch: XFC16065
Analytical Method: AK103
Analyst: IVM
Analytical Date/Time: 08/27/21 15:13
Container ID: 1215320003-A

Prep Batch: XXX45455
Prep Method: SW3520C
Prep Date/Time: 08/26/21 16:10
Prep Initial Wt./Vol.: 265 mL
Prep Extract Vol: 1 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW18-2**

Client Sample ID: **NE-MW18-2**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320003
Lab Project ID: 1215320

Collection Date: 08/18/21 10:17
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.100	U	0.100	0.0450	mg/L	1		09/01/21 23:15
Surrogates								
4-Bromofluorobenzene (surr)	99.4		50-150		%	1		09/01/21 23:15

Batch Information

Analytical Batch: VFC15790
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 09/01/21 23:15
Container ID: 1215320003-H

Prep Batch: VXX37750
Prep Method: SW5030B
Prep Date/Time: 09/01/21 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW18-2**

Client Sample ID: **NE-MW18-2**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320003
Lab Project ID: 1215320

Collection Date: 08/18/21 10:17
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 12:45
1,1,1-Trichloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,1,2,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 12:45
1,1,2-Trichloroethane	0.400	U	0.400	0.120	ug/L	1		09/01/21 12:45
1,1-Dichloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,1-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,1-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,2,3-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,2,3-Trichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,2,4-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,2,4-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,2-Dibromo-3-chloropropane	10.0	U	10.0	3.10	ug/L	1		09/01/21 12:45
1,2-Dibromoethane	0.0750	U	0.0750	0.0180	ug/L	1		09/01/21 12:45
1,2-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,2-Dichloroethane	0.500	U	0.500	0.200	ug/L	1		09/01/21 12:45
1,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,3,5-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,3-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
1,3-Dichloropropane	0.500	U	0.500	0.150	ug/L	1		09/01/21 12:45
1,4-Dichlorobenzene	0.500	U	0.500	0.150	ug/L	1		09/01/21 12:45
2,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
2-Butanone (MEK)	10.0	U	10.0	3.10	ug/L	1		09/01/21 12:45
2-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
2-Hexanone	10.0	U	10.0	3.10	ug/L	1		09/01/21 12:45
4-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
4-Isopropyltoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
4-Methyl-2-pentanone (MIBK)	10.0	U	10.0	3.10	ug/L	1		09/01/21 12:45
Benzene	0.400	U	0.400	0.120	ug/L	1		09/01/21 12:45
Bromobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Bromochloromethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Bromodichloromethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 12:45
Bromoform	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Bromomethane	6.00	U	6.00	3.00	ug/L	1		09/01/21 12:45
Carbon disulfide	10.0	U	10.0	3.10	ug/L	1		09/01/21 12:45
Carbon tetrachloride	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Chlorobenzene	0.500	U	0.500	0.150	ug/L	1		09/01/21 12:45
Chloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45

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Results of **NE-MW18-2**

Client Sample ID: **NE-MW18-2**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320003
Lab Project ID: 1215320

Collection Date: 08/18/21 10:17
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Chloromethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
cis-1,2-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
cis-1,3-Dichloropropene	0.500	U	0.500	0.150	ug/L	1		09/01/21 12:45
Dibromochloromethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 12:45
Dibromomethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Dichlorodifluoromethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Ethylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Freon-113	10.0	U	10.0	3.10	ug/L	1		09/01/21 12:45
Hexachlorobutadiene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Isopropylbenzene (Cumene)	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Methylene chloride	10.0	U	10.0	3.10	ug/L	1		09/01/21 12:45
Methyl-t-butyl ether	10.0	U	10.0	3.10	ug/L	1		09/01/21 12:45
Naphthalene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
n-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
n-Propylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
o-Xylene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
P & M -Xylene	2.00	U	2.00	0.620	ug/L	1		09/01/21 12:45
sec-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Styrene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
tert-Butylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Tetrachloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Toluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
trans-1,2-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
trans-1,3-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Trichloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Trichlorofluoromethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 12:45
Vinyl acetate	10.0	U	10.0	3.10	ug/L	1		09/01/21 12:45
Vinyl chloride	0.150	U	0.150	0.0500	ug/L	1		09/01/21 12:45
Xylenes (total)	3.00	U	3.00	1.00	ug/L	1		09/01/21 12:45
Surrogates								
1,2-Dichloroethane-D4 (surr)	101		81-118		%	1		09/01/21 12:45
4-Bromofluorobenzene (surr)	102		85-114		%	1		09/01/21 12:45
Toluene-d8 (surr)	103		89-112		%	1		09/01/21 12:45

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Results of **NE-MW18-2**

Client Sample ID: **NE-MW18-2**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320003
Lab Project ID: 1215320

Collection Date: 08/18/21 10:17
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21127
Analytical Method: SW8260D
Analyst: JMG
Analytical Date/Time: 09/01/21 12:45
Container ID: 1215320003-F

Prep Batch: VXX37753
Prep Method: SW5030B
Prep Date/Time: 09/01/21 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW18-3**

Client Sample ID: **NE-MW18-3**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320004
Lab Project ID: 1215320

Collection Date: 08/18/21 13:27
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.577	U	0.577	0.173	mg/L	1		08/27/21 15:23
Surrogates								
5a Androstane (surr)	78.5		50-150		%	1		08/27/21 15:23

Batch Information

Analytical Batch: XFC16065
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/27/21 15:23
Container ID: 1215320004-A

Prep Batch: XXX45455
Prep Method: SW3520C
Prep Date/Time: 08/26/21 16:10
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.481	U	0.481	0.144	mg/L	1		08/27/21 15:23
Surrogates								
n-Triacontane-d62 (surr)	87.1		50-150		%	1		08/27/21 15:23

Batch Information

Analytical Batch: XFC16065
Analytical Method: AK103
Analyst: IVM
Analytical Date/Time: 08/27/21 15:23
Container ID: 1215320004-A

Prep Batch: XXX45455
Prep Method: SW3520C
Prep Date/Time: 08/26/21 16:10
Prep Initial Wt./Vol.: 260 mL
Prep Extract Vol: 1 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW18-3**

Client Sample ID: **NE-MW18-3**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320004
Lab Project ID: 1215320

Collection Date: 08/18/21 13:27
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.100	U	0.100	0.0450	mg/L	1		08/27/21 05:13
Surrogates								
4-Bromofluorobenzene (surr)	83.3		50-150		%	1		08/27/21 05:13

Batch Information

Analytical Batch: VFC15781
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 08/27/21 05:13
Container ID: 1215320004-C

Prep Batch: VXX37714
Prep Method: SW5030B
Prep Date/Time: 08/26/21 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW18-3**

Client Sample ID: **NE-MW18-3**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320004
Lab Project ID: 1215320

Collection Date: 08/18/21 13:27
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 04:36
1,1,1-Trichloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,1,2,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 04:36
1,1,2-Trichloroethane	0.400	U	0.400	0.120	ug/L	1		09/01/21 04:36
1,1-Dichloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,1-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,1-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,2,3-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,2,3-Trichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,2,4-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,2,4-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,2-Dibromo-3-chloropropane	10.0	U	10.0	3.10	ug/L	1		09/01/21 04:36
1,2-Dibromoethane	0.0750	U	0.0750	0.0180	ug/L	1		09/01/21 04:36
1,2-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,2-Dichloroethane	0.500	U	0.500	0.200	ug/L	1		09/01/21 04:36
1,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,3,5-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,3-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
1,3-Dichloropropane	0.500	U	0.500	0.150	ug/L	1		09/01/21 04:36
1,4-Dichlorobenzene	0.500	U	0.500	0.150	ug/L	1		09/01/21 04:36
2,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
2-Butanone (MEK)	10.0	U	10.0	3.10	ug/L	1		09/01/21 04:36
2-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
2-Hexanone	10.0	U	10.0	3.10	ug/L	1		09/01/21 04:36
4-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
4-Isopropyltoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
4-Methyl-2-pentanone (MIBK)	10.0	U	10.0	3.10	ug/L	1		09/01/21 04:36
Benzene	0.400	U	0.400	0.120	ug/L	1		09/01/21 04:36
Bromobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
Bromochloromethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
Bromodichloromethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 04:36
Bromoform	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
Bromomethane	6.00	U	6.00	3.00	ug/L	1		09/01/21 04:36
Carbon disulfide	10.0	U	10.0	3.10	ug/L	1		09/01/21 04:36
Carbon tetrachloride	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36
Chlorobenzene	0.500	U	0.500	0.150	ug/L	1		09/01/21 04:36
Chloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 04:36

Results of **NE-MW18-3**

Client Sample ID: **NE-MW18-3**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320004
Lab Project ID: 1215320

Collection Date: 08/18/21 13:27
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Chloromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
cis-1,2-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
cis-1,3-Dichloropropene	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:36
Dibromochloromethane	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:36
Dibromomethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Dichlorodifluoromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Ethylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Freon-113	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:36
Hexachlorobutadiene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Isopropylbenzene (Cumene)	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Methylene chloride	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:36
Methyl-t-butyl ether	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:36
Naphthalene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
n-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
n-Propylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
o-Xylene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
P & M -Xylene	2.00 U		2.00	0.620	ug/L	1		09/01/21 04:36
sec-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Styrene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
tert-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Tetrachloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Toluene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
trans-1,2-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
trans-1,3-Dichloropropene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Trichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Trichlorofluoromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:36
Vinyl acetate	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:36
Vinyl chloride	0.150 U		0.150	0.0500	ug/L	1		09/01/21 04:36
Xylenes (total)	3.00 U		3.00	1.00	ug/L	1		09/01/21 04:36
Surrogates								
1,2-Dichloroethane-D4 (surr)	103		81-118		%	1		09/01/21 04:36
4-Bromofluorobenzene (surr)	103		85-114		%	1		09/01/21 04:36
Toluene-d8 (surr)	102		89-112		%	1		09/01/21 04:36

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Results of **NE-MW18-3**

Client Sample ID: **NE-MW18-3**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320004
Lab Project ID: 1215320

Collection Date: 08/18/21 13:27
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21120
Analytical Method: SW8260D
Analyst: JMG
Analytical Date/Time: 09/01/21 04:36
Container ID: 1215320004-F

Prep Batch: VXX37741
Prep Method: SW5030B
Prep Date/Time: 08/31/21 21:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW21-4**

Client Sample ID: **NE-MW21-4**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320005
Lab Project ID: 1215320

Collection Date: 08/18/21 14:11
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	0.556	U	0.556	0.167	mg/L	1		08/30/21 11:58
Surrogates								
5a Androstane (surr)	77.6		50-150		%	1		08/30/21 11:58

Batch Information

Analytical Batch: XFC16070
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/30/21 11:58
Container ID: 1215320005-A

Prep Batch: XXX45462
Prep Method: SW3520C
Prep Date/Time: 08/27/21 16:10
Prep Initial Wt./Vol.: 270 mL
Prep Extract Vol: 1 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	0.463	U	0.463	0.139	mg/L	1		08/30/21 11:58
Surrogates								
n-Triacontane-d62 (surr)	83.9		50-150		%	1		08/30/21 11:58

Batch Information

Analytical Batch: XFC16070
Analytical Method: AK103
Analyst: IVM
Analytical Date/Time: 08/30/21 11:58
Container ID: 1215320005-A

Prep Batch: XXX45462
Prep Method: SW3520C
Prep Date/Time: 08/27/21 16:10
Prep Initial Wt./Vol.: 270 mL
Prep Extract Vol: 1 mL

Print Date: 09/16/2021 1:34:43PM

Results of **NE-MW21-4**

Client Sample ID: **NE-MW21-4**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320005
Lab Project ID: 1215320

Collection Date: 08/18/21 14:11
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.100	U	0.100	0.0450	mg/L	1		08/27/21 05:31
Surrogates								
4-Bromofluorobenzene (surr)	87.4		50-150		%	1		08/27/21 05:31

Batch Information

Analytical Batch: VFC15781
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 08/27/21 05:31
Container ID: 1215320005-C

Prep Batch: VXX37714
Prep Method: SW5030B
Prep Date/Time: 08/26/21 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Results of **NE-MW21-4**

Client Sample ID: **NE-MW21-4**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320005
Lab Project ID: 1215320

Collection Date: 08/18/21 14:11
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:51
1,1,1-Trichloroethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,1,2,2-Tetrachloroethane	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:51
1,1,2-Trichloroethane	0.400 U		0.400	0.120	ug/L	1		09/01/21 04:51
1,1-Dichloroethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,1-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,1-Dichloropropene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,2,3-Trichlorobenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,2,3-Trichloropropane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,2,4-Trichlorobenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,2,4-Trimethylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,2-Dibromo-3-chloropropane	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:51
1,2-Dibromoethane	0.0750 U		0.0750	0.0180	ug/L	1		09/01/21 04:51
1,2-Dichlorobenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,2-Dichloroethane	0.500 U		0.500	0.200	ug/L	1		09/01/21 04:51
1,2-Dichloropropane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,3,5-Trimethylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,3-Dichlorobenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
1,3-Dichloropropane	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:51
1,4-Dichlorobenzene	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:51
2,2-Dichloropropane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
2-Butanone (MEK)	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:51
2-Chlorotoluene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
2-Hexanone	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:51
4-Chlorotoluene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
4-Isopropyltoluene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
4-Methyl-2-pentanone (MIBK)	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:51
Benzene	0.400 U		0.400	0.120	ug/L	1		09/01/21 04:51
Bromobenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Bromochloromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Bromodichloromethane	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:51
Bromoform	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Bromomethane	6.00 U		6.00	3.00	ug/L	1		09/01/21 04:51
Carbon disulfide	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:51
Carbon tetrachloride	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Chlorobenzene	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:51
Chloroethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51

Results of **NE-MW21-4**

Client Sample ID: **NE-MW21-4**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320005
Lab Project ID: 1215320

Collection Date: 08/18/21 14:11
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Chloromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
cis-1,2-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
cis-1,3-Dichloropropene	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:51
Dibromochloromethane	0.500 U		0.500	0.150	ug/L	1		09/01/21 04:51
Dibromomethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Dichlorodifluoromethane	1.59		1.00	0.310	ug/L	1		09/01/21 04:51
Ethylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Freon-113	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:51
Hexachlorobutadiene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Isopropylbenzene (Cumene)	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Methylene chloride	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:51
Methyl-t-butyl ether	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:51
Naphthalene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
n-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
n-Propylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
o-Xylene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
P & M -Xylene	2.00 U		2.00	0.620	ug/L	1		09/01/21 04:51
sec-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Styrene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
tert-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Tetrachloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Toluene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
trans-1,2-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
trans-1,3-Dichloropropene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Trichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Trichlorofluoromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 04:51
Vinyl acetate	10.0 U		10.0	3.10	ug/L	1		09/01/21 04:51
Vinyl chloride	0.150 U		0.150	0.0500	ug/L	1		09/01/21 04:51
Xylenes (total)	3.00 U		3.00	1.00	ug/L	1		09/01/21 04:51
Surrogates								
1,2-Dichloroethane-D4 (surr)	107		81-118		%	1		09/01/21 04:51
4-Bromofluorobenzene (surr)	99.3		85-114		%	1		09/01/21 04:51
Toluene-d8 (surr)	102		89-112		%	1		09/01/21 04:51

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Results of **NE-MW21-4**

Client Sample ID: **NE-MW21-4**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320005
Lab Project ID: 1215320

Collection Date: 08/18/21 14:11
Received Date: 08/20/21 10:21
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21120
Analytical Method: SW8260D
Analyst: JMG
Analytical Date/Time: 09/01/21 04:51
Container ID: 1215320005-F

Prep Batch: VXX37741
Prep Method: SW5030B
Prep Date/Time: 08/31/21 21:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:34:43PM

Results of **Trip Blanks**

Client Sample ID: **Trip Blanks**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320006
Lab Project ID: 1215320

Collection Date: 08/18/21 10:17
Received Date: 08/20/21 11:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	0.100	U	0.100	0.0450	mg/L	1		08/27/21 00:25
Surrogates								
4-Bromofluorobenzene (surr)	85.3		50-150		%	1		08/27/21 00:25

Batch Information

Analytical Batch: VFC15781
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 08/27/21 00:25
Container ID: 1215320006-A

Prep Batch: VXX37714
Prep Method: SW5030B
Prep Date/Time: 08/26/21 06:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Print Date: 09/16/2021 1:34:43PM

Results of **Trip Blanks**

Client Sample ID: **Trip Blanks**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320006
Lab Project ID: 1215320

Collection Date: 08/18/21 10:17
Received Date: 08/20/21 11:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 01:40
1,1,1-Trichloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,1,2,2-Tetrachloroethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 01:40
1,1,2-Trichloroethane	0.400	U	0.400	0.120	ug/L	1		09/01/21 01:40
1,1-Dichloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,1-Dichloroethene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,1-Dichloropropene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,2,3-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,2,3-Trichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,2,4-Trichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,2,4-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,2-Dibromo-3-chloropropane	10.0	U	10.0	3.10	ug/L	1		09/01/21 01:40
1,2-Dibromoethane	0.0750	U	0.0750	0.0180	ug/L	1		09/01/21 01:40
1,2-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,2-Dichloroethane	0.500	U	0.500	0.200	ug/L	1		09/01/21 01:40
1,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,3,5-Trimethylbenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,3-Dichlorobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
1,3-Dichloropropane	0.500	U	0.500	0.150	ug/L	1		09/01/21 01:40
1,4-Dichlorobenzene	0.500	U	0.500	0.150	ug/L	1		09/01/21 01:40
2,2-Dichloropropane	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
2-Butanone (MEK)	10.0	U	10.0	3.10	ug/L	1		09/01/21 01:40
2-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
2-Hexanone	10.0	U	10.0	3.10	ug/L	1		09/01/21 01:40
4-Chlorotoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
4-Isopropyltoluene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
4-Methyl-2-pentanone (MIBK)	10.0	U	10.0	3.10	ug/L	1		09/01/21 01:40
Benzene	0.400	U	0.400	0.120	ug/L	1		09/01/21 01:40
Bromobenzene	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
Bromochloromethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
Bromodichloromethane	0.500	U	0.500	0.150	ug/L	1		09/01/21 01:40
Bromoform	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
Bromomethane	6.00	U	6.00	3.00	ug/L	1		09/01/21 01:40
Carbon disulfide	10.0	U	10.0	3.10	ug/L	1		09/01/21 01:40
Carbon tetrachloride	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40
Chlorobenzene	0.500	U	0.500	0.150	ug/L	1		09/01/21 01:40
Chloroethane	1.00	U	1.00	0.310	ug/L	1		09/01/21 01:40

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Results of **Trip Blanks**

Client Sample ID: **Trip Blanks**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320006
Lab Project ID: 1215320

Collection Date: 08/18/21 10:17
Received Date: 08/20/21 11:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroform	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Chloromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
cis-1,2-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
cis-1,3-Dichloropropene	0.500 U		0.500	0.150	ug/L	1		09/01/21 01:40
Dibromochloromethane	0.500 U		0.500	0.150	ug/L	1		09/01/21 01:40
Dibromomethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Dichlorodifluoromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Ethylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Freon-113	10.0 U		10.0	3.10	ug/L	1		09/01/21 01:40
Hexachlorobutadiene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Isopropylbenzene (Cumene)	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Methylene chloride	10.0 U		10.0	3.10	ug/L	1		09/01/21 01:40
Methyl-t-butyl ether	10.0 U		10.0	3.10	ug/L	1		09/01/21 01:40
Naphthalene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
n-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
n-Propylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
o-Xylene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
P & M -Xylene	2.00 U		2.00	0.620	ug/L	1		09/01/21 01:40
sec-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Styrene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
tert-Butylbenzene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Tetrachloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Toluene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
trans-1,2-Dichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
trans-1,3-Dichloropropene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Trichloroethene	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Trichlorofluoromethane	1.00 U		1.00	0.310	ug/L	1		09/01/21 01:40
Vinyl acetate	10.0 U		10.0	3.10	ug/L	1		09/01/21 01:40
Vinyl chloride	0.150 U		0.150	0.0500	ug/L	1		09/01/21 01:40
Xylenes (total)	3.00 U		3.00	1.00	ug/L	1		09/01/21 01:40
Surrogates								
1,2-Dichloroethane-D4 (surr)	103		81-118		%	1		09/01/21 01:40
4-Bromofluorobenzene (surr)	103		85-114		%	1		09/01/21 01:40
Toluene-d8 (surr)	102		89-112		%	1		09/01/21 01:40

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Results of **Trip Blanks**

Client Sample ID: **Trip Blanks**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215320006
Lab Project ID: 1215320

Collection Date: 08/18/21 10:17
Received Date: 08/20/21 11:19
Matrix: Water (Surface, Eff., Ground)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21120
Analytical Method: SW8260D
Analyst: JMG
Analytical Date/Time: 09/01/21 01:40
Container ID: 1215320006-D

Prep Batch: VXX37741
Prep Method: SW5030B
Prep Date/Time: 08/31/21 21:00
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1824738 [VXX/37714]
Blank Lab ID: 1632741

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320001, 1215320002, 1215320004, 1215320005, 1215320006

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.0500U	0.100	0.0450	mg/L
Surrogates				
4-Bromofluorobenzene (surr)	79.9	50-150		%

Batch Information

Analytical Batch: VFC15781
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: MDT
Analytical Date/Time: 8/26/2021 12:29:00PM

Prep Batch: VXX37714
Prep Method: SW5030B
Prep Date/Time: 8/26/2021 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [VXX37714]
Blank Spike Lab ID: 1632744
Date Analyzed: 08/26/2021 13:23

Spike Duplicate ID: LCSD for HBN 1215320 [VXX37714]
Spike Duplicate Lab ID: 1632745
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320001, 1215320002, 1215320004, 1215320005, 1215320006

Results by **AK101**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	1.00	0.978	98	1.00	0.996	100	(60-120)	1.80	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	0.0500		98	0.0500		99	(50-150)	0.41	

Batch Information

Analytical Batch: **VFC15781**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **MDT**

Prep Batch: **VXX37714**
Prep Method: **SW5030B**
Prep Date/Time: **08/26/2021 06:00**
Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1824948 [VXX/37741]
Blank Lab ID: 1633694

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320001, 1215320002, 1215320004, 1215320005, 1215320006

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units
1,1,1,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,1-Trichloroethane	0.500U	1.00	0.310	ug/L
1,1,2,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,2-Trichloroethane	0.200U	0.400	0.120	ug/L
1,1-Dichloroethane	0.500U	1.00	0.310	ug/L
1,1-Dichloroethene	0.500U	1.00	0.310	ug/L
1,1-Dichloropropene	0.500U	1.00	0.310	ug/L
1,2,3-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,3-Trichloropropane	0.500U	1.00	0.310	ug/L
1,2,4-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,2-Dibromo-3-chloropropane	5.00U	10.0	3.10	ug/L
1,2-Dibromoethane	0.0375U	0.0750	0.0180	ug/L
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,2-Dichloroethane	0.250U	0.500	0.200	ug/L
1,2-Dichloropropane	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichloropropane	0.250U	0.500	0.150	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
2,2-Dichloropropane	0.500U	1.00	0.310	ug/L
2-Butanone (MEK)	5.00U	10.0	3.10	ug/L
2-Chlorotoluene	0.500U	1.00	0.310	ug/L
2-Hexanone	5.00U	10.0	3.10	ug/L
4-Chlorotoluene	0.500U	1.00	0.310	ug/L
4-Isopropyltoluene	0.500U	1.00	0.310	ug/L
4-Methyl-2-pentanone (MIBK)	5.00U	10.0	3.10	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Bromobenzene	0.500U	1.00	0.310	ug/L
Bromochloromethane	0.500U	1.00	0.310	ug/L
Bromodichloromethane	0.250U	0.500	0.150	ug/L
Bromoform	0.500U	1.00	0.310	ug/L
Bromomethane	3.00U	6.00	3.00	ug/L
Carbon disulfide	5.00U	10.0	3.10	ug/L
Carbon tetrachloride	0.500U	1.00	0.310	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Chloroethane	0.500U	1.00	0.310	ug/L
Chloroform	0.500U	1.00	0.310	ug/L

Method Blank

Blank ID: MB for HBN 1824948 [VXX/37741]
Blank Lab ID: 1633694

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320001, 1215320002, 1215320004, 1215320005, 1215320006

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units
Chloromethane	0.500U	1.00	0.310	ug/L
cis-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
cis-1,3-Dichloropropene	0.250U	0.500	0.150	ug/L
Dibromochloromethane	0.250U	0.500	0.150	ug/L
Dibromomethane	0.500U	1.00	0.310	ug/L
Dichlorodifluoromethane	0.500U	1.00	0.310	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Freon-113	5.00U	10.0	3.10	ug/L
Hexachlorobutadiene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Methylene chloride	5.00U	10.0	3.10	ug/L
Methyl-t-butyl ether	5.00U	10.0	3.10	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
n-Propylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
Styrene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Tetrachloroethene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
trans-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
trans-1,3-Dichloropropene	0.500U	1.00	0.310	ug/L
Trichloroethene	0.500U	1.00	0.310	ug/L
Trichlorofluoromethane	0.500U	1.00	0.310	ug/L
Vinyl acetate	5.00U	10.0	3.10	ug/L
Vinyl chloride	0.0750U	0.150	0.0500	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	106	81-118		%
4-Bromofluorobenzene (surr)	102	85-114		%
Toluene-d8 (surr)	102	89-112		%

Method Blank

Blank ID: MB for HBN 1824948 [VXX/37741]
Blank Lab ID: 1633694

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320001, 1215320002, 1215320004, 1215320005, 1215320006

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units

Batch Information

Analytical Batch: VMS21120
Analytical Method: SW8260D
Instrument: VPA 780/5975 GC/MS
Analyst: JMG
Analytical Date/Time: 8/31/2021 9:27:00PM

Prep Batch: VXX37741
Prep Method: SW5030B
Prep Date/Time: 8/31/2021 9:00:00PM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [VXX37741]
Blank Spike Lab ID: 1633695
Date Analyzed: 08/31/2021 21:42

Spike Duplicate ID: LCSD for HBN 1215320 [VXX37741]
Spike Duplicate Lab ID: 1633696
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320001, 1215320002, 1215320004, 1215320005, 1215320006

Results by **SW8260D**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,1,1,2-Tetrachloroethane	30	31.6	105	30	31.6	105	(78-124)	0.05	(< 20)
1,1,1-Trichloroethane	30	30.3	101	30	30.4	101	(74-131)	0.54	(< 20)
1,1,2,2-Tetrachloroethane	30	31.7	106	30	30.9	103	(71-121)	2.60	(< 20)
1,1,2-Trichloroethane	30	31.3	104	30	30.9	103	(80-119)	1.40	(< 20)
1,1-Dichloroethane	30	29.8	99	30	29.5	98	(77-125)	1.20	(< 20)
1,1-Dichloroethene	30	31.2	104	30	27.8	93	(71-131)	11.20	(< 20)
1,1-Dichloropropene	30	30.7	102	30	30.7	102	(79-125)	0.04	(< 20)
1,2,3-Trichlorobenzene	30	32.8	109	30	32.6	109	(69-129)	0.62	(< 20)
1,2,3-Trichloropropane	30	31.6	105	30	30.7	102	(73-122)	3.00	(< 20)
1,2,4-Trichlorobenzene	30	32.0	107	30	32.5	108	(69-130)	1.50	(< 20)
1,2,4-Trimethylbenzene	30	32.6	109	30	33.7	112	(79-124)	3.00	(< 20)
1,2-Dibromo-3-chloropropane	30	31.6	105	30	29.9	100	(62-128)	5.30	(< 20)
1,2-Dibromoethane	30	31.9	106	30	31.4	105	(77-121)	1.50	(< 20)
1,2-Dichlorobenzene	30	31.1	104	30	31.4	105	(80-119)	1.20	(< 20)
1,2-Dichloroethane	30	28.8	96	30	28.3	94	(73-128)	1.80	(< 20)
1,2-Dichloropropane	30	30.0	100	30	29.9	100	(78-122)	0.51	(< 20)
1,3,5-Trimethylbenzene	30	32.5	108	30	33.2	111	(75-124)	2.30	(< 20)
1,3-Dichlorobenzene	30	31.7	106	30	32.1	107	(80-119)	1.20	(< 20)
1,3-Dichloropropane	30	31.3	104	30	31.0	103	(80-119)	0.99	(< 20)
1,4-Dichlorobenzene	30	31.6	105	30	32.1	107	(79-118)	1.90	(< 20)
2,2-Dichloropropane	30	31.2	104	30	31.3	104	(60-139)	0.52	(< 20)
2-Butanone (MEK)	90	91.6	102	90	84.2	94	(56-143)	8.40	(< 20)
2-Chlorotoluene	30	31.7	106	30	32.4	108	(79-122)	1.90	(< 20)
2-Hexanone	90	96.1	107	90	89.5	100	(57-139)	7.10	(< 20)
4-Chlorotoluene	30	32.0	107	30	32.7	109	(78-122)	2.30	(< 20)
4-Isopropyltoluene	30	29.4	98	30	30.3	101	(77-127)	3.10	(< 20)
4-Methyl-2-pentanone (MIBK)	90	95.6	106	90	88.8	99	(67-130)	7.30	(< 20)
Benzene	30	30.0	100	30	29.8	99	(79-120)	0.76	(< 20)
Bromobenzene	30	30.3	101	30	31.0	103	(80-120)	2.30	(< 20)
Bromochloromethane	30	29.9	100	30	29.6	99	(78-123)	1.10	(< 20)
Bromodichloromethane	30	30.5	102	30	30.3	101	(79-125)	0.80	(< 20)
Bromoform	30	30.3	101	30	29.4	98	(66-130)	3.10	(< 20)
Bromomethane	30	28.9	97	30	29.0	97	(53-141)	0.16	(< 20)
Carbon disulfide	45	45.2	100	45	41.1	91	(64-133)	9.60	(< 20)

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [VXX37741]
Blank Spike Lab ID: 1633695
Date Analyzed: 08/31/2021 21:42

Spike Duplicate ID: LCSD for HBN 1215320 [VXX37741]
Spike Duplicate Lab ID: 1633696
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320001, 1215320002, 1215320004, 1215320005, 1215320006

Results by **SW8260D**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Carbon tetrachloride	30	31.0	103	30	31.0	103	(72-136)	0.13	(< 20)
Chlorobenzene	30	31.1	104	30	31.0	103	(82-118)	0.52	(< 20)
Chloroethane	30	29.8	99	30	28.0	93	(60-138)	6.30	(< 20)
Chloroform	30	28.9	96	30	28.7	96	(79-124)	0.68	(< 20)
Chloromethane	30	27.4	92	30	29.9	100	(50-139)	8.40	(< 20)
cis-1,2-Dichloroethene	30	29.8	99	30	29.2	97	(78-123)	2.10	(< 20)
cis-1,3-Dichloropropene	30	31.2	104	30	31.0	103	(75-124)	0.90	(< 20)
Dibromochloromethane	30	32.5	108	30	32.3	108	(74-126)	0.51	(< 20)
Dibromomethane	30	30.2	101	30	29.5	98	(79-123)	2.40	(< 20)
Dichlorodifluoromethane	30	33.5	112	30	32.4	108	(32-152)	3.30	(< 20)
Ethylbenzene	30	31.6	105	30	31.8	106	(79-121)	0.43	(< 20)
Freon-113	45	45.9	102	45	43.8	97	(70-136)	4.60	(< 20)
Hexachlorobutadiene	30	32.4	108	30	33.5	112	(66-134)	3.30	(< 20)
Isopropylbenzene (Cumene)	30	32.6	109	30	32.8	109	(72-131)	0.72	(< 20)
Methylene chloride	30	31.3	104	30	18.7	62	* (74-124)	50.40	* (< 20)
Methyl-t-butyl ether	45	48.3	107	45	47.0	104	(71-124)	2.90	(< 20)
Naphthalene	30	29.9	100	30	28.9	96	(61-128)	3.60	(< 20)
n-Butylbenzene	30	30.2	101	30	30.8	103	(75-128)	1.90	(< 20)
n-Propylbenzene	30	32.4	108	30	33.3	111	(76-126)	2.60	(< 20)
o-Xylene	30	31.6	105	30	31.7	106	(78-122)	0.25	(< 20)
P & M -Xylene	60	62.8	105	60	63.4	106	(80-121)	0.88	(< 20)
sec-Butylbenzene	30	33.0	110	30	33.7	112	(77-126)	2.00	(< 20)
Styrene	30	32.4	108	30	32.7	109	(78-123)	0.75	(< 20)
tert-Butylbenzene	30	32.6	109	30	33.3	111	(78-124)	2.20	(< 20)
Tetrachloroethene	30	31.6	105	30	31.9	106	(74-129)	0.94	(< 20)
Toluene	30	30.3	101	30	30.5	102	(80-121)	0.75	(< 20)
trans-1,2-Dichloroethene	30	31.4	105	30	31.2	104	(75-124)	0.75	(< 20)
trans-1,3-Dichloropropene	30	32.8	109	30	32.1	107	(73-127)	2.20	(< 20)
Trichloroethene	30	30.0	100	30	30.0	100	(79-123)	0.04	(< 20)
Trichlorofluoromethane	30	30.8	103	30	29.8	99	(65-141)	3.30	(< 20)
Vinyl acetate	30	29.9	100	30	28.3	94	(54-146)	5.60	(< 20)
Vinyl chloride	30	29.3	98	30	31.3	104	(58-137)	6.50	(< 20)
Xylenes (total)	90	94.5	105	90	95.1	106	(79-121)	0.67	(< 20)

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [VXX37741]
Blank Spike Lab ID: 1633695
Date Analyzed: 08/31/2021 21:42

Spike Duplicate ID: LCSD for HBN 1215320 [VXX37741]
Spike Duplicate Lab ID: 1633696
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320001, 1215320002, 1215320004, 1215320005, 1215320006

Results by **SW8260D**

	Blank Spike (%)			Spike Duplicate (%)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Surrogates									
1,2-Dichloroethane-D4 (surr)	30		99	30		97	(81-118)	2.10	
4-Bromofluorobenzene (surr)	30		100	30		101	(85-114)	1.80	
Toluene-d8 (surr)	30		103	30		103	(89-112)	0.45	

Batch Information

Analytical Batch: **VMS21120**
Analytical Method: **SW8260D**
Instrument: **VPA 780/5975 GC/MS**
Analyst: **JMG**

Prep Batch: **VXX37741**
Prep Method: **SW5030B**
Prep Date/Time: **08/31/2021 21:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1824993 [VXX/37749]
Blank Lab ID: 1633911

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320001

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units
4-Isopropyltoluene	0.500U	1.00	0.310	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	104	81-118		%
4-Bromofluorobenzene (surr)	103	85-114		%
Toluene-d8 (surr)	99.9	89-112		%

Batch Information

Analytical Batch: VMS21125
Analytical Method: SW8260D
Instrument: Agilent 7890-75MS
Analyst: JMG
Analytical Date/Time: 9/1/2021 10:48:00AM

Prep Batch: VXX37749
Prep Method: SW5030B
Prep Date/Time: 9/1/2021 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [VXX37749]
Blank Spike Lab ID: 1633912
Date Analyzed: 09/01/2021 11:03

Spike Duplicate ID: LCSD for HBN 1215320 [VXX37749]
Spike Duplicate Lab ID: 1633913
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320001

Results by **SW8260D**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
4-Isopropyltoluene	30	27.8	93	30	28.6	95	(77-127)	2.70	(< 20)
Naphthalene	30	26.1	87	30	28.5	95	(61-128)	8.70	(< 20)
Surrogates									
1,2-Dichloroethane-D4 (surr)	30		101	30		100	(81-118)	1.10	
4-Bromofluorobenzene (surr)	30		100	30		100	(85-114)	0.35	
Toluene-d8 (surr)	30		100	30		102	(89-112)	2.00	

Batch Information

Analytical Batch: **VMS21125**
Analytical Method: **SW8260D**
Instrument: **Agilent 7890-75MS**
Analyst: **JMG**

Prep Batch: **VXX37749**
Prep Method: **SW5030B**
Prep Date/Time: **09/01/2021 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1824994 [VXX/37750]
Blank Lab ID: 1633914

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320003

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	0.0500U	0.100	0.0450	mg/L
Surrogates				
4-Bromofluorobenzene (surr)	85.8	50-150		%

Batch Information

Analytical Batch: VFC15790
Analytical Method: AK101
Instrument: Agilent 7890A PID/FID
Analyst: MDT
Analytical Date/Time: 9/1/2021 8:30:00AM

Prep Batch: VXX37750
Prep Method: SW5030B
Prep Date/Time: 9/1/2021 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [VXX37750]
Blank Spike Lab ID: 1633915
Date Analyzed: 09/01/2021 19:56

Spike Duplicate ID: LCSD for HBN 1215320 [VXX37750]
Spike Duplicate Lab ID: 1633916
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320003

Results by **AK101**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	1.00	1.00	100	1.00	1.01	101	(60-120)	0.65	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	0.0500		117	0.0500		116	(50-150)	1.00	

Batch Information

Analytical Batch: **VFC15790**
Analytical Method: **AK101**
Instrument: **Agilent 7890A PID/FID**
Analyst: **MDT**

Prep Batch: **VXX37750**
Prep Method: **SW5030B**
Prep Date/Time: **09/01/2021 06:00**
Spike Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 1.00 mg/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1825017 [VXX/37753]
Blank Lab ID: 1633985

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320003

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units
1,1,1,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,1-Trichloroethane	0.500U	1.00	0.310	ug/L
1,1,2,2-Tetrachloroethane	0.250U	0.500	0.150	ug/L
1,1,2-Trichloroethane	0.200U	0.400	0.120	ug/L
1,1-Dichloroethane	0.500U	1.00	0.310	ug/L
1,1-Dichloroethene	0.500U	1.00	0.310	ug/L
1,1-Dichloropropene	0.500U	1.00	0.310	ug/L
1,2,3-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,3-Trichloropropane	0.500U	1.00	0.310	ug/L
1,2,4-Trichlorobenzene	0.500U	1.00	0.310	ug/L
1,2,4-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,2-Dibromo-3-chloropropane	5.00U	10.0	3.10	ug/L
1,2-Dibromoethane	0.0375U	0.0750	0.0180	ug/L
1,2-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,2-Dichloroethane	0.250U	0.500	0.200	ug/L
1,2-Dichloropropane	0.500U	1.00	0.310	ug/L
1,3,5-Trimethylbenzene	0.500U	1.00	0.310	ug/L
1,3-Dichlorobenzene	0.500U	1.00	0.310	ug/L
1,3-Dichloropropane	0.250U	0.500	0.150	ug/L
1,4-Dichlorobenzene	0.250U	0.500	0.150	ug/L
2,2-Dichloropropane	0.500U	1.00	0.310	ug/L
2-Butanone (MEK)	5.00U	10.0	3.10	ug/L
2-Chlorotoluene	0.500U	1.00	0.310	ug/L
2-Hexanone	5.00U	10.0	3.10	ug/L
4-Chlorotoluene	0.500U	1.00	0.310	ug/L
4-Isopropyltoluene	0.500U	1.00	0.310	ug/L
4-Methyl-2-pentanone (MIBK)	5.00U	10.0	3.10	ug/L
Benzene	0.200U	0.400	0.120	ug/L
Bromobenzene	0.500U	1.00	0.310	ug/L
Bromochloromethane	0.500U	1.00	0.310	ug/L
Bromodichloromethane	0.250U	0.500	0.150	ug/L
Bromoform	0.500U	1.00	0.310	ug/L
Bromomethane	3.00U	6.00	3.00	ug/L
Carbon disulfide	5.00U	10.0	3.10	ug/L
Carbon tetrachloride	0.500U	1.00	0.310	ug/L
Chlorobenzene	0.250U	0.500	0.150	ug/L
Chloroethane	0.500U	1.00	0.310	ug/L
Chloroform	0.500U	1.00	0.310	ug/L

Method Blank

Blank ID: MB for HBN 1825017 [VXX/37753]
Blank Lab ID: 1633985

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320003

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units
Chloromethane	0.500U	1.00	0.310	ug/L
cis-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
cis-1,3-Dichloropropene	0.250U	0.500	0.150	ug/L
Dibromochloromethane	0.250U	0.500	0.150	ug/L
Dibromomethane	0.500U	1.00	0.310	ug/L
Dichlorodifluoromethane	0.500U	1.00	0.310	ug/L
Ethylbenzene	0.500U	1.00	0.310	ug/L
Freon-113	5.00U	10.0	3.10	ug/L
Hexachlorobutadiene	0.500U	1.00	0.310	ug/L
Isopropylbenzene (Cumene)	0.500U	1.00	0.310	ug/L
Methylene chloride	5.00U	10.0	3.10	ug/L
Methyl-t-butyl ether	5.00U	10.0	3.10	ug/L
Naphthalene	0.500U	1.00	0.310	ug/L
n-Butylbenzene	0.500U	1.00	0.310	ug/L
n-Propylbenzene	0.500U	1.00	0.310	ug/L
o-Xylene	0.500U	1.00	0.310	ug/L
P & M -Xylene	1.00U	2.00	0.620	ug/L
sec-Butylbenzene	0.500U	1.00	0.310	ug/L
Styrene	0.500U	1.00	0.310	ug/L
tert-Butylbenzene	0.500U	1.00	0.310	ug/L
Tetrachloroethene	0.500U	1.00	0.310	ug/L
Toluene	0.500U	1.00	0.310	ug/L
trans-1,2-Dichloroethene	0.500U	1.00	0.310	ug/L
trans-1,3-Dichloropropene	0.500U	1.00	0.310	ug/L
Trichloroethene	0.500U	1.00	0.310	ug/L
Trichlorofluoromethane	0.500U	1.00	0.310	ug/L
Vinyl acetate	5.00U	10.0	3.10	ug/L
Vinyl chloride	0.0750U	0.150	0.0500	ug/L
Xylenes (total)	1.50U	3.00	1.00	ug/L
Surrogates				
1,2-Dichloroethane-D4 (surr)	105	81-118		%
4-Bromofluorobenzene (surr)	102	85-114		%
Toluene-d8 (surr)	102	89-112		%

Method Blank

Blank ID: MB for HBN 1825017 [VXX/37753]
Blank Lab ID: 1633985

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320003

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units

Batch Information

Analytical Batch: VMS21127
Analytical Method: SW8260D
Instrument: VPA 780/5975 GC/MS
Analyst: JMG
Analytical Date/Time: 9/1/2021 10:47:00AM

Prep Batch: VXX37753
Prep Method: SW5030B
Prep Date/Time: 9/1/2021 6:00:00AM
Prep Initial Wt./Vol.: 5 mL
Prep Extract Vol: 5 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [VXX37753]
Blank Spike Lab ID: 1633986
Date Analyzed: 09/01/2021 11:02

Spike Duplicate ID: LCSD for HBN 1215320 [VXX37753]
Spike Duplicate Lab ID: 1633987
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320003

Results by **SW8260D**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,1,1,2-Tetrachloroethane	30	32.5	108	30	32.2	107	(78-124)	0.89	(< 20)
1,1,1-Trichloroethane	30	30.7	102	30	30.2	101	(74-131)	1.70	(< 20)
1,1,2,2-Tetrachloroethane	30	31.1	104	30	30.3	101	(71-121)	2.60	(< 20)
1,1,2-Trichloroethane	30	31.3	104	30	30.8	103	(80-119)	1.50	(< 20)
1,1-Dichloroethane	30	30.1	100	30	29.7	99	(77-125)	1.60	(< 20)
1,1-Dichloroethene	30	32.6	109	30	28.6	95	(71-131)	12.90	(< 20)
1,1-Dichloropropene	30	30.8	103	30	30.2	101	(79-125)	1.90	(< 20)
1,2,3-Trichlorobenzene	30	32.7	109	30	31.9	106	(69-129)	2.50	(< 20)
1,2,3-Trichloropropane	30	30.7	102	30	29.8	99	(73-122)	3.10	(< 20)
1,2,4-Trichlorobenzene	30	32.4	108	30	31.9	106	(69-130)	1.50	(< 20)
1,2,4-Trimethylbenzene	30	33.6	112	30	32.7	109	(79-124)	2.70	(< 20)
1,2-Dibromo-3-chloropropane	30	29.9	100	30	28.7	96	(62-128)	4.10	(< 20)
1,2-Dibromoethane	30	31.7	106	30	31.6	105	(77-121)	0.51	(< 20)
1,2-Dichlorobenzene	30	31.4	105	30	31.2	104	(80-119)	0.56	(< 20)
1,2-Dichloroethane	30	28.9	96	30	28.7	96	(73-128)	0.51	(< 20)
1,2-Dichloropropane	30	30.3	101	30	29.9	100	(78-122)	1.30	(< 20)
1,3,5-Trimethylbenzene	30	33.1	110	30	32.5	108	(75-124)	1.80	(< 20)
1,3-Dichlorobenzene	30	32.4	108	30	31.5	105	(80-119)	2.80	(< 20)
1,3-Dichloropropane	30	31.6	105	30	31.2	104	(80-119)	1.30	(< 20)
1,4-Dichlorobenzene	30	32.0	107	30	32.1	107	(79-118)	0.07	(< 20)
2,2-Dichloropropane	30	31.6	105	30	30.9	103	(60-139)	2.00	(< 20)
2-Butanone (MEK)	90	84.7	94	90	80.0	89	(56-143)	5.70	(< 20)
2-Chlorotoluene	30	32.3	108	30	31.5	105	(79-122)	2.50	(< 20)
2-Hexanone	90	90.4	100	90	87.0	97	(57-139)	3.90	(< 20)
4-Chlorotoluene	30	32.6	109	30	31.8	106	(78-122)	2.50	(< 20)
4-Isopropyltoluene	30	30.5	102	30	29.1	97	(77-127)	4.50	(< 20)
4-Methyl-2-pentanone (MIBK)	90	90.7	101	90	87.5	97	(67-130)	3.60	(< 20)
Benzene	30	30.2	101	30	29.7	99	(79-120)	1.60	(< 20)
Bromobenzene	30	31.1	104	30	30.6	102	(80-120)	1.60	(< 20)
Bromochloromethane	30	30.4	101	30	30.2	101	(78-123)	0.80	(< 20)
Bromodichloromethane	30	30.9	103	30	30.5	102	(79-125)	1.10	(< 20)
Bromoform	30	29.9	100	30	29.4	98	(66-130)	1.70	(< 20)
Bromomethane	30	29.2	97	30	32.2	107	(53-141)	10.00	(< 20)
Carbon disulfide	45	49.7	110	45	44.1	98	(64-133)	11.90	(< 20)

Print Date: 09/16/2021 1:35:07PM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [VXX37753]
Blank Spike Lab ID: 1633986
Date Analyzed: 09/01/2021 11:02

Spike Duplicate ID: LCSD for HBN 1215320 [VXX37753]
Spike Duplicate Lab ID: 1633987
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320003

Results by **SW8260D**

	Blank Spike (ug/L)			Spike Duplicate (ug/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Carbon tetrachloride	30	31.7	106	30	30.9	103	(72-136)	2.40	(< 20)
Chlorobenzene	30	31.5	105	30	31.2	104	(82-118)	0.91	(< 20)
Chloroethane	30	31.1	104	30	33.0	110	(60-138)	5.90	(< 20)
Chloroform	30	29.3	98	30	29.0	97	(79-124)	1.10	(< 20)
Chloromethane	30	28.3	94	30	27.8	93	(50-139)	1.70	(< 20)
cis-1,2-Dichloroethene	30	30.5	102	30	29.5	98	(78-123)	3.20	(< 20)
cis-1,3-Dichloropropene	30	31.0	103	30	30.9	103	(75-124)	0.17	(< 20)
Dibromochloromethane	30	32.9	110	30	32.5	108	(74-126)	1.30	(< 20)
Dibromomethane	30	29.7	99	30	29.6	99	(79-123)	0.15	(< 20)
Dichlorodifluoromethane	30	30.5	102	30	30.5	102	(32-152)	0.20	(< 20)
Ethylbenzene	30	32.1	107	30	32.0	107	(79-121)	0.32	(< 20)
Freon-113	45	51.6	115	45	47.0	104	(70-136)	9.30	(< 20)
Hexachlorobutadiene	30	33.2	111	30	32.8	109	(66-134)	1.20	(< 20)
Isopropylbenzene (Cumene)	30	33.2	111	30	32.7	109	(72-131)	1.40	(< 20)
Methylene chloride	30	31.1	104	30	30.2	101	(74-124)	2.90	(< 20)
Methyl-t-butyl ether	45	47.3	105	45	46.7	104	(71-124)	1.30	(< 20)
Naphthalene	30	28.4	95	30	28.0	93	(61-128)	1.30	(< 20)
n-Butylbenzene	30	30.9	103	30	29.8	99	(75-128)	3.40	(< 20)
n-Propylbenzene	30	32.7	109	30	32.3	108	(76-126)	1.30	(< 20)
o-Xylene	30	32.2	107	30	31.9	106	(78-122)	0.94	(< 20)
P & M -Xylene	60	64.5	108	60	63.8	106	(80-121)	1.10	(< 20)
sec-Butylbenzene	30	33.6	112	30	32.6	109	(77-126)	3.00	(< 20)
Styrene	30	33.0	110	30	32.9	110	(78-123)	0.48	(< 20)
tert-Butylbenzene	30	33.0	110	30	32.4	108	(78-124)	1.80	(< 20)
Tetrachloroethene	30	32.4	108	30	32.0	107	(74-129)	1.30	(< 20)
Toluene	30	30.8	103	30	30.5	102	(80-121)	1.10	(< 20)
trans-1,2-Dichloroethene	30	31.7	106	30	30.8	103	(75-124)	2.70	(< 20)
trans-1,3-Dichloropropene	30	32.2	107	30	32.5	108	(73-127)	0.91	(< 20)
Trichloroethene	30	30.3	101	30	29.9	100	(79-123)	1.30	(< 20)
Trichlorofluoromethane	30	33.0	110	30	32.7	109	(65-141)	0.93	(< 20)
Vinyl acetate	30	28.5	95	30	27.8	93	(54-146)	2.60	(< 20)
Vinyl chloride	30	32.0	107	30	30.1	100	(58-137)	6.10	(< 20)
Xylenes (total)	90	96.7	107	90	95.7	106	(79-121)	1.10	(< 20)

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [VXX37753]
Blank Spike Lab ID: 1633986
Date Analyzed: 09/01/2021 11:02

Spike Duplicate ID: LCSD for HBN 1215320 [VXX37753]
Spike Duplicate Lab ID: 1633987
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320003

Results by **SW8260D**

	Blank Spike (%)			Spike Duplicate (%)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Surrogates									
1,2-Dichloroethane-D4 (surr)	30		100	30		100	(81-118)	0.06	
4-Bromofluorobenzene (surr)	30		100	30		99	(85-114)	0.75	
Toluene-d8 (surr)	30		104	30		104	(89-112)	0.40	

Batch Information

Analytical Batch: **VMS21127**
Analytical Method: **SW8260D**
Instrument: **VPA 780/5975 GC/MS**
Analyst: **JMG**

Prep Batch: **VXX37753**
Prep Method: **SW5030B**
Prep Date/Time: **09/01/2021 06:00**
Spike Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL
Dupe Init Wt./Vol.: 30 ug/L Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1824672 [XXX/45455]
Blank Lab ID: 1632424

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320001, 1215320002, 1215320003, 1215320004

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	0.300U	0.600	0.180	mg/L
Surrogates				
5a Androstane (surr)	79.2	60-120		%

Batch Information

Analytical Batch: XFC16065
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: IVM
Analytical Date/Time: 8/27/2021 11:25:00AM

Prep Batch: XXX45455
Prep Method: SW3520C
Prep Date/Time: 8/26/2021 4:10:29PM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [XXX45455]
Blank Spike Lab ID: 1632425
Date Analyzed: 08/27/2021 11:35

Spike Duplicate ID: LCSD for HBN 1215320 [XXX45455]
Spike Duplicate Lab ID: 1632426
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320001, 1215320002, 1215320003, 1215320004

Results by **AK102**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	20	19.0	95	20	16.1	81	(75-125)	16.80	(< 20)
Surrogates									
5a Androstane (surr)	0.4		104	0.4		96	(60-120)	7.70	

Batch Information

Analytical Batch: **XFC16065**
Analytical Method: **AK102**
Instrument: **Agilent 7890B F**
Analyst: **IVM**

Prep Batch: **XXX45455**
Prep Method: **SW3520C**
Prep Date/Time: **08/26/2021 16:10**
Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1824672 [XXX/45455]
Blank Lab ID: 1632424

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320001, 1215320002, 1215320003, 1215320004

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	0.250U	0.500	0.150	mg/L
Surrogates				
n-Triacontane-d62 (surr)	86.9	60-120		%

Batch Information

Analytical Batch: XFC16065
Analytical Method: AK103
Instrument: Agilent 7890B F
Analyst: IVM
Analytical Date/Time: 8/27/2021 11:25:00AM

Prep Batch: XXX45455
Prep Method: SW3520C
Prep Date/Time: 8/26/2021 4:10:29PM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [XXX45455]
Blank Spike Lab ID: 1632425
Date Analyzed: 08/27/2021 11:35

Spike Duplicate ID: LCSD for HBN 1215320 [XXX45455]
Spike Duplicate Lab ID: 1632426
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320001, 1215320002, 1215320003, 1215320004

Results by **AK103**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	20	19.1	95	20	17.9	89	(60-120)	6.60	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	0.4		95	0.4		92	(60-120)	3.20	

Batch Information

Analytical Batch: **XFC16065**
Analytical Method: **AK103**
Instrument: **Agilent 7890B F**
Analyst: **IVM**

Prep Batch: **XXX45455**
Prep Method: **SW3520C**
Prep Date/Time: **08/26/2021 16:10**
Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1824751 [XXX/45462]
Blank Lab ID: 1632800

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320005

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	0.300U	0.600	0.180	mg/L
Surrogates				
5a Androstane (surr)	89.5	60-120		%

Batch Information

Analytical Batch: XFC16070
Analytical Method: AK102
Instrument: Agilent 7890B R
Analyst: IVM
Analytical Date/Time: 8/30/2021 11:19:00AM

Prep Batch: XXX45462
Prep Method: SW3520C
Prep Date/Time: 8/27/2021 4:10:09PM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [XXX45462]
Blank Spike Lab ID: 1632801
Date Analyzed: 08/30/2021 11:29

Spike Duplicate ID: LCSD for HBN 1215320 [XXX45462]
Spike Duplicate Lab ID: 1632802
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320005

Results by **AK102**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	20	18.9	95	20	15.7	79	(75-125)	18.30	(< 20)
Surrogates									
5a Androstane (surr)	0.4		104	0.4		87	(60-120)	17.60	

Batch Information

Analytical Batch: **XFC16070**
Analytical Method: **AK102**
Instrument: **Agilent 7890B R**
Analyst: **IVM**

Prep Batch: **XXX45462**
Prep Method: **SW3520C**
Prep Date/Time: **08/27/2021 16:10**
Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

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Method Blank

Blank ID: MB for HBN 1824751 [XXX/45462]
Blank Lab ID: 1632800

Matrix: Water (Surface, Eff., Ground)

QC for Samples:
1215320005

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	0.158J	0.500	0.150	mg/L
Surrogates				
n-Triacontane-d62 (surr)	96.9	60-120		%

Batch Information

Analytical Batch: XFC16070
Analytical Method: AK103
Instrument: Agilent 7890B R
Analyst: IVM
Analytical Date/Time: 8/30/2021 11:19:00AM

Prep Batch: XXX45462
Prep Method: SW3520C
Prep Date/Time: 8/27/2021 4:10:09PM
Prep Initial Wt./Vol.: 250 mL
Prep Extract Vol: 1 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215320 [XXX45462]
Blank Spike Lab ID: 1632801
Date Analyzed: 08/30/2021 11:29

Spike Duplicate ID: LCSD for HBN 1215320 [XXX45462]
Spike Duplicate Lab ID: 1632802
Matrix: Water (Surface, Eff., Ground)

QC for Samples: 1215320005

Results by **AK103**

	Blank Spike (mg/L)			Spike Duplicate (mg/L)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	20	17.7	89	20	15.0	75	(60-120)	1640	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	0.4		98	0.4		79	(60-120)	21.90	

Batch Information

Analytical Batch: **XFC16070**
Analytical Method: **AK103**
Instrument: **Agilent 7890B R**
Analyst: **IVM**

Prep Batch: **XXX45462**
Prep Method: **SW3520C**
Prep Date/Time: **08/27/2021 16:10**
Spike Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL
Dupe Init Wt./Vol.: 20 mg/L Extract Vol: 1 mL

Print Date: 09/16/2021 1:35:26PM

CHAIN-OF-CUSTODY RECORD

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
2355 Hill Road
Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

Laboratory SGS
Attn: Jen Dawkins

Turn Around Time:	Quote No:	MSA Number: MSA-SGS-2016	J-Flags: Yes ☐ No ☒
☒ Normal ☐ Rush			
Please Specify			

Analytical Methods (include preservative if used)

1215320

Sample Identity	Lab No.	Time	Date Sampled	GRO (AK101)	VOC (8260D)	DRO (AK102)	RRO (AK103)					Remarks/Matrix Composition/Grab? Sample Containers
NE-MW17-1	1AH	1517	8/18/21	X	X						8	Groundwater
NE-MW17-101	2AH	1507		X	X						8	
NE-MW18-2	3AH	1017		X	X						8	
NE-MW18-3	4AH	1327		X	X						8	
NE-MW21-4	5AH	1411		X	X						8	
Trip Blank	6AF			X							1	

Project Information	
Number:	11729-071
Name:	Nenana MS
Contact:	TXG
Ongoing Project?	Yes ☐ No ☒
Sampler:	DHF

Sample Receipt	
Total No. of Containers:	41
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	2.2
Delivery Method:	hand

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Time: 910	Signature: Time: 1500	Signature: Time:
Printed Name: Dana Fjare Date: 8/19/21	Printed Name: Date: 8/19/21	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company: SGS	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time: 0910	Signature: Time:	Signature: Time: 1021
Printed Name: Jen Dawkins Date: 8/19/21	Printed Name: Date:	Printed Name: Chris Chmura Date: 08/20/21
Company: SGS	Company:	Company: SGS 3.3°C IFR 1B DSO

Notes:

Trip Blank remained in cooler with Samples at all times.

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - job file

No.

e-Sample Receipt Form FBK

SGS Workorder #: **S&W** | S&W

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		Yes — Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
☐ **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 2.2 °C Therm. ID: D57
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
If >6°C, were samples collected <8 hours ago?		
If <0°C, were sample containers ice free?		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	N/C	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were samples in good condition (no leaks/cracks/breakage)?	Yes	
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/C	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	
For Rush/Short Hold Time, was RUSH/Short HT email sent?	N/A	
Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.		

Additional notes (if applicable):

SGS Profile #	350627	350627

e-Sample Receipt Form

SGS Workorder #: **1215320** | 1215320

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F,1B
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 3.3 °C Therm. ID: D50
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.	N/A	Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
		N/A ***Exemption permitted for metals (e.g,200.8/6020B).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	Yes	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1215320001-A	HCL to pH < 2	OK			
1215320001-B	HCL to pH < 2	OK			
1215320001-C	HCL to pH < 2	OK			
1215320001-D	HCL to pH < 2	OK			
1215320001-E	HCL to pH < 2	OK			
1215320001-F	HCL to pH < 2	OK			
1215320001-G	HCL to pH < 2	OK			
1215320001-H	HCL to pH < 2	OK			
1215320002-A	HCL to pH < 2	OK			
1215320002-B	HCL to pH < 2	OK			
1215320002-C	HCL to pH < 2	OK			
1215320002-D	HCL to pH < 2	OK			
1215320002-E	HCL to pH < 2	OK			
1215320002-F	HCL to pH < 2	OK			
1215320002-G	HCL to pH < 2	OK			
1215320002-H	HCL to pH < 2	OK			
1215320003-A	HCL to pH < 2	OK			
1215320003-B	HCL to pH < 2	OK			
1215320003-C	HCL to pH < 2	OK			
1215320003-D	HCL to pH < 2	OK			
1215320003-E	HCL to pH < 2	OK			
1215320003-F	HCL to pH < 2	OK			
1215320003-G	HCL to pH < 2	OK			
1215320003-H	HCL to pH < 2	OK			
1215320004-A	HCL to pH < 2	OK			
1215320004-B	HCL to pH < 2	OK			
1215320004-C	HCL to pH < 2	OK			
1215320004-D	HCL to pH < 2	OK			
1215320004-E	HCL to pH < 2	OK			
1215320004-F	HCL to pH < 2	OK			
1215320004-G	HCL to pH < 2	OK			
1215320004-H	HCL to pH < 2	OK			
1215320005-A	HCL to pH < 2	OK			
1215320005-B	HCL to pH < 2	OK			
1215320005-C	HCL to pH < 2	OK			
1215320005-D	HCL to pH < 2	OK			
1215320005-E	HCL to pH < 2	OK			
1215320005-F	HCL to pH < 2	OK			
1215320005-G	HCL to pH < 2	OK			
1215320005-H	HCL to pH < 2	OK			
1215320006-A	HCL to pH < 2	OK			
1215320006-B	HCL to pH < 2	OK			
1215320006-C	HCL to pH < 2	OK			
1215320006-D	HCL to pH < 2	OK			
1215320006-E	HCL to pH < 2	OK			
1215320006-F	HCL to pH < 2	OK			

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM - The container was received damaged.
FR - The container was received frozen and not usable for Bacteria or BOD analyses.
IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.
NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
QN - Insufficient sample quantity provided.

Laboratory Data Review Checklist

Completed By:

Justin Risley

Title:

Engineering Staff

Date:

October 4, 2021

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

SGS North America, Inc.

Laboratory Report Number:

1215320

Laboratory Report Date:

9/16/2021

CS Site Name:

DOT&PF Nenana Maintenance Station

ADEC File Number:

110.38.012

Hazard Identification Number:

26544

1215320

Laboratory Report Date:

9/16/2021

CS Site Name:

DOT&PF Nenana Maintenance Station

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   Yes☒ No☐ N/A☐ Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Analyses were performed by SGS North America in Anchorage, AK.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☒ No☐ N/A☐ Comments:

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   Yes☒ No☐ N/A☐ Comments:

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CS Site Name:

DOT&PF Nenana Maintenance Station

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes☒ No☐ N/A☐ Comments:

The laboratory noted that samples were received in acceptable condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

The laboratory did not note any sample handling discrepancies.

e. Data quality or usability affected?

Comments:

Data quality and usability were not affected; see above.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

Yes☒ No☐ N/A☐ Comments:

The EPA method 8260D laboratory control sample duplicate (LCSD) reported with preparation batch VXX3774 exhibited low recovery for methylene chloride. The associated laboratory control sample (LCS) exhibited passing recovery. Subsequently, the relative precision demonstrated between the methylene chloride recoveries of the LCS and LCSD did not meet acceptance criteria.

c. Were all corrective actions documented?

Yes☐ No☐ N/A☒ Comments:

The laboratory did not specify any corrective actions.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The laboratory did not specify an effect on data quality or usability. See section 6.b for further assessment.

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5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☐ No☐ N/A☒ Comments:

The sample matrix is groundwater.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☐ No☒ N/A☐ Comments:

The LOQs are generally less than their associated ADEC cleanup levels. However, 1,2,3-trichloropropane and 1,2-dibromoethane were not detected in the project samples and reported at LOQs exceeding their respective DEC Groundwater Cleanup Levels.

e. Data quality or usability affected?

We cannot assess if the above listed analytes are present in the project sample at concentrations below the laboratory LOQs but above their respective DEC cleanup levels.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

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ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

However, residual range organics (RRO) were detected at an estimated concentration of 0.158 J mg/L in the method blank sample reported for preparation batch XXX45462.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

The associated sample, *NE-MW21-4*, did not contain a detectable concentration of RRO; therefore, it is not considered affected and qualification is not required.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

The samples were not meaningfully affected by laboratory/method contamination.

v. Data quality or usability affected?

Comments:

Data quality and/or usability are not affected; see above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

Metals/Inorganics analyses were not requested with this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

The EPA method 8260D LCSD reported with preparatory batch VXX37741 exhibited low recovery for methylene chloride.

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iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☐ No☒ N/A☐ Comments:

The relative precision demonstrated between the methylene chloride recoveries of the EPA method 8260D LCS and LCSD reported with preparation batch VXX37741 did not meet acceptance criteria.

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

Project samples *NE-MW17-1, NE-MW17-101, NE-MW18-3, NE-MW21-4,* and *Trip Blank* are associated with preparatory batch VXX37741. Methyl chloride was not detected in any of the associated samples. These samples may be affected by low method recovery for methylene chloride.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☒ No☐ N/A☐ Comments:

The non-detect methylene chloride results of samples *NE-MW17-1, NE-MW17-101, NE-MW18-3,* and *NE-MW21-4* are considered estimated and flagged 'UJ' for reporting purposes.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality is affected; see above for applied qualifiers.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☐ Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☐ Comments:

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iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☐ No☐ N/A☐ Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☐ No☐ N/A☐ Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☐ Comments:

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☒ No☐ N/A☐ Comments:

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iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

There are no surrogate recovery failures reported for this work order.

iv. Data quality or usability affected?

Comments:

Data quality and/or usability are not affected; see above.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☒ No☐ N/A☐ Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☒ No☐ N/A☐ Comments:

iii. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

N/A; target analytes were not detected in the trip blank.

v. Data quality or usability affected?

Comments:

Data quality and/or usability are not affected; see above.

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f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The field duplicate sample pair *NE-MW17-1* and *NE-MW17-101* was submitted to the laboratory.

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

The relative precision demonstrated between the detected results of the field duplicate samples was within the recommended DQO of 30% for all analytes.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and/or usability is not affected; see above.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☐ No☐ N/A☒ Comments:

An equipment blank was not collected with this work order. However, equipment blank samples are collected at the frequency required for the overall project.

i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

An equipment blank was not submitted with this work order.

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Laboratory Report Date:

9/16/2021

CS Site Name:

DOT&PF Nenana Maintenance Station

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

N/A; an equipment blank was not submitted with this work order.

iii. Data quality or usability affected?

Comments:

Data quality and/or usability is not affected; see above.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes☐ No☐ N/A☒ Comments:

Additional data flags/qualifiers were not required.

Laboratory Report of Analysis

To: Shannon & Wilson-Fairbanks
2355 Hill Road
Fairbanks, AK 99709
(907)458-3153

Report Number: **1215323**

Client Project: **11729-071 Nenana MS**

Dear Tiffany Green,

Enclosed are the results of the analytical services performed under the referenced project for the received samples and associated QC as applicable. The samples are certified to meet the requirements of the National Environmental Laboratory Accreditation Conference Standards. Copies of this report and supporting data will be retained in our files for a period of ten years in the event they are required for future reference. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. Any samples submitted to our laboratory will be retained for a maximum of fourteen (14) days from the date of this report unless other archiving requirements were included in the quote.

If there are any questions about the report or services performed during this project, please call Jennifer at (907) 562-2343. We will be happy to answer any questions or concerns which you may have.

Thank you for using SGS North America Inc. for your analytical services. We look forward to working with you again on any additional analytical needs.

Sincerely,
SGS North America Inc.

Stephen C. Ede 2021.08.30 09:40:23 -08'00'

Jennifer Dawkins Date
Project Manager
Jennifer.Dawkins@sgs.com

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Case Narrative

SGS Client: **Shannon & Wilson-Fairbanks**
SGS Project: **1215323**
Project Name/Site: **11729-071 Nenana MS**
Project Contact: **Tiffany Green**

Refer to sample receipt form for information on sample condition.

*QC comments may be associated with the field samples found in this report. When applicable, comments will be applied to associated field samples.

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Laboratory Qualifiers

Enclosed are the analytical results associated with the above work order. The results apply to the samples as received. All results are intended to be used in their entirety and SGS is not responsible for use of less than the complete report. This document is issued by the Company under its General Conditions of Service accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indenmification and jurisdiction issues defined therein.

Any holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. Any unauthorized alteration, forgery or falsification of the context or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020B, 7470A, 7471B, 8015C, 8021B, 8082A, 8260D, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). SGS is only certified for the analytes listed on our Drinking Water Certification (DW methods: 200.8, 2130B, 2320B, 2510B, 300.0, 4500-CN-C,E, 4500-H-B, 4500-NO3-F, 4500-P-E and 524.2) and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

The following descriptors or qualifiers may be found in your report:

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
IB	Instrument Blank
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
TNTC	Too Numerous To Count
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content. All DRO/RRO analyses are integrated per SOP.

SGS North America Inc. 200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Sample Summary

Client Sample ID	Lab Sample ID	Collected	Received	Matrix
NE21-SB-1	1215323001	08/17/2021	08/20/2021	Soil/Solid (dry weight)
NE21-SB-101	1215323002	08/17/2021	08/20/2021	Soil/Solid (dry weight)
Trip Blank	1215323003	08/17/2021	08/20/2021	Soil/Solid (dry weight)

Method	Method Description
AK102	Diesel/Residual Range Organics
AK103	Diesel/Residual Range Organics
AK101	Gasoline Range Organics (S)
SM21 2540G	Percent Solids SM2540G
SW8260D	VOC 8260 (S) Field Extracted

SGS North America Inc.
200 West Potter Drive, Anchorage, AK 99518
t 907.562.2343 **f** 907.561.5301 www.us.sgs.com

Results of **NE21-SB-1**

Client Sample ID: **NE21-SB-1**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323001
Lab Project ID: 1215323

Collection Date: 08/17/21 10:13
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):77.1
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	25.7	U	25.7	7.98	mg/kg	1		08/24/21 15:47
Surrogates								
5a Androstane (surr)	87.9		50-150		%	1		08/24/21 15:47

Batch Information

Analytical Batch: XFC16054
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/24/21 15:47
Container ID: 1215323001-A

Prep Batch: XXX45430
Prep Method: SW3550C
Prep Date/Time: 08/24/21 07:10
Prep Initial Wt./Vol.: 30.251 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	129	U	129	55.3	mg/kg	1		08/24/21 15:47
Surrogates								
n-Triacontane-d62 (surr)	86.6		50-150		%	1		08/24/21 15:47

Batch Information

Analytical Batch: XFC16054
Analytical Method: AK103
Analyst: IVM
Analytical Date/Time: 08/24/21 15:47
Container ID: 1215323001-A

Prep Batch: XXX45430
Prep Method: SW3550C
Prep Date/Time: 08/24/21 07:10
Prep Initial Wt./Vol.: 30.251 g
Prep Extract Vol: 5 mL

Print Date: 08/30/2021 9:30:54AM

Results of **NE21-SB-1**

Client Sample ID: **NE21-SB-1**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323001
Lab Project ID: 1215323

Collection Date: 08/17/21 10:13
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):77.1
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.33	U	3.33	1.00	mg/kg	1		08/27/21 12:33
Surrogates								
4-Bromofluorobenzene (surr)	88		50-150		%	1		08/27/21 12:33

Batch Information

Analytical Batch: VFC15782
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 08/27/21 12:33
Container ID: 1215323001-B

Prep Batch: VXX37718
Prep Method: SW5035A
Prep Date/Time: 08/17/21 10:13
Prep Initial Wt./Vol.: 87.883 g
Prep Extract Vol: 45.1613 mL

Print Date: 08/30/2021 9:30:54AM

Results of **NE21-SB-1**

Client Sample ID: **NE21-SB-1**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323001
Lab Project ID: 1215323

Collection Date: 08/17/21 10:13
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):77.1
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.0267	U	0.0267	0.00827	mg/kg	1		08/26/21 19:27
1,1,1-Trichloroethane	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
1,1,2,2-Tetrachloroethane	0.00267	U	0.00267	0.000827	mg/kg	1		08/26/21 19:27
1,1,2-Trichloroethane	0.00133	U	0.00133	0.000667	mg/kg	1		08/26/21 19:27
1,1-Dichloroethane	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
1,1-Dichloroethene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
1,1-Dichloropropene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
1,2,3-Trichlorobenzene	0.133	U	0.133	0.0400	mg/kg	1		08/26/21 19:27
1,2,3-Trichloropropane	0.00267	U	0.00267	0.000827	mg/kg	1		08/26/21 19:27
1,2,4-Trichlorobenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
1,2,4-Trimethylbenzene	0.133	U	0.133	0.0400	mg/kg	1		08/26/21 19:27
1,2-Dibromo-3-chloropropane	0.133	U	0.133	0.0413	mg/kg	1		08/26/21 19:27
1,2-Dibromoethane	0.00200	U	0.00200	0.00100	mg/kg	1		08/26/21 19:27
1,2-Dichlorobenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
1,2-Dichloroethane	0.00267	U	0.00267	0.000934	mg/kg	1		08/26/21 19:27
1,2-Dichloropropane	0.0133	U	0.0133	0.00667	mg/kg	1		08/26/21 19:27
1,3,5-Trimethylbenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
1,3-Dichlorobenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
1,3-Dichloropropane	0.0133	U	0.0133	0.00413	mg/kg	1		08/26/21 19:27
1,4-Dichlorobenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
2,2-Dichloropropane	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
2-Butanone (MEK)	0.333	U	0.333	0.104	mg/kg	1		08/26/21 19:27
2-Chlorotoluene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
2-Hexanone	0.160	U	0.160	0.0800	mg/kg	1		08/26/21 19:27
4-Chlorotoluene	0.0267	U	0.0267	0.0133	mg/kg	1		08/26/21 19:27
4-Isopropyltoluene	0.107	U	0.107	0.0533	mg/kg	1		08/26/21 19:27
4-Methyl-2-pentanone (MIBK)	0.333	U	0.333	0.104	mg/kg	1		08/26/21 19:27
Acetone	0.333	U	0.333	0.147	mg/kg	1		08/26/21 19:27
Benzene	0.0167	U	0.0167	0.00520	mg/kg	1		08/26/21 19:27
Bromobenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
Bromochloromethane	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
Bromodichloromethane	0.00267	U	0.00267	0.000827	mg/kg	1		08/26/21 19:27
Bromoform	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
Bromomethane	0.0267	U	0.0267	0.0107	mg/kg	1		08/26/21 19:27
Carbon disulfide	0.133	U	0.133	0.0413	mg/kg	1		08/26/21 19:27
Carbon tetrachloride	0.0167	U	0.0167	0.00520	mg/kg	1		08/26/21 19:27
Chlorobenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27

Results of **NE21-SB-1**

Client Sample ID: **NE21-SB-1**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323001
Lab Project ID: 1215323

Collection Date: 08/17/21 10:13
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):77.1
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroethane	0.267	U	0.267	0.0827	mg/kg	1		08/26/21 19:27
Chloroform	0.00800	U	0.00800	0.00400	mg/kg	1		08/26/21 19:27
Chloromethane	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
cis-1,2-Dichloroethene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
cis-1,3-Dichloropropene	0.0167	U	0.0167	0.00520	mg/kg	1		08/26/21 19:27
Dibromochloromethane	0.00667	U	0.00667	0.00200	mg/kg	1		08/26/21 19:27
Dibromomethane	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
Dichlorodifluoromethane	0.133	U	0.133	0.0400	mg/kg	1		08/26/21 19:27
Ethylbenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
Freon-113	0.133	U	0.133	0.0413	mg/kg	1		08/26/21 19:27
Hexachlorobutadiene	0.0267	U	0.0267	0.00827	mg/kg	1		08/26/21 19:27
Isopropylbenzene (Cumene)	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
Methylene chloride	0.133	U	0.133	0.0413	mg/kg	1		08/26/21 19:27
Methyl-t-butyl ether	0.133	U	0.133	0.0413	mg/kg	1		08/26/21 19:27
Naphthalene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
n-Butylbenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
n-Propylbenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
o-Xylene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
P & M -Xylene	0.0667	U	0.0667	0.0200	mg/kg	1		08/26/21 19:27
sec-Butylbenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
Styrene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
tert-Butylbenzene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
Tetrachloroethene	0.0167	U	0.0167	0.00520	mg/kg	1		08/26/21 19:27
Toluene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
trans-1,2-Dichloroethene	0.0333	U	0.0333	0.0104	mg/kg	1		08/26/21 19:27
trans-1,3-Dichloropropene	0.0167	U	0.0167	0.00520	mg/kg	1		08/26/21 19:27
Trichloroethene	0.0133	U	0.0133	0.00427	mg/kg	1		08/26/21 19:27
Trichlorofluoromethane	0.0667	U	0.0667	0.0200	mg/kg	1		08/26/21 19:27
Vinyl acetate	0.133	U	0.133	0.0413	mg/kg	1		08/26/21 19:27
Vinyl chloride	0.00107	U	0.00107	0.000333	mg/kg	1		08/26/21 19:27
Xylenes (total)	0.100	U	0.100	0.0304	mg/kg	1		08/26/21 19:27
Surrogates								
1,2-Dichloroethane-D4 (surr)	106		71-136		%	1		08/26/21 19:27
4-Bromofluorobenzene (surr)	96.8		55-151		%	1		08/26/21 19:27
Toluene-d8 (surr)	100		85-116		%	1		08/26/21 19:27

Print Date: 08/30/2021 9:30:54AM

Results of **NE21-SB-1**

Client Sample ID: **NE21-SB-1**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323001
Lab Project ID: 1215323

Collection Date: 08/17/21 10:13
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):77.1
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21104
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 08/26/21 19:27
Container ID: 1215323001-B

Prep Batch: VXX37713
Prep Method: SW5035A
Prep Date/Time: 08/17/21 10:13
Prep Initial Wt./Vol.: 87.883 g
Prep Extract Vol: 45.1613 mL

Print Date: 08/30/2021 9:30:54AM

Results of **NE21-SB-101**

Client Sample ID: **NE21-SB-101**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323002
Lab Project ID: 1215323

Collection Date: 08/17/21 10:03
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):77.7
Location:

Results by **Semivolatile Organic Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Diesel Range Organics	25.5	U	25.5	7.92	mg/kg	1		08/24/21 15:56
Surrogates								
5a Androstane (surr)	85.1		50-150		%	1		08/24/21 15:56

Batch Information

Analytical Batch: XFC16054
Analytical Method: AK102
Analyst: IVM
Analytical Date/Time: 08/24/21 15:56
Container ID: 1215323002-A

Prep Batch: XXX45430
Prep Method: SW3550C
Prep Date/Time: 08/24/21 07:10
Prep Initial Wt./Vol.: 30.235 g
Prep Extract Vol: 5 mL

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Residual Range Organics	128	U	128	54.9	mg/kg	1		08/24/21 15:56
Surrogates								
n-Triacontane-d62 (surr)	84.1		50-150		%	1		08/24/21 15:56

Batch Information

Analytical Batch: XFC16054
Analytical Method: AK103
Analyst: IVM
Analytical Date/Time: 08/24/21 15:56
Container ID: 1215323002-A

Prep Batch: XXX45430
Prep Method: SW3550C
Prep Date/Time: 08/24/21 07:10
Prep Initial Wt./Vol.: 30.235 g
Prep Extract Vol: 5 mL

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Results of **NE21-SB-101**

Client Sample ID: **NE21-SB-101**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323002
Lab Project ID: 1215323

Collection Date: 08/17/21 10:03
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):77.7
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	3.59	U	3.59	1.08	mg/kg	1		08/27/21 12:51
Surrogates								
4-Bromofluorobenzene (surr)	82.9		50-150		%	1		08/27/21 12:51

Batch Information

Analytical Batch: VFC15782
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 08/27/21 12:51
Container ID: 1215323002-B

Prep Batch: VXX37718
Prep Method: SW5035A
Prep Date/Time: 08/17/21 10:03
Prep Initial Wt./Vol.: 74.456 g
Prep Extract Vol: 41.596 mL

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Results of **NE21-SB-101**

Client Sample ID: **NE21-SB-101**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323002
Lab Project ID: 1215323

Collection Date: 08/17/21 10:03
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):77.7
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.0288	U	0.0288	0.00891	mg/kg	1		08/26/21 19:43
1,1,1-Trichloroethane	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
1,1,2,2-Tetrachloroethane	0.00288	U	0.00288	0.000891	mg/kg	1		08/26/21 19:43
1,1,2-Trichloroethane	0.00144	U	0.00144	0.000719	mg/kg	1		08/26/21 19:43
1,1-Dichloroethane	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
1,1-Dichloroethene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
1,1-Dichloropropene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
1,2,3-Trichlorobenzene	0.144	U	0.144	0.0431	mg/kg	1		08/26/21 19:43
1,2,3-Trichloropropane	0.00288	U	0.00288	0.000891	mg/kg	1		08/26/21 19:43
1,2,4-Trichlorobenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
1,2,4-Trimethylbenzene	0.144	U	0.144	0.0431	mg/kg	1		08/26/21 19:43
1,2-Dibromo-3-chloropropane	0.144	U	0.144	0.0446	mg/kg	1		08/26/21 19:43
1,2-Dibromoethane	0.00216	U	0.00216	0.00108	mg/kg	1		08/26/21 19:43
1,2-Dichlorobenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
1,2-Dichloroethane	0.00288	U	0.00288	0.00101	mg/kg	1		08/26/21 19:43
1,2-Dichloropropane	0.0144	U	0.0144	0.00719	mg/kg	1		08/26/21 19:43
1,3,5-Trimethylbenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
1,3-Dichlorobenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
1,3-Dichloropropane	0.0144	U	0.0144	0.00446	mg/kg	1		08/26/21 19:43
1,4-Dichlorobenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
2,2-Dichloropropane	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
2-Butanone (MEK)	0.359	U	0.359	0.112	mg/kg	1		08/26/21 19:43
2-Chlorotoluene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
2-Hexanone	0.173	U	0.173	0.0863	mg/kg	1		08/26/21 19:43
4-Chlorotoluene	0.0288	U	0.0288	0.0144	mg/kg	1		08/26/21 19:43
4-Isopropyltoluene	0.115	U	0.115	0.0575	mg/kg	1		08/26/21 19:43
4-Methyl-2-pentanone (MIBK)	0.359	U	0.359	0.112	mg/kg	1		08/26/21 19:43
Acetone	0.359	U	0.359	0.158	mg/kg	1		08/26/21 19:43
Benzene	0.0180	U	0.0180	0.00561	mg/kg	1		08/26/21 19:43
Bromobenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
Bromochloromethane	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
Bromodichloromethane	0.00288	U	0.00288	0.000891	mg/kg	1		08/26/21 19:43
Bromoform	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
Bromomethane	0.0288	U	0.0288	0.0115	mg/kg	1		08/26/21 19:43
Carbon disulfide	0.144	U	0.144	0.0446	mg/kg	1		08/26/21 19:43
Carbon tetrachloride	0.0180	U	0.0180	0.00561	mg/kg	1		08/26/21 19:43
Chlorobenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43

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Results of **NE21-SB-101**

Client Sample ID: **NE21-SB-101**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323002
Lab Project ID: 1215323

Collection Date: 08/17/21 10:03
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):77.7
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroethane	0.288	U	0.288	0.0891	mg/kg	1		08/26/21 19:43
Chloroform	0.00863	U	0.00863	0.00431	mg/kg	1		08/26/21 19:43
Chloromethane	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
cis-1,2-Dichloroethene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
cis-1,3-Dichloropropene	0.0180	U	0.0180	0.00561	mg/kg	1		08/26/21 19:43
Dibromochloromethane	0.00719	U	0.00719	0.00216	mg/kg	1		08/26/21 19:43
Dibromomethane	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
Dichlorodifluoromethane	0.144	U	0.144	0.0431	mg/kg	1		08/26/21 19:43
Ethylbenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
Freon-113	0.144	U	0.144	0.0446	mg/kg	1		08/26/21 19:43
Hexachlorobutadiene	0.0288	U	0.0288	0.00891	mg/kg	1		08/26/21 19:43
Isopropylbenzene (Cumene)	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
Methylene chloride	0.144	U	0.144	0.0446	mg/kg	1		08/26/21 19:43
Methyl-t-butyl ether	0.144	U	0.144	0.0446	mg/kg	1		08/26/21 19:43
Naphthalene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
n-Butylbenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
n-Propylbenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
o-Xylene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
P & M -Xylene	0.0719	U	0.0719	0.0216	mg/kg	1		08/26/21 19:43
sec-Butylbenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
Styrene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
tert-Butylbenzene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
Tetrachloroethene	0.0180	U	0.0180	0.00561	mg/kg	1		08/26/21 19:43
Toluene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
trans-1,2-Dichloroethene	0.0359	U	0.0359	0.0112	mg/kg	1		08/26/21 19:43
trans-1,3-Dichloropropene	0.0180	U	0.0180	0.00561	mg/kg	1		08/26/21 19:43
Trichloroethene	0.0144	U	0.0144	0.00460	mg/kg	1		08/26/21 19:43
Trichlorofluoromethane	0.0719	U	0.0719	0.0216	mg/kg	1		08/26/21 19:43
Vinyl acetate	0.144	U	0.144	0.0446	mg/kg	1		08/26/21 19:43
Vinyl chloride	0.00115	U	0.00115	0.000359	mg/kg	1		08/26/21 19:43
Xylenes (total)	0.108	U	0.108	0.0328	mg/kg	1		08/26/21 19:43
Surrogates								
1,2-Dichloroethane-D4 (surr)	104		71-136		%	1		08/26/21 19:43
4-Bromofluorobenzene (surr)	99.1		55-151		%	1		08/26/21 19:43
Toluene-d8 (surr)	99.1		85-116		%	1		08/26/21 19:43

Print Date: 08/30/2021 9:30:54AM

Results of **NE21-SB-101**

Client Sample ID: **NE21-SB-101**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323002
Lab Project ID: 1215323

Collection Date: 08/17/21 10:03
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):77.7
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21104
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 08/26/21 19:43
Container ID: 1215323002-B

Prep Batch: VXX37713
Prep Method: SW5035A
Prep Date/Time: 08/17/21 10:03
Prep Initial Wt./Vol.: 74.456 g
Prep Extract Vol: 41.596 mL

Print Date: 08/30/2021 9:30:54AM

Results of **Trip Blank**

Client Sample ID: **Trip Blank**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323003
Lab Project ID: 1215323

Collection Date: 08/17/21 10:03
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile Fuels**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Gasoline Range Organics	2.52	U	2.52	0.756	mg/kg	1		08/27/21 07:08
Surrogates								
4-Bromofluorobenzene (surr)	91.7		50-150		%	1		08/27/21 07:08

Batch Information

Analytical Batch: VFC15782
Analytical Method: AK101
Analyst: MDT
Analytical Date/Time: 08/27/21 07:08
Container ID: 1215323003-A

Prep Batch: VXX37718
Prep Method: SW5035A
Prep Date/Time: 08/17/21 10:03
Prep Initial Wt./Vol.: 49.596 g
Prep Extract Vol: 25 mL

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Results of **Trip Blank**

Client Sample ID: **Trip Blank**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323003
Lab Project ID: 1215323

Collection Date: 08/17/21 10:03
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
1,1,1,2-Tetrachloroethane	0.0202	U	0.0202	0.00625	mg/kg	1		08/26/21 13:56
1,1,1-Trichloroethane	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
1,1,2,2-Tetrachloroethane	0.00202	U	0.00202	0.000625	mg/kg	1		08/26/21 13:56
1,1,2-Trichloroethane	0.00101	U	0.00101	0.000504	mg/kg	1		08/26/21 13:56
1,1-Dichloroethane	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
1,1-Dichloroethene	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
1,1-Dichloropropene	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
1,2,3-Trichlorobenzene	0.101	U	0.101	0.0302	mg/kg	1		08/26/21 13:56
1,2,3-Trichloropropane	0.00202	U	0.00202	0.000625	mg/kg	1		08/26/21 13:56
1,2,4-Trichlorobenzene	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
1,2,4-Trimethylbenzene	0.101	U	0.101	0.0302	mg/kg	1		08/26/21 13:56
1,2-Dibromo-3-chloropropane	0.101	U	0.101	0.0313	mg/kg	1		08/26/21 13:56
1,2-Dibromoethane	0.00151	U	0.00151	0.000756	mg/kg	1		08/26/21 13:56
1,2-Dichlorobenzene	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
1,2-Dichloroethane	0.00202	U	0.00202	0.000706	mg/kg	1		08/26/21 13:56
1,2-Dichloropropane	0.0101	U	0.0101	0.00504	mg/kg	1		08/26/21 13:56
1,3,5-Trimethylbenzene	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
1,3-Dichlorobenzene	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
1,3-Dichloropropane	0.0101	U	0.0101	0.00313	mg/kg	1		08/26/21 13:56
1,4-Dichlorobenzene	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
2,2-Dichloropropane	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
2-Butanone (MEK)	0.252	U	0.252	0.0786	mg/kg	1		08/26/21 13:56
2-Chlorotoluene	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
2-Hexanone	0.121	U	0.121	0.0605	mg/kg	1		08/26/21 13:56
4-Chlorotoluene	0.0202	U	0.0202	0.0101	mg/kg	1		08/26/21 13:56
4-Isopropyltoluene	0.0807	U	0.0807	0.0403	mg/kg	1		08/26/21 13:56
4-Methyl-2-pentanone (MIBK)	0.252	U	0.252	0.0786	mg/kg	1		08/26/21 13:56
Acetone	0.252	U	0.252	0.111	mg/kg	1		08/26/21 13:56
Benzene	0.0126	U	0.0126	0.00393	mg/kg	1		08/26/21 13:56
Bromobenzene	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
Bromochloromethane	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
Bromodichloromethane	0.00202	U	0.00202	0.000625	mg/kg	1		08/26/21 13:56
Bromoform	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56
Bromomethane	0.0202	U	0.0202	0.00807	mg/kg	1		08/26/21 13:56
Carbon disulfide	0.101	U	0.101	0.0313	mg/kg	1		08/26/21 13:56
Carbon tetrachloride	0.0126	U	0.0126	0.00393	mg/kg	1		08/26/21 13:56
Chlorobenzene	0.0252	U	0.0252	0.00786	mg/kg	1		08/26/21 13:56

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Results of **Trip Blank**

Client Sample ID: **Trip Blank**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323003
Lab Project ID: 1215323

Collection Date: 08/17/21 10:03
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Parameter	Result	Qual	LOQ/CL	DL	Units	DF	Allowable Limits	Date Analyzed
Chloroethane	0.202 U		0.202	0.0625	mg/kg	1		08/26/21 13:56
Chloroform	0.00605 U		0.00605	0.00302	mg/kg	1		08/26/21 13:56
Chloromethane	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
cis-1,2-Dichloroethene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
cis-1,3-Dichloropropene	0.0126 U		0.0126	0.00393	mg/kg	1		08/26/21 13:56
Dibromochloromethane	0.00504 U		0.00504	0.00151	mg/kg	1		08/26/21 13:56
Dibromomethane	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
Dichlorodifluoromethane	0.101 U		0.101	0.0302	mg/kg	1		08/26/21 13:56
Ethylbenzene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
Freon-113	0.101 U		0.101	0.0313	mg/kg	1		08/26/21 13:56
Hexachlorobutadiene	0.0202 U		0.0202	0.00625	mg/kg	1		08/26/21 13:56
Isopropylbenzene (Cumene)	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
Methylene chloride	0.101 U		0.101	0.0313	mg/kg	1		08/26/21 13:56
Methyl-t-butyl ether	0.101 U		0.101	0.0313	mg/kg	1		08/26/21 13:56
Naphthalene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
n-Butylbenzene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
n-Propylbenzene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
o-Xylene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
P & M -Xylene	0.0504 U		0.0504	0.0151	mg/kg	1		08/26/21 13:56
sec-Butylbenzene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
Styrene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
tert-Butylbenzene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
Tetrachloroethene	0.0126 U		0.0126	0.00393	mg/kg	1		08/26/21 13:56
Toluene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
trans-1,2-Dichloroethene	0.0252 U		0.0252	0.00786	mg/kg	1		08/26/21 13:56
trans-1,3-Dichloropropene	0.0126 U		0.0126	0.00393	mg/kg	1		08/26/21 13:56
Trichloroethene	0.0101 U		0.0101	0.00323	mg/kg	1		08/26/21 13:56
Trichlorofluoromethane	0.0504 U		0.0504	0.0151	mg/kg	1		08/26/21 13:56
Vinyl acetate	0.101 U		0.101	0.0313	mg/kg	1		08/26/21 13:56
Vinyl chloride	0.000807 U		0.000807	0.000252	mg/kg	1		08/26/21 13:56
Xylenes (total)	0.0756 U		0.0756	0.0230	mg/kg	1		08/26/21 13:56
Surrogates								
1,2-Dichloroethane-D4 (surr)	107		71-136		%	1		08/26/21 13:56
4-Bromofluorobenzene (surr)	101		55-151		%	1		08/26/21 13:56
Toluene-d8 (surr)	99.6		85-116		%	1		08/26/21 13:56

Print Date: 08/30/2021 9:30:54AM

Results of **Trip Blank**

Client Sample ID: **Trip Blank**
Client Project ID: **11729-071 Nenana MS**
Lab Sample ID: 1215323003
Lab Project ID: 1215323

Collection Date: 08/17/21 10:03
Received Date: 08/20/21 10:21
Matrix: Soil/Solid (dry weight)
Solids (%):
Location:

Results by **Volatile GC/MS**

Batch Information

Analytical Batch: VMS21104
Analytical Method: SW8260D
Analyst: S.S
Analytical Date/Time: 08/26/21 13:56
Container ID: 1215323003-A

Prep Batch: VXX37713
Prep Method: SW5035A
Prep Date/Time: 08/17/21 10:03
Prep Initial Wt./Vol.: 49.596 g
Prep Extract Vol: 25 mL

Print Date: 08/30/2021 9:30:54AM

Method Blank

Blank ID: MB for HBN 1824538 [SPT/11356]
Blank Lab ID: 1631945

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215323001, 1215323002

Results by **SM21 2540G**

Parameter	Results	LOQ/CL	DL	Units
Total Solids	100			%

Batch Information

Analytical Batch: SPT11356
Analytical Method: SM21 2540G
Instrument:
Analyst: TMM
Analytical Date/Time: 8/23/2021 5:30:00PM

Print Date: 08/30/2021 9:30:56AM

Duplicate Sample Summary

Original Sample ID: 1215350001
Duplicate Sample ID: 1631950
QC for Samples:
1215323001, 1215323002

Analysis Date: 08/23/2021 17:30
Matrix: Soil/Solid (dry weight)

Results by **SM21 2540G**

NAME	Original	Duplicate	Units	RPD (%)	RPD CL
Total Solids	92.6	93.8	%	1.30	(< 15)

Batch Information

Analytical Batch: SPT11356
Analytical Method: SM21 2540G
Instrument:
Analyst: TMM

Print Date: 08/30/2021 9:30:57AM

Method Blank

Blank ID: MB for HBN 1824735 [VXX/37713]
Blank Lab ID: 1632727

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215323001, 1215323002, 1215323003

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units
1,1,1,2-Tetrachloroethane	0.0100U	0.0200	0.00620	mg/kg
1,1,1-Trichloroethane	0.0125U	0.0250	0.00780	mg/kg
1,1,2,2-Tetrachloroethane	0.00100U	0.00200	0.000620	mg/kg
1,1,2-Trichloroethane	0.000500U	0.00100	0.000500	mg/kg
1,1-Dichloroethane	0.0125U	0.0250	0.00780	mg/kg
1,1-Dichloroethene	0.0125U	0.0250	0.00780	mg/kg
1,1-Dichloropropene	0.0125U	0.0250	0.00780	mg/kg
1,2,3-Trichlorobenzene	0.0500U	0.100	0.0300	mg/kg
1,2,3-Trichloropropane	0.00100U	0.00200	0.000620	mg/kg
1,2,4-Trichlorobenzene	0.0125U	0.0250	0.00780	mg/kg
1,2,4-Trimethylbenzene	0.0500U	0.100	0.0300	mg/kg
1,2-Dibromo-3-chloropropane	0.0500U	0.100	0.0310	mg/kg
1,2-Dibromoethane	0.000750U	0.00150	0.000750	mg/kg
1,2-Dichlorobenzene	0.0125U	0.0250	0.00780	mg/kg
1,2-Dichloroethane	0.00100U	0.00200	0.000700	mg/kg
1,2-Dichloropropane	0.00500U	0.0100	0.00500	mg/kg
1,3,5-Trimethylbenzene	0.0125U	0.0250	0.00780	mg/kg
1,3-Dichlorobenzene	0.0125U	0.0250	0.00780	mg/kg
1,3-Dichloropropane	0.00500U	0.0100	0.00310	mg/kg
1,4-Dichlorobenzene	0.0125U	0.0250	0.00780	mg/kg
2,2-Dichloropropane	0.0125U	0.0250	0.00780	mg/kg
2-Butanone (MEK)	0.125U	0.250	0.0780	mg/kg
2-Chlorotoluene	0.0125U	0.0250	0.00780	mg/kg
2-Hexanone	0.0600U	0.120	0.0600	mg/kg
4-Chlorotoluene	0.0100U	0.0200	0.0100	mg/kg
4-Isopropyltoluene	0.0400U	0.0800	0.0400	mg/kg
4-Methyl-2-pentanone (MIBK)	0.125U	0.250	0.0780	mg/kg
Acetone	0.125U	0.250	0.110	mg/kg
Benzene	0.00625U	0.0125	0.00390	mg/kg
Bromobenzene	0.0125U	0.0250	0.00780	mg/kg
Bromochloromethane	0.0125U	0.0250	0.00780	mg/kg
Bromodichloromethane	0.00100U	0.00200	0.000620	mg/kg
Bromoform	0.0125U	0.0250	0.00780	mg/kg
Bromomethane	0.0100U	0.0200	0.00800	mg/kg
Carbon disulfide	0.0500U	0.100	0.0310	mg/kg
Carbon tetrachloride	0.00625U	0.0125	0.00390	mg/kg
Chlorobenzene	0.0125U	0.0250	0.00780	mg/kg
Chloroethane	0.100U	0.200	0.0620	mg/kg

Method Blank

Blank ID: MB for HBN 1824735 [VXX/37713]
Blank Lab ID: 1632727

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215323001, 1215323002, 1215323003

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units
Chloroform	0.00300U	0.00600	0.00300	mg/kg
Chloromethane	0.0125U	0.0250	0.00780	mg/kg
cis-1,2-Dichloroethene	0.0125U	0.0250	0.00780	mg/kg
cis-1,3-Dichloropropene	0.00625U	0.0125	0.00390	mg/kg
Dibromochloromethane	0.00250U	0.00500	0.00150	mg/kg
Dibromomethane	0.0125U	0.0250	0.00780	mg/kg
Dichlorodifluoromethane	0.0500U	0.100	0.0300	mg/kg
Ethylbenzene	0.0125U	0.0250	0.00780	mg/kg
Freon-113	0.0500U	0.100	0.0310	mg/kg
Hexachlorobutadiene	0.0100U	0.0200	0.00620	mg/kg
Isopropylbenzene (Cumene)	0.0125U	0.0250	0.00780	mg/kg
Methylene chloride	0.0500U	0.100	0.0310	mg/kg
Methyl-t-butyl ether	0.0500U	0.100	0.0310	mg/kg
Naphthalene	0.0125U	0.0250	0.00780	mg/kg
n-Butylbenzene	0.0125U	0.0250	0.00780	mg/kg
n-Propylbenzene	0.0125U	0.0250	0.00780	mg/kg
o-Xylene	0.0125U	0.0250	0.00780	mg/kg
P & M -Xylene	0.0250U	0.0500	0.0150	mg/kg
sec-Butylbenzene	0.0125U	0.0250	0.00780	mg/kg
Styrene	0.0125U	0.0250	0.00780	mg/kg
tert-Butylbenzene	0.0125U	0.0250	0.00780	mg/kg
Tetrachloroethene	0.00625U	0.0125	0.00390	mg/kg
Toluene	0.0125U	0.0250	0.00780	mg/kg
trans-1,2-Dichloroethene	0.0125U	0.0250	0.00780	mg/kg
trans-1,3-Dichloropropene	0.00625U	0.0125	0.00390	mg/kg
Trichloroethene	0.00500U	0.0100	0.00320	mg/kg
Trichlorofluoromethane	0.0250U	0.0500	0.0150	mg/kg
Vinyl acetate	0.0500U	0.100	0.0310	mg/kg
Vinyl chloride	0.000400U	0.000800	0.000250	mg/kg
Xylenes (total)	0.0375U	0.0750	0.0228	mg/kg
Surrogates				
1,2-Dichloroethane-D4 (surr)	107	71-136		%
4-Bromofluorobenzene (surr)	99.1	55-151		%
Toluene-d8 (surr)	99.1	85-116		%

Method Blank

Blank ID: MB for HBN 1824735 [VXX/37713]
Blank Lab ID: 1632727

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215323001, 1215323002, 1215323003

Results by **SW8260D**

Parameter	Results	LOQ/CL	DL	Units

Batch Information

Analytical Batch: VMS21104
Analytical Method: SW8260D
Instrument: VQA 7890/5975 GC/MS
Analyst: S.S
Analytical Date/Time: 8/26/2021 10:59:00AM

Prep Batch: VXX37713
Prep Method: SW5035A
Prep Date/Time: 8/26/2021 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Print Date: 08/30/2021 9:31:01AM

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215323 [VXX37713]
Blank Spike Lab ID: 1632728
Date Analyzed: 08/26/2021 11:15

Matrix: Soil/Solid (dry weight)

QC for Samples: 1215323001, 1215323002, 1215323003

Results by **SW8260D**

	Blank Spike (mg/kg)			
Parameter	Spike	Result	Rec (%)	CL
1,1,1,2-Tetrachloroethane	0.750	0.799	107	(78-125)
1,1,1-Trichloroethane	0.750	0.760	101	(73-130)
1,1,2,2-Tetrachloroethane	0.750	0.754	101	(70-124)
1,1,2-Trichloroethane	0.750	0.796	106	(78-121)
1,1-Dichloroethane	0.750	0.731	98	(76-125)
1,1-Dichloroethene	0.750	0.704	94	(70-131)
1,1-Dichloropropene	0.750	0.746	100	(76-125)
1,2,3-Trichlorobenzene	0.750	0.673	90	(66-130)
1,2,3-Trichloropropane	0.750	0.736	98	(73-125)
1,2,4-Trichlorobenzene	0.750	0.688	92	(67-129)
1,2,4-Trimethylbenzene	0.750	0.722	96	(75-123)
1,2-Dibromo-3-chloropropane	0.750	0.716	96	(61-132)
1,2-Dibromoethane	0.750	0.834	111	(78-122)
1,2-Dichlorobenzene	0.750	0.719	96	(78-121)
1,2-Dichloroethane	0.750	0.709	95	(73-128)
1,2-Dichloropropane	0.750	0.787	105	(76-123)
1,3,5-Trimethylbenzene	0.750	0.703	94	(73-124)
1,3-Dichlorobenzene	0.750	0.721	96	(77-121)
1,3-Dichloropropane	0.750	0.785	105	(77-121)
1,4-Dichlorobenzene	0.750	0.729	97	(75-120)
2,2-Dichloropropane	0.750	0.791	106	(67-133)
2-Butanone (MEK)	2.25	2.07	92	(51-148)
2-Chlorotoluene	0.750	0.728	97	(75-122)
2-Hexanone	2.25	2.21	98	(53-145)
4-Chlorotoluene	0.750	0.713	95	(72-124)
4-Isopropyltoluene	0.750	0.681	91	(73-127)
4-Methyl-2-pentanone (MIBK)	2.25	2.34	104	(65-135)
Acetone	2.25	1.97	88	(36-164)
Benzene	0.750	0.775	103	(77-121)
Bromobenzene	0.750	0.794	106	(78-121)
Bromochloromethane	0.750	0.776	103	(78-125)
Bromodichloromethane	0.750	0.781	104	(75-127)
Bromoform	0.750	0.810	108	(67-132)
Bromomethane	0.750	0.765	102	(53-143)

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200 West Potter Drive Anchorage, AK 95518
t 907.562.2343 f 907.561.5301 www.us.sgs.com

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215323 [VXX37713]
Blank Spike Lab ID: 1632728
Date Analyzed: 08/26/2021 11:15

Matrix: Soil/Solid (dry weight)

QC for Samples: 1215323001, 1215323002, 1215323003

Results by **SW8260D**

Blank Spike (mg/kg)

Parameter	Spike	Result	Rec (%)	CL
Carbon disulfide	1.13	1.00	89	(63-132)
Carbon tetrachloride	0.750	0.747	100	(70-135)
Chlorobenzene	0.750	0.752	100	(79-120)
Chloroethane	0.750	0.693	92	(59-139)
Chloroform	0.750	0.770	103	(78-123)
Chloromethane	0.750	0.733	98	(50-136)
cis-1,2-Dichloroethene	0.750	0.744	99	(77-123)
cis-1,3-Dichloropropene	0.750	0.847	113	(74-126)
Dibromochloromethane	0.750	0.840	112	(74-126)
Dibromomethane	0.750	0.779	104	(78-125)
Dichlorodifluoromethane	0.750	0.791	106	(29-149)
Ethylbenzene	0.750	0.720	96	(76-122)
Freon-113	1.13	1.03	92	(66-136)
Hexachlorobutadiene	0.750	0.704	94	(61-135)
Isopropylbenzene (Cumene)	0.750	0.715	95	(68-134)
Methylene chloride	0.750	0.786	105	(70-128)
Methyl-t-butyl ether	1.13	1.16	103	(73-125)
Naphthalene	0.750	0.703	94	(62-129)
n-Butylbenzene	0.750	0.661	88	(70-128)
n-Propylbenzene	0.750	0.701	94	(73-125)
o-Xylene	0.750	0.743	99	(77-123)
P & M -Xylene	1.50	1.40	94	(77-124)
sec-Butylbenzene	0.750	0.650	87	(73-126)
Styrene	0.750	0.765	102	(76-124)
tert-Butylbenzene	0.750	0.696	93	(73-125)
Tetrachloroethene	0.750	0.746	99	(73-128)
Toluene	0.750	0.738	98	(77-121)
trans-1,2-Dichloroethene	0.750	0.735	98	(74-125)
trans-1,3-Dichloropropene	0.750	0.750	100	(71-130)
Trichloroethene	0.750	0.785	105	(77-123)
Trichlorofluoromethane	0.750	0.919	123	(62-140)
Vinyl acetate	0.750	0.768	102	(50-151)
Vinyl chloride	0.750	0.650	87	(56-135)
Xylenes (total)	2.25	2.15	95	(78-124)

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Blank Spike Summary

Blank Spike ID: LCS for HBN 1215323 [VXX37713]
Blank Spike Lab ID: 1632728
Date Analyzed: 08/26/2021 11:15

Matrix: Soil/Solid (dry weight)

QC for Samples: 1215323001, 1215323002, 1215323003

Results by **SW8260D**

	Blank Spike (mg/kg)			
Parameter	Spike	Result	Rec (%)	CL
Surrogates				
1,2-Dichloroethane-D4 (surr)	0.750		95	(71-136)
4-Bromofluorobenzene (surr)	0.750		95	(55-151)
Toluene-d8 (surr)	0.750		99	(85-116)

Batch Information

Analytical Batch: **VMS21104**
Analytical Method: **SW8260D**
Instrument: **VQA 7890/5975 GC/MS**
Analyst: **S.S**

Prep Batch: **VXX37713**
Prep Method: **SW5035A**
Prep Date/Time: **08/26/2021 06:00**
Spike Init Wt./Vol.: 0.750 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: Extract Vol:

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Matrix Spike Summary

Original Sample ID: 1632729
MS Sample ID: 1632730 MS
MSD Sample ID: 1632731 MSD

Analysis Date: 08/26/2021 14:29
Analysis Date: 08/26/2021 12:33
Analysis Date: 08/26/2021 12:50
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1215323001, 1215323002, 1215323003

Results by **SW8260D**

		Matrix Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
1,1,1,2-Tetrachloroethane	0.0135U	1.01	1.08	107	1.01	1.06	105	78-125	1.40	(< 20)
1,1,1-Trichloroethane	0.0169U	1.01	1.03	101	1.01	1.01	100	73-130	1.10	(< 20)
1,1,2,2-Tetrachloroethane	0.00135U	1.01	1.03	101	1.01	1.01	100	70-124	1.60	(< 20)
1,1,2-Trichloroethane	0.000675U	1.01	1.07	106	1.01	1.06	105	78-121	1.20	(< 20)
1,1-Dichloroethane	0.0169U	1.01	0.976	96	1.01	0.987	97	76-125	1.10	(< 20)
1,1-Dichloroethene	0.0169U	1.01	0.962	95	1.01	0.955	94	70-131	0.67	(< 20)
1,1-Dichloropropene	0.0169U	1.01	1.01	100	1.01	0.991	98	76-125	2.30	(< 20)
1,2,3-Trichlorobenzene	0.0675U	1.01	0.907	90	1.01	0.960	95	66-130	5.70	(< 20)
1,2,3-Trichloropropane	0.00135U	1.01	1.00	99	1.01	0.990	98	73-125	0.98	(< 20)
1,2,4-Trichlorobenzene	0.0169U	1.01	0.915	90	1.01	0.935	92	67-129	2.10	(< 20)
1,2,4-Trimethylbenzene	0.0675U	1.01	0.964	95	1.01	0.952	94	75-123	1.30	(< 20)
1,2-Dibromo-3-chloropropane	0.0675U	1.01	0.956	94	1.01	0.947	94	61-132	0.89	(< 20)
1,2-Dibromoethane	0.00101U	1.01	1.12	111	1.01	1.10	109	78-122	1.80	(< 20)
1,2-Dichlorobenzene	0.0169U	1.01	0.964	95	1.01	0.963	95	78-121	0.11	(< 20)
1,2-Dichloroethane	0.00135U	1.01	0.944	93	1.01	0.951	94	73-128	0.75	(< 20)
1,2-Dichloropropane	0.00675U	1.01	1.05	104	1.01	1.06	105	76-123	0.48	(< 20)
1,3,5-Trimethylbenzene	0.0169U	1.01	0.948	94	1.01	0.922	91	73-124	2.70	(< 20)
1,3-Dichlorobenzene	0.0169U	1.01	0.965	95	1.01	0.959	95	77-121	0.63	(< 20)
1,3-Dichloropropane	0.00675U	1.01	1.07	106	1.01	1.05	104	77-121	1.80	(< 20)
1,4-Dichlorobenzene	0.0169U	1.01	0.968	96	1.01	0.967	96	75-120	0.14	(< 20)
2,2-Dichloropropane	0.0169U	1.01	1.08	106	1.01	1.06	105	67-133	1.20	(< 20)
2-Butanone (MEK)	0.169U	3.04	2.75	91	3.04	2.66	88	51-148	3.10	(< 20)
2-Chlorotoluene	0.0169U	1.01	0.975	96	1.01	0.968	96	75-122	0.66	(< 20)
2-Hexanone	0.0810U	3.04	2.97	98	3.04	2.90	96	53-145	2.30	(< 20)
4-Chlorotoluene	0.0135U	1.01	0.965	95	1.01	0.948	94	72-124	1.80	(< 20)
4-Isopropyltoluene	0.0540U	1.01	0.904	89	1.01	0.883	87	73-127	2.40	(< 20)
4-Methyl-2-pentanone (MIBK)	0.169U	3.04	3.14	103	3.04	3.12	103	65-135	0.76	(< 20)
Acetone	0.169U	3.04	2.58	85	3.04	2.46	81	36-164	4.60	(< 20)
Benzene	0.0108J	1.01	1.05	103	1.01	1.05	102	77-121	0.64	(< 20)
Bromobenzene	0.0169U	1.01	1.08	107	1.01	1.07	106	78-121	0.78	(< 20)
Bromochloromethane	0.0169U	1.01	1.04	102	1.01	1.06	105	78-125	2.10	(< 20)
Bromodichloromethane	0.00135U	1.01	1.04	103	1.01	1.05	104	75-127	0.97	(< 20)
Bromoform	0.0169U	1.01	1.09	108	1.01	1.08	107	67-132	0.84	(< 20)
Bromomethane	0.0135U	1.01	1.04	102	1.01	1.08	107	53-143	4.30	(< 20)
Carbon disulfide	0.0675U	1.52	1.35	89	1.52	1.36	89	63-132	0.35	(< 20)
Carbon tetrachloride	0.00845U	1.01	1.02	101	1.01	0.991	98	70-135	2.70	(< 20)
Chlorobenzene	0.0169U	1.01	1.01	99	1.01	0.995	98	79-120	1.10	(< 20)

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Matrix Spike Summary

Original Sample ID: 1632729
MS Sample ID: 1632730 MS
MSD Sample ID: 1632731 MSD

Analysis Date: 08/26/2021 14:29
Analysis Date: 08/26/2021 12:33
Analysis Date: 08/26/2021 12:50
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1215323001, 1215323002, 1215323003

Results by **SW8260D**

		Matrix Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Chloroethane	0.135U	1.01	0.927	92	1.01	0.969	96	59-139	4.40	(< 20)
Chloroform	0.00405U	1.01	1.03	102	1.01	1.04	103	78-123	1.10	(< 20)
Chloromethane	0.0169U	1.01	0.930	92	1.01	0.923	91	50-136	0.76	(< 20)
cis-1,2-Dichloroethene	0.0169U	1.01	0.999	99	1.01	1.00	99	77-123	0.37	(< 20)
cis-1,3-Dichloropropene	0.00845U	1.01	1.14	112	1.01	1.14	112	74-126	0.24	(< 20)
Dibromochloromethane	0.00338U	1.01	1.13	112	1.01	1.12	111	74-126	0.96	(< 20)
Dibromomethane	0.0169U	1.01	1.04	103	1.01	1.05	104	78-125	1.40	(< 20)
Dichlorodifluoromethane	0.0675U	1.01	0.921	91	1.01	0.899	89	29-149	2.50	(< 20)
Ethylbenzene	0.0169U	1.01	0.965	95	1.01	0.946	93	76-122	1.90	(< 20)
Freon-113	0.0675U	1.52	1.43	94	1.52	1.37	90	66-136	4.20	(< 20)
Hexachlorobutadiene	0.0135U	1.01	0.929	92	1.01	0.975	96	61-135	4.90	(< 20)
Isopropylbenzene (Cumene)	0.0169U	1.01	0.957	95	1.01	0.926	92	68-134	3.20	(< 20)
Methylene chloride	0.0675U	1.01	1.02	100	1.01	1.04	103	70-128	2.40	(< 20)
Methyl-t-butyl ether	0.0675U	1.52	1.57	103	1.52	1.55	102	73-125	0.99	(< 20)
Naphthalene	0.0169U	1.01	0.937	93	1.01	0.962	95	62-129	2.60	(< 20)
n-Butylbenzene	0.0169U	1.01	0.867	86	1.01	0.845	83	70-128	2.50	(< 20)
n-Propylbenzene	0.0169U	1.01	0.947	94	1.01	0.921	91	73-125	2.70	(< 20)
o-Xylene	0.0169U	1.01	1.00	99	1.01	0.985	97	77-123	1.70	(< 20)
P & M -Xylene	0.0338U	2.03	1.89	93	2.03	1.84	91	77-124	2.50	(< 20)
sec-Butylbenzene	0.0169U	1.01	0.865	85	1.01	0.839	83	73-126	3.10	(< 20)
Styrene	0.0169U	1.01	1.03	101	1.01	1.01	100	76-124	1.50	(< 20)
tert-Butylbenzene	0.0169U	1.01	0.925	91	1.01	0.907	90	73-125	2.00	(< 20)
Tetrachloroethene	0.00845U	1.01	1.02	101	1.01	0.977	97	73-128	4.70	(< 20)
Toluene	0.0169U	1.01	1.00	99	1.01	0.987	98	77-121	1.50	(< 20)
trans-1,2-Dichloroethene	0.0169U	1.01	0.972	96	1.01	0.982	97	74-125	1.10	(< 20)
trans-1,3-Dichloropropene	0.00845U	1.01	1.02	101	1.01	1.01	100	71-130	1.00	(< 20)
Trichloroethene	0.00675U	1.01	1.06	105	1.01	1.05	104	77-123	0.93	(< 20)
Trichlorofluoromethane	0.0338U	1.01	1.35	134	1.01	1.37	136	62-140	1.40	(< 20)
Vinyl acetate	0.0675U	1.01	1.03	102	1.01	1.02	101	50-151	1.20	(< 20)
Vinyl chloride	0.000540U	1.01	0.850	84	1.01	0.837	83	56-135	1.60	(< 20)
Xylenes (total)	0.0505U	3.04	2.89	95	3.04	2.83	93	78-124	2.20	(< 20)
Surrogates										
1,2-Dichloroethane-D4 (surr)		1.01	0.952	94	1.01	0.951	94	71-136	0.11	
4-Bromofluorobenzene (surr)		1.23	0.219	18 *	1.23	0.216	18 *	55-151	1.40	
Toluene-d8 (surr)		1.01	1.01	100	1.01	1.01	100	85-116	0.47	

Print Date: 08/30/2021 9:31:04AM

Matrix Spike Summary

Original Sample ID: 1632729
MS Sample ID: 1632730 MS
MSD Sample ID: 1632731 MSD

Analysis Date:
Analysis Date: 08/26/2021 12:33
Analysis Date: 08/26/2021 12:50
Matrix: Solid/Soil (Wet Weight)

QC for Samples: 1215323001, 1215323002, 1215323003

Results by **SW8260D**

		Matrix Spike (%)			Spike Duplicate (%)					
Parameter	Sample	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL

Batch Information

Analytical Batch: VMS21104
Analytical Method: SW8260D
Instrument: VQA 7890/5975 GC/MS
Analyst: S.S
Analytical Date/Time: 8/26/2021 12:33:00PM

Prep Batch: VXX37713
Prep Method: Vol. Extraction SW8260 Field Extracted L
Prep Date/Time: 8/26/2021 6:00:00AM
Prep Initial Wt./Vol.: 50.85g
Prep Extract Vol: 34.31mL

Print Date: 08/30/2021 9:31:04AM

Method Blank

Blank ID: MB for HBN 1824748 [VXX/37718]
Blank Lab ID: 1632788

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215323001, 1215323002, 1215323003

Results by **AK101**

Parameter	Results	LOQ/CL	DL	Units
Gasoline Range Organics	1.00J	2.50	0.750	mg/kg
Surrogates				
4-Bromofluorobenzene (surr)	82.1	50-150		%

Batch Information

Analytical Batch: VFC15782
Analytical Method: AK101
Instrument: Agilent 7890 PID/FID
Analyst: MDT
Analytical Date/Time: 8/27/2021 6:32:00AM

Prep Batch: VXX37718
Prep Method: SW5035A
Prep Date/Time: 8/26/2021 6:00:00AM
Prep Initial Wt./Vol.: 50 g
Prep Extract Vol: 25 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215323 [VXX37718]
Blank Spike Lab ID: 1632789
Date Analyzed: 08/27/2021 05:56

Spike Duplicate ID: LCSD for HBN 1215323 [VXX37718]
Spike Duplicate Lab ID: 1632790
Matrix: Soil/Solid (dry weight)

QC for Samples: 1215323001, 1215323002, 1215323003

Results by **AK101**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Gasoline Range Organics	12.5	12.7	102	12.5	12.8	102	(60-120)	0.40	(< 20)
Surrogates									
4-Bromofluorobenzene (surr)	1.25		90	1.25		92	(50-150)	1.70	

Batch Information

Analytical Batch: **VFC15782**
Analytical Method: **AK101**
Instrument: **Agilent 7890 PID/FID**
Analyst: **MDT**

Prep Batch: **VXX37718**
Prep Method: **SW5035A**
Prep Date/Time: **08/26/2021 06:00**
Spike Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL
Dupe Init Wt./Vol.: 12.5 mg/Kg Extract Vol: 25 mL

Method Blank

Blank ID: MB for HBN 1824532 [XXX/45430]
Blank Lab ID: 1631925

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215323001, 1215323002

Results by **AK102**

Parameter	Results	LOQ/CL	DL	Units
Diesel Range Organics	10.0U	20.0	6.20	mg/kg
Surrogates				
5a Androstane (surr)	88.6	60-120		%

Batch Information

Analytical Batch: XFC16054
Analytical Method: AK102
Instrument: Agilent 7890B F
Analyst: IVM
Analytical Date/Time: 8/24/2021 2:28:00PM

Prep Batch: XXX45430
Prep Method: SW3550C
Prep Date/Time: 8/24/2021 7:10:53AM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215323 [XXX45430]
Blank Spike Lab ID: 1631926
Date Analyzed: 08/24/2021 14:37

Spike Duplicate ID: LCSD for HBN 1215323 [XXX45430]
Spike Duplicate Lab ID: 1631927
Matrix: Soil/Solid (dry weight)

QC for Samples: 1215323001, 1215323002

Results by **AK102**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Diesel Range Organics	667	691	104	667	668	100	(75-125)	3.30	(< 20)
Surrogates									
5a Androstane (surr)	16.7		97	16.7		95	(60-120)	2.70	

Batch Information

Analytical Batch: **XFC16054**
Analytical Method: **AK102**
Instrument: **Agilent 7890B F**
Analyst: **IVM**

Prep Batch: **XXX45430**
Prep Method: **SW3550C**
Prep Date/Time: **08/24/2021 07:10**
Spike Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL
Dupe Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL

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Method Blank

Blank ID: MB for HBN 1824532 [XXX/45430]
Blank Lab ID: 1631925

Matrix: Soil/Solid (dry weight)

QC for Samples:
1215323001, 1215323002

Results by **AK103**

Parameter	Results	LOQ/CL	DL	Units
Residual Range Organics	50.0U	100	43.0	mg/kg
Surrogates				
n-Triacontane-d62 (surr)	91.6	60-120		%

Batch Information

Analytical Batch: XFC16054
Analytical Method: AK103
Instrument: Agilent 7890B F
Analyst: IVM
Analytical Date/Time: 8/24/2021 2:28:00PM

Prep Batch: XXX45430
Prep Method: SW3550C
Prep Date/Time: 8/24/2021 7:10:53AM
Prep Initial Wt./Vol.: 30 g
Prep Extract Vol: 5 mL

Blank Spike Summary

Blank Spike ID: LCS for HBN 1215323 [XXX45430]
Blank Spike Lab ID: 1631926
Date Analyzed: 08/24/2021 14:37

Spike Duplicate ID: LCSD for HBN 1215323 [XXX45430]
Spike Duplicate Lab ID: 1631927
Matrix: Soil/Solid (dry weight)

QC for Samples: 1215323001, 1215323002

Results by **AK103**

	Blank Spike (mg/kg)			Spike Duplicate (mg/kg)					
Parameter	Spike	Result	Rec (%)	Spike	Result	Rec (%)	CL	RPD (%)	RPD CL
Residual Range Organics	667	643	96	667	634	95	(60-120)	1.40	(< 20)
Surrogates									
n-Triacontane-d62 (surr)	16.7		94	16.7		93	(60-120)	1.60	

Batch Information

Analytical Batch: **XFC16054**
Analytical Method: **AK103**
Instrument: **Agilent 7890B F**
Analyst: **IVM**

Prep Batch: **XXX45430**
Prep Method: **SW3550C**
Prep Date/Time: **08/24/2021 07:10**
Spike Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL
Dupe Init Wt./Vol.: 667 mg/kg Extract Vol: 5 mL

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Fairbanks, AK 99709
(907) 479-0600
www.shannonwilson.com

CHAIN-OF-CUSTODY RECORD

Laboratory SGS
Attn: Jen Dawkins

Analytical Methods (include preservative if used)

Turn Around Time:	Quote No:	MSA Number: MSA-SGS-2016	J-Flags: ☐ Yes ☒ No
☒ Normal ☐ Rush			
Please Specify			

1215323

Sample Identity	Lab No.	Time	Date Sampled	AK102 DRO	AK103 RRO	AK101 GRO	8260D VOC				# of Containers	Remarks/Matrix Composition/Grab? Sample Containers
NE21-SB-1	1AB	1013	8/17/21	X	X						2	soil
NE21-SB-101	2AB	1003	8/17/21	X	X						2	↓
Trip Blank	3A				X						1	

Project Information	
Number:	11729-071
Name:	Nenana MS
Contact:	TXG
Ongoing Project?	Yes ☐ No ☒
Sampler:	DHF

Sample Receipt	
Total No. of Containers:	5
COC Seals/Intact? Y/N/NA	
Received Good Cond./Cold	
Temp:	1.4
Delivery Method:	hand

Reliquished By: 1.	Reliquished By: 2.	Reliquished By: 3.
Signature: Time: 940	Signature: Time: 1500	Signature: Time:
Printed Name: Dave Fare Date: 8/19/21	Printed Name: Jen Dawkins Date: 8/19/21	Printed Name: Date:
Company: Shannon & Wilson, Inc.	Company: SGS	Company:
Received By: 1.	**Received By: 2.**	**Received By: 3.**
Signature: Time: 0940	Signature: Time:	Signature: Time: 1021
Printed Name: Jen Dawkins Date: 8/19/21	Printed Name: Date:	Printed Name: Chris Clemens Date: 08/19/21
Company: SGS	Company:	Company: SGS LP, IB 2.4c 065

Notes:

Trip Blank remained in cooler with samples at all times.

Distribution: White - w/shipment - returned to Shannon & Wilson w/ laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - job file

No. _____

SGS

e-Sample Receipt Form FBK

SGS Workorder #:	S&W	S&W

Review Criteria	Condition (Yes, No, N/A	Exceptions Noted below
Chain of Custody / Temperature Requirements		Yes Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
☐ **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 1.4 °C Therm. ID: D62
		Cooler ID: @ °C Therm. ID:
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?		
If <0°C, were sample containers ice free?		
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	N/C	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were samples in good condition (no leaks/cracks/breakage)?	Yes	
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/C	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	
For Rush/Short Hold Time, was RUSH/Short HT email sent?	N/A	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

SGS Profile #	363145	363145

e-Sample Receipt Form

SGS Workorder #: **1215323** | 1215323

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		N/A Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	Yes	1F, 1B
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	Yes	Cooler ID: 1 @ 2.4 °C Therm. ID: D65
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	N/A	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	Yes	
		N/A ***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	Yes	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	Yes	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1215323001-A	No Preservative Required	OK			
1215323001-B	Methanol field pres. 4 C	OK			
1215323002-A	No Preservative Required	OK			
1215323002-B	Methanol field pres. 4 C	OK			
1215323003-A	Methanol field pres. 4 C	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM - The container was received damaged.
FR - The container was received frozen and not usable for Bacteria or BOD analyses.
IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.
NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
QN - Insufficient sample quantity provided.

Laboratory Data Review Checklist

Completed By:

Justin Risley

Title:

Engineering Staff

Date:

October 4, 2021

Consultant Firm:

Shannon & Wilson, Inc.

Laboratory Name:

SGS North America, Inc.

Laboratory Report Number:

1215323

Laboratory Report Date:

8/30/2021

CS Site Name:

DOT&PF Nenana Maintenance Station

ADEC File Number:

110.38.012

Hazard Identification Number:

26544

1215323

Laboratory Report Date:

8/30/2021

CS Site Name:

DOT&PF Nenana Maintenance Station

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

   a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

   Yes☒ No☐ N/A☐ Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

   Yes☐ No☐ N/A☒ Comments:

   Analyses were performed by SGS North America in Anchorage, AK.

2. Chain of Custody (CoC)

   a. CoC information completed, signed, and dated (including released/received by)?

   Yes☒ No☐ N/A☐ Comments:

   b. Correct analyses requested?

   Yes☒ No☐ N/A☐ Comments:

3. Laboratory Sample Receipt Documentation

   a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

   Yes☒ No☐ N/A☐ Comments:

   b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

   Yes☒ No☐ N/A☐ Comments:

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Laboratory Report Date:

8/30/2021

CS Site Name:

DOT&PF Nenana Maintenance Station

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes☒ No☐ N/A☐ Comments:

The laboratory noted that samples were received in acceptable condition.

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes☐ No☐ N/A☒ Comments:

The laboratory did not note any sample handling discrepancies.

e. Data quality or usability affected?

Comments:

Data quality and usability were not affected; see above.

4. Case Narrative

a. Present and understandable?

Yes☒ No☐ N/A☐ Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

Yes☒ No☐ N/A☐ Comments:

No discrepancies, errors, of QC failures were documented in the case narrative.

c. Were all corrective actions documented?

Yes☐ No☐ N/A☒ Comments:

Corrective actions were not required.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

The laboratory did not specify an effect on data quality or usability. See section 6.b for further assessment.

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8/30/2021

CS Site Name:

DOT&PF Nenana Maintenance Station

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes☒ No☐ N/A☐ Comments:

b. All applicable holding times met?

Yes☒ No☐ N/A☐ Comments:

c. All soils reported on a dry weight basis?

Yes☒ No☐ N/A☐ Comments:

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes☐ No☒ N/A☐ Comments:

The LOQs are generally less than their associated DEC cleanup levels. However, 1,1,1,2-tetrachloroethane, 1,1,2-trichloroethane, 1,2,3-trichloropropane, 1,2-dibromoethane, 2-hexanon, bromomethane, chloroform, dibromochloromethane, dibromomethane, hexachlorobutadiene, trans-1,3-dichloropropene, trichloroethene, and vinyl chloride were not detected in the project samples and reported at LOQs exceeding their respective DEC Migration to Groundwater Soil Cleanup Levels.

e. Data quality or usability affected?

We cannot assess if the above listed analytes are present in the project sample at concentrations below the laboratory LOQs but above their respective DEC cleanup levels.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

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ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes☒ No☐ N/A☐ Comments:

However, gasoline range organics (GRO) were detected at an estimated concentration of 1.0 J mg/kg in the AK101 method blank reported with preparation batch VXX37718.

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

GRO were not detected in any of the project samples; therefore, the results are considered unaffected and do not require qualifications.

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

The samples were not affected by laboratory/method contamination.

v. Data quality or usability affected?

Comments:

The data quality and/or usability is not affected; see above.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes☒ No☐ N/A☐ Comments:

An LCS was reported for EPA method SW8260D. See MS/MSD discussion for assessment of method precision.

LCS/LCSDs were reported for methods AK101, AK102, and AK103.

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

Metals/Inorganics analyses were not requested with this work order.

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iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes☒ No☐ N/A☐ Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; method accuracy and, where applicable, precision were demonstrated to be within acceptable limits for the requested analytical methods.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

The results did not require qualification.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability is not affected; see above.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes☒ No☐ N/A☐ Comments:

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CS Site Name:

DOT&PF Nenana Maintenance Station

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes☐ No☐ N/A☒ Comments:

Metals/Inorganics analyses were not requested with this work order.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable?

Yes☒ No☐ N/A☐ Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate.

Yes☒ No☐ N/A☐ Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

None; method accuracy and precision were demonstrated to be within acceptable limits.

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

The results did not require qualification.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

The data quality and/or usability is not affected.

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes☒ No☐ N/A☐ Comments:

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ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R for field samples and 60-120 %R for QC samples; all other analyses see the laboratory report pages)

Yes☐ No☒ N/A☐ Comments:

Percent recovery for the method SW8260D surrogate 4-bromofluorobenzene was grossly low in the MS/MSD samples reported with preparation batch VXX37713.

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes☐ No☐ N/A☒ Comments:

The field sample from which the MS and MSD samples were spiked is not included with this work order. Potential matrix effects impacting method recovery are not applicable to the reported project samples.

iv. Data quality or usability affected?

Comments:

The data quality and/or usability is not affected; see above.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes☒ No☐ N/A☐ Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes☒ No☐ N/A☐ Comments:

iii. All results less than LOQ and project specified objectives?

Yes☒ No☐ N/A☐ Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

N/A; target analytes were not detected in the trip blank.

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v. Data quality or usability affected?

Comments:

The data quality and/or usability is not affected; see above.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes☒ No☐ N/A☐ Comments:

ii. Submitted blind to lab?

Yes☒ No☐ N/A☐ Comments:

The field duplicate sample pair *NE21-SB-1* and *NE21-SB-101* was submitted to the laboratory.

iii. Precision – All relative percent differences (RPD) less than specified project objectives? (Recommended: 30% water, 50% soil)

$$\text{RPD (\%)} = \text{Absolute value of: } \frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

Yes☒ No☐ N/A☐ Comments:

Target analytes were not detected in the field duplicate samples so the relative precision could not be assessed. The results are not affected.

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

The data quality and/or usability is not affected.

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes☐ No☐ N/A☒ Comments:

Reusable equipment was not used in the sampling procedure; therefore, cross-contamination is unlikely and equipment blanks are not necessary.

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CS Site Name:

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i. All results less than LOQ and project specified objectives?

Yes☐ No☐ N/A☒ Comments:

An equipment blank was not submitted with this work order.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

N/A; an equipment blank was not submitted with this work order.

iii. Data quality or usability affected?

Comments:

Data quality and usability are not affected; see above.

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes☐ No☐ N/A☒ Comments:

Additional data flags/qualifiers were not required.

APPENDIX D: FIELD NOTES

Appendix D

Field Notes

CONTENTS

SHANNON & WILSON, INC.
Geotechnical and Environmental Consultants

JOB NAME DOT UIC — JOB NO. 1729-071
SUBJECT Nenana MS GWM — DATE 8/17/21
BY DHF — CHK'D TXG — SHEET 1 of 1

Nenana Monitoring well Installation
field Activity Report
8/17/21 DHF

730 Calibrate PID to 100 ppm isobutylene standard. Reading 99.8 ppm.
800 Leave fairbanks for Nenana MS.
900 Arrive at Nenana MS. Safety meeting with Discovery Drilling and Erik N. (DOT Station foreman). Begin drilling to install NE-MW21-4, west from M&O shop.
1100 Discovery finishing monitoring well surface completion.
1145 monitoring well installation completed. clean up site and leave for fairbanks.
1230 Return to fairbanks.
1600 Calibrate/confidence solution check for YSI. Recalibrated conductivity.

8/18/21
815 Calibrate dissolved oxygen on YSI. Leave fairbanks for Nenana MS.
900 Arrive at Nenana MS. Begin groundwater purging at NE-MW18-2.
1050 YSI pH probe failure. Probe pH readings keep climbing (ORP is also affected, because it depends in part on pH). Called TXG to discuss how to remedy. we will measure pH with paper test strips if YSI probe will not work.
Soaked pH probe in pH 4 solution for 2 hours in hopes that might remedy the issue. It did not. Proceeding by measuring pH with test strips.

1130 Begin developing NE-MW21-4

1630 Swingties for NE-MW21-4, clean up site, and leave for fairbanks.

1715 Arrive in fairbanks.

MONITORING WELL CONSTRUCTION DETAILS

Monitoring Well No. ~~NE3I~~ NE-MW21-4
Project Name Nerum MS Site characterization
Project Number 11729-071

Date Installed 8/17/21
Logged By DHF
Driller Discovery Drilling

I. TOP SECTION (CASING)

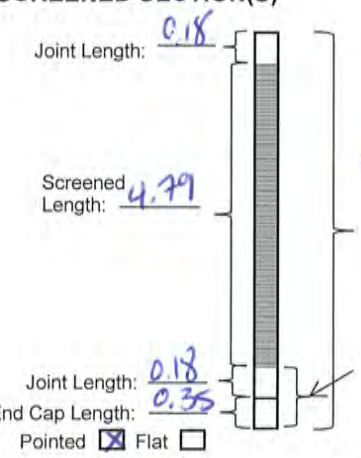
Initial Pipe Length	10
Cuttoff Length	2.08
Add-on Length	—
Total Length	7.92

II. MID SECTION (CASING)

Number of Blank Sections —
Length of Section(s):

Sum of Lengths: —

III. SCREENED SECTION(S)



+
x2
Total Pipe Length: 10.65
=
TOC to BOW: 18.57

IV. WELL DATA

Pipe Type: PVC ☒ SS ☐ Other
Diameter: 2" ☒ 4" ☐ Other
Slot Size: 0.01 ☒ 0.02 ☐ Other
Joint Pin End: Up ☒ Down ☐ Type
threads up

V. BACKFILL

	Depth Below GS Bottom	Top
CEM (No Pipe)		
CEM_PB	1	0
*SLUF_PB/FIL_PB		
BCH_PB	1.9	1
*SLUF_PB/FIL_PB		
BGR_PB		
*SLUF_PB/FIL_PB	4.5	1.9
*SLUF_PS/FIL_PS	14.5	4.5
*SLUF/FIL (No Pipe)		
*SLUF_PB/FIL_PB		

Filter Pack Type or Gradation: prepack and 10/20

VI. MONUMENTS

Stickup ☒ Flushmount ☐

TOM to GS	4.21
TOM to TOC	0.60
^TOC to GS	3.61
Lock type	—

VII. MOISTURE CONTENT

Depth to Water Below GS: 6.5

	Frozen Soil Below GS Bottom	Top
Seasonal 1		
Seasonal 2		
Permafrost 1		
Permafrost 2		

BCH = Bentonite Chips (gINT code)
BGR = Bentonite Grout (gINT code)
bgs = Below Ground Surface
BOS = Bottom of Screen
BOW = Bottom of Well
CEM = Cement (gINT code)
FIL = Sand Pack (gINT code)
GS = Ground Surface
SLUF = Natural Collapse/ Pea Gravel (gINT code)
SS = Stainless Steel
TOC = Top of Casing
TOM = Top of Monument
TOS = Top of Screen
PB = Blank Pipe (gINT code)
PS = Slotted Pipe (gINT code)
* Circle filter-pack type
^ Flushmount = Negative Number
Stickup = Positive Number

VIII. CALCULATIONS BELOW GROUND SURFACE

TOC to BOW	18.57
- BOW to BOS	0.53
= TOC to BOS	18.04
TOC to BOS	18.04
- Screened Length	9.76
= TOC to TOS	8.28

TOC to BOW	18.57
- TOC to GS	3.61
BOW bgs	14.96
TOC to TOS	8.28
- TOC to GS	3.61
TOS bgs	4.67
TOC to BOS	18.04
- TOC to GS	3.61
BOS bgs	14.79

Screen 14.5 - 4.5

WELL DEVELOPMENT LOG

Owner-Client: DOT&PF
Location: Nenana MS
Weather: Sunny
Development Personnel: DHF

Well No.: NE-MW21-4
Project No: 11729-071
Date: 8/18/21

Diameter and Type of Casing: 2" PVC
Total Depth of Well **Before** Development (feet below top of casing): 17.13 + 1.16 = 18.29
Depth to Water **Before** Development (feet below top of casing): 8.75
Depth to Screen Top and Bottom (from Construction Log): Top: 4.6 Bottom: 14.8

Development Details

Feet of water in well: 9.54
Gallons per foot: 0.17
Gallons in well: 1.62
Surge method: Surge block
Pump used: Waterra (inertial pump)
Tubing used (ft): 25

Time pumping started: 1136
Flow rate (gal/min): ~1
Flow-rate measurement method: visual observation
Time pumping ended: 1303
Gallons Pumped: 55
Disposal: GAC

Depth to Water **After** Development (feet below top of casing): 8.75
Total Depth of Well **After** Development (feet below top of casing): 18.30

Observations

Approx. depth	Time	Water Clarity (Visual)
	1130	Surged well
17.5	1136	pump start, very turbid, brown
17.5	1150	less turbid, opaque brown
16.5	1155	Same as above
16.5	1201	almost clear
15.5	1207	almost clear
14	1211	clear
13	1214	clear
12	1216	clear
11	1219	clear

depth	Time	Water Clarity (Visual)
9.5	1231	slightly turbid, light brown
8	1240	Same as above
8	1244	almost clear
17.5	1250	clear
9	1257	almost clear
9	1302	almost clear, slight yellow tint

NOTES: Strong sulfur smell in water

WELL CASING VOLUMES

Diameter of Well [ID-inches]	1¼	2	3	4	6	8
Gallons per lineal foot	0.08	0.17	0.38	0.66	1.5	2.6

SHANNON & WILSON, INC.

SAMPLE COLLECTION LOG

Project Number: 11729-071 Location: Nenana Maintenance Station Page 1 of 1

Date: 8/17/21

Sampler: DHF

Sample Number	Location	Sample Time	Depth Interval (ft) top	Depth Interval (ft) bottom	Matrix Type	Sampling Method	Sample Type	PID Reading	Analyses
FS1	Soil boring SB-1, west from M&O Shop	—	0	2	Soil	Grab	FS	0	—
FS2	↓	—	2	4	↓	↓	↓	0	—
FS3		—	5	7				0	—
NEZI-SB-1	west from M&O Shop, GW interface	1013	5	6.5			ES	0	DRO, RRO, GRO, VOC
NEZI-SB-101	Duplicate of NEZI-SB-1	1003	5	6.5	↓	↓	DUP	0	DRO, RRO, GRO, VOC

Matrix Type

AR	Air
GW	Groundwater
PR	Product
SB	Subsurf. soil
SE	Sediment
SG	Sludge
SS	Surface soil
SW	Surface water
WR	Water

Sampling Method

B	Bailer/Coliwasa
D	Drill cuttings
G	Grab sampling
H	Hand auger
L	Tube liner
P	Pump (liquid)
SS	Split spoon
T	Shelby tube
V	Vacuum (gas)
W	Wipe sampling

Sample Type

ES	Environmental sample
ER	Equipment rinsate
FB	Field blank
FD	Field duplicate
FM	Field measurement
FR	Field replicate
MD	Matrix spike duplicate
MS	Matrix spike duplicate
TB	Trip blank

MONITORING WELL SAMPLING LOG

Owner/Client: DOT&PF
Location: Nenana Maintenance Station
Sampling Personnel: DHF
Weather Conditions: Mostly sunny Air Temp. (°F): 50

Project No.: 11729-071
Date: 8/18/21
Well: NE-MW21-4
Time started: 1345
Time completed: 1420

Sample No.: NE-MW21-4 Time: 1411
Duplicate: — Time: —
Equipment Blank: — Time: —

Pump: Hurricane
Purging Method: *portable / dedicated* pump
Pumping Start: 1354
Purge Rate (gal./min.): 1
Pumping End: 1411

Pump Set Depth Below MP (ft.): 16.5
KuriTec Tubing (ft.): 25
TruPoly Tubing (ft.): —

Diameter and Type of Casing: 2" PVC
Approximate Total Depth of Well Below MP (ft.): —
Measured Total Depth of Well Below MP (ft.): ~~18.75~~ 18.30
Depth to Water Below MP (ft.): 8.75
Depth to Ice (if frozen) Below MP (ft.): —
Feet of Water in Well: 9.55
Gallons per foot: 0.17
Gallons in Well: 1.62
Purge Water Volume (gal.): 15
Purge Water Disposal: GAC

Monument Condition: new
Casing Condition: new
Wiring Condition (dedicated pumps): n/a

Measuring Point (MP): *Top of Casing (TOC)*
Monument type: (*Stickup*) / *Flushmount*
Measurement method: *Rod & level* / (*Tape measure*)

Top-of-casing to monument (ft.): 0.66
Monument to ground surface (ft.): 4.21

Datalogger type: n/a
Datalogger serial #: n/a
Measured cable length (ft.): n/a

☒ Lock present and operational
☒ Well name legible on outside of well
☐ Evidence of frost-jacking: none

Notes

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1¼	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No. NE-MW21-4

MONITORING WELL SAMPLING LOG

Field Parameter Instrument: YSI B Circle one: *Parameters stabilized* or *>3 well volumes purged*

Sample Observations:

Notes: pH taken with pH strips because YSI probe malfunctioned

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1355	5.4	0.83	528	6.0	-503.8	Slightly opaque, light gray
1358	5.0	0.89	532	6.0	-513.8	
1401	4.7	0.90	527	6.0	-524.0	
1404	4.7	0.92	522	6.0	-523.3	
1407	4.7	0.91	518	6.0	-529.3	
1411	Sample					

Laboratory: *SGS*

	Analysis	Sample Containers	Preservatives	Dup
☑	DRO/RRO			☐
☑	GRO/VOC			☐
☐				☐
☐				☐
☐				☐
☐				☐

Well No. NE-MW21-4

MONITORING WELL SAMPLING LOG

Owner/Client: DOT & PF
Location: Nenana Maintenance Station
Sampling Personnel: DHF
Weather Conditions: partly sunny Air Temp. (°F): 50

Project No.: 11729-071
Date: 8/18/21
Well: NE-MW18-3
Time started: 1030
Time completed: 1330

Sample No.: NE-MW18-3 Time: 1327
Duplicate: — Time: —
Equipment Blank: — Time: —

Pump: Hurricane
Purging Method: *portable / dedicated* pump
Pumping Start: 1041/1307
Purge Rate (gal./min.): 1
Pumping End: 1327

Pump Set Depth Below MP (ft.): 8
KuriTec Tubing (ft.): 15
TruPoly Tubing (ft.): —

Diameter and Type of Casing: 2" PVC
Approximate Total Depth of Well Below MP (ft.): —
Measured Total Depth of Well Below MP (ft.): 15.88 + 1.16 = 17.04
Depth to Water Below MP (ft.): 7.44
Depth to Ice (if frozen) Below MP (ft.): —
Feet of Water in Well: 9.6
Gallons per foot: 0.17
Gallons in Well: 1.63
Purge Water Volume (gal.): 15
Purge Water Disposal: GAC

Monument Condition: good
Casing Condition: good
Wiring Condition (dedicated pumps): n/a

Measuring Point (MP): *Top of Casing (TOC)*
Monument type: *Stickup* / *Flushmount*
Measurement method: *Rod & level* / *Tape measure*

Top-of-casing to monument (ft.): 0.64
Monument to ground surface (ft.): 3.20

Datalogger type: n/a
Datalogger serial #: n/a
Measured cable length (ft.): n/a

- ☑ Lock present and operational
- ☑ Well name legible on outside of well
- ☐ Evidence of frost-jacking: none

Notes: Had issues with pH probe readings. Soaked probe in pH 4 solution for 2 hours. probe reading pH 4 at the end but began to drift immediately after beginning to purge well water again. Using pH strip reading instead of probe on YST.

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1¼	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No.
NE-MW18-3

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI B Circle one: *Parameters stabilized* or *>3 well volumes purged*

Sample Observations

Notes pH value steadily climbing, seems like a probe error not a real result. Tried tuning YSI off/on but no change. Not recording PH.

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1042	9.8	2.43	878	8.59	-62.8	clear
1045	9.2	1.53	860	8.86	-146.6	↓
1048	9.1	1.24	849	9.26	-268.4	↓
1053	9.1	1.08	842	10.40	-450.1	↓
1056 ~~1054~~	9.0	1.07	836	—	-522.5	↓
~~1100~~	paused purging to check pH probe					
1307	pump restart					
1309	9.6	1.42	841	7.0	-402.7	clear (pH strip)
1312	9.2	1.14	826	6.5	-438.1	↓
1315	9.1	1.01	818	6.5	-453.5	↓
1318	9.1	0.96	815	6.5	-457.4	↓
1321	9.0	0.95	816	6.5	-456.8	↓
1324	9.0	0.96	816	6.5	-456.4	↓
1327	Sample					

Laboratory *SGS*

	Analysis	Sample Containers	Preservatives	Dup
☑	DRO/ARO			☐
☑	GRO/VOC			☐
☐				☐
☐				☐
☐				☐
☐				☐

Well No. NE-MW18-3

MONITORING WELL SAMPLING LOG

Owner/Client: DOT & PF
Location: Nenana Maintenance Station
Sampling Personnel: DHF
Weather Conditions: overcast Air Temp. (°F): 45

Project No.: 11729-071
Date: 8/18/21
Well: NE-MW18-2
Time started: 910
Time completed: 1030

Sample No.: NE-MW18-2 Time: 1017
Duplicate: — Time: —
Equipment Blank: — Time: —

Pump: Hurricane
Purging Method: portable / dedicated pump
Pumping Start: 934
Purge Rate (gal./min.): ~1
Pumping End: 1025

Pump Set Depth Below MP (ft.): 8.5
KuriTec Tubing (ft.): 14
TruPoly Tubing (ft.): —

Diameter and Type of Casing: 2" PVC
Approximate Total Depth of Well Below MP (ft.): —
Measured Total Depth of Well Below MP (ft.): 15.54 + 1.16 = 17.06
Depth to Water Below MP (ft.): 7.7
Depth to Ice (if frozen) Below MP (ft.): —
Feet of Water in Well: 9.36
Gallons per foot: 0.17
Gallons in Well: 1.6
Purge Water Volume (gal.): 35
Purge Water Disposal: GAC

Monument Condition: good
Casing Condition: good
Wiring Condition (dedicated pumps): n/a

Measuring Point (MP): Top of Casing (TOC)
Monument type: Stickup / Flushmount
Measurement method: Rod & level / Tape measure

Top-of-casing to monument (ft.): 0.65
Monument to ground surface (ft.): 3.38

Datalogger type: n/a
Datalogger serial #: n/a
Measured cable length (ft.): n/a

- ☑ Lock present and operational
- ☑ Well name legible on outside of well
- ☐ Evidence of frost-jacking: none

Notes:

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1¼	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No. NE-MW18-2

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI B Circle one: *Parameters stabilized or >3 well volumes purged*

Sample Observations

Notes

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
0934	7.1	2.51	~~93~~ 872	7.9	-93.7	clear but orange
0937	6.8	1.39	752	8.01	-136.9	" "
0940	6.8	1.15	727	8.04	-148.2	clear w/yellow tint
0943	6.8	0.99	710	8.04	-153.6	
0946	6.7	0.91	688	8.04	-159.2	
0949	6.8	0.95	689	8.03	-153.0	
0952	6.7	0.78	663	8.05	-162.8	
0955	6.7	0.83	656	8.05	-164.4	
0958	6.7	0.80	651	8.06	-168.4	
1001	6.7	0.77	644	8.08	-176.9	
1004	6.7	0.73	640	8.12	-181.3	clear
1007	6.7	0.76	632	8.14	-188.3	
1010	6.6	0.73	615	8.16	-201.8	
1013	6.7	0.73	611	8.20	-209.1	
1016	6.7	0.70	606	8.21	-218.9	
~~1019~~	~~Stopped~~					
1019	6.7	0.69	607	8.19	-224.8	
1022	6.6	0.67	604	8.19	-231.1	
1025	6.6	0.66	600	8.21	-245.8	
Sample						

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
☑	DRO/RRO			☐
☑	VOC/GRO			☐
☐				☐
☐				☐
☐				☐
☐				☐

Well No. NE-MW18-2

MONITORING WELL SAMPLING LOG

Owner/Client: DOT&PF
Location: Nenana Maintenance Station
Sampling Personnel: DAF
Weather Conditions: Sunny Air Temp. (°F): 55

Project No.: 11729-071
Date: 8/18/21
Well: NE-MW17-1
Time started: 1430
Time completed: 1545

Sample No.: NE-MW17-1 Time: 1517
Duplicate: NE-MW17-101 Time: 1507
Equipment Blank: — Time: —

Pump: Hurricane
Purging Method: (portable) / dedicated pump
Pumping Start: 1448
Purge Rate (gal./min.): 1
Pumping End: 1517

Pump Set Depth Below MP (ft.): 6
KuriTec Tubing (ft.): 15
TruPoly Tubing (ft.): —

Diameter and Type of Casing: 2" PVC
Approximate Total Depth of Well Below MP (ft.): —
Measured Total Depth of Well Below MP (ft.): 12.83 + 1.16 = 13.99
Depth to Water Below MP (ft.): 4.88
Depth to Ice (if frozen) Below MP (ft.): —
Feet of Water in Well: 9.11
Gallons per foot: 0.17
Gallons in Well: 1.55
Purge Water Volume (gal.): 18
Purge Water Disposal: GAC

Monument Condition: good

Casing Condition: good

Wiring Condition (dedicated pumps): n/a

Measuring Point (MP): Top of Casing (TOC)

Monument type: Stickup / (Flushmount)
Measurement method: Rod & level / (Tape measure)

Top-of-casing to monument (ft.): 0.48
Monument to ground surface (ft.): 0

Datalogger type: n/a
Datalogger serial #: n/a
Measured cable length (ft.): n/a

- ☐ Lock present and operational n/a
- ☑ Well name legible on outside of well
- ☐ Evidence of frost-jacking none

Notes

WELL CASING VOLUMES

Diameter of Well [ID-inches]	CMT	1¼	2	3	4	6	8
Gallons per lineal foot	0.000253	0.08	0.17	0.38	0.66	1.5	2.6

Well No. NE-MW17-1

MONITORING WELL SAMPLING LOG

Field Parameter Instrument YSI B Circle one: *Parameters stabilized or >3 well volumes purged*

Sample Observations

Notes pH with pH strips because YSI probe malfunction

FIELD PARAMETERS [stabilization criteria]

Time	Temp. (°C) [± 3%]	Dissolved Oxygen (mg/L) [±10%]	Conductivity (µS/cm) [± 3%]	pH [± 0.1]	ORP (mV) [± 10 mV]	Water Clarity (visual)
1450	8.4	3.90	809	6.0	-518.7	Clear, orange tint
1453	7.2	1.80	744	6.0	-550.8	↓
1456	7.2	1.03	702	6.0	-572.7	Clear
1459	7.0	0.62	673	6.0	-591.8	↓
~~1503~~	6.9	0.47	630	6.0	-603.2	
1506	6.9	0.44	621	6.0	-605.1	
1509	6.9	0.41	610	6.0	-611.6	
1512	6.8	0.39	603	6.0	-612.9	
~~1514~~	~~Sample~~					
1515	6.8	0.37	600		-612.5	↓
1517	Sample					

Laboratory SGS

	Analysis	Sample Containers	Preservatives	Dup
☑	DRO/RRO			☑
☑	GRO/VOC			☑
☐				☐
☐				☐
☐				☐
☐				☐

Well No. NE-MW17-1

IMPORTANT INFORMATION

Important Information

About Your Environmental Report

IMPORTANT INFORMATION

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between

IMPORTANT INFORMATION

materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

IMPORTANT INFORMATION

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland